

С. А. ШАНШИЕВА

АНГЛИЙСКИЙ ЯЗЫК ДЛЯ МАТЕМАТИКОВ

(интенсивный курс для начинающих)

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(зав. кафедрой кандидат педагогических наук *Г. И. Славина*),
кандидат филологических наук *Л. С. Каменская*

Шаншиева С. А.

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Учебник (1-е изд. — 1976 г.) представляет собой переработанный с учетом более чем десятилетнего опыта работы вариант комплексного курса английского языка для студентов и аспирантов математических специальностей, начинающих изучение английского языка в вузе или продолжающих его изучение после перерыва в занятиях. Работа с учебником позволяет достичь уровня владения английским языком, способного обеспечить практическое использование его в профессиональной деятельности.

Для студентов математических специальностей университетов, институтов, а также всех изучающих язык самостоятельно.

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Настоящий учебник представляет собой комплексный, интенсивный курс английского языка, предназначенный для студентов и аспирантов математических специальностей, начинающих изучение языка.

Цель учебника — выработать у обучаемых навыки и умения, необходимые для практического использования английского языка в профессиональной деятельности.

Интенсификация обучения достигается путем ограничения изучаемого языка подязыком математики (исключение составляют первые 10 уроков); отбора минимального объема лексики и грамматики, необходимого для чтения математической литературы и овладения устной речью; параллельного и взаимосвязанного обучения устной и письменной речи на одном и том же языковом и учебном материале.

Интенсификации способствует и соответствующая организация учебного материала и действий с ним обучаемых в системе занятий.

При составлении учебника автор исходил из того, что он призван обеспечить как учащихся, так и преподавателя учебным и справочным материалом, необходимым и достаточным для реализации целей обучения.

Учебник состоит из 26 уроков; раздела для преподавателя, содержащего дополнительный материал для развития умений аудирования и говорения; грамматического справочника; англо-русского словаря, отражающего лексический состав текстов и упражнений учебника. Каждый урок содержит учебный материал — тексты и упражнения для работы в аудитории, дома и в ЛУРе.

В грамматическом справочнике кратко изложены сведения об основных явлениях грамматики и явлениях, типичных для языка английской научной прозы.

Англо-русский словарь содержит 2000 лексических единиц, полностью отражает лексический состав текстов учебника и представляет собой минимум лексики, подлежащей усвоению.

Структура каждого урока (взаиморасположение в нем аудиторных, домашних и лабораторных занятий) и распределение учебного материала — текстов и упражнений — отражают попытку направить и организовать всю учебную деятельность обучаемого и обучающего, и позволяют наметить своего рода программу формирования требуемых навыков и умений в различных видах речевой деятельности.

Необходимо подчеркнуть, что успешное обучение по данному учебнику возможно лишь при неукоснительном соблюдении предлагаемой автором последовательности выполнения всех учебных операций и действий с материалом. Важно при этом иметь в виду, что занятия в ЛУРе рассматриваются не как дополнительный, а как обязательный, неотъемлемый компонент системы занятий. Сказанное не исключает, разумеется, возможности творческого подхода со стороны преподавателя, ведущего занятия.

В настоящее издание внесены некоторые принципиальные структурные изменения, даны новые тексты и виды упражнений. Учебный материал дополнен текстами хрестоматийного характера, предназначенными для домашнего чтения. (Тексты последовательно предлагаются после каждого двух уроков, начиная с 12-го.)

Курс — 26 уроков — ориентировочно рассчитан на 3 семестра при сетке 4 часа в неделю: I семестр — 10 уроков, II и III семестры по 8 уроков. При этом на каждый урок должно отводиться 4 часа аудиторной работы, примерно такое же количество часов домашней работы и 1—2 часа работы в ЛУРе.

ЧАСТЬ I

УРОК I

Аудиторное занятие I Английский алфавит и знаки транскрипции

Печат- ные буквы	Написание букв	Название букв	Печат- ные буквы	Написание букв	Название букв
A a	<i>A a</i>	[ei]	N n	<i>N n</i>	[en]
B b	<i>B b</i>	[bi:]	O o	<i>O o</i>	[ou]
C c	<i>C c</i>	[si:]	P p	<i>P p</i>	[pi:]
D d	<i>D d</i>	[di:]	Q q	<i>Q q</i>	[kju:]
E e	<i>E e</i>	[i:]	R r	<i>R r</i>	[a:]
F f	<i>F f</i>	[ef]	S s	<i>S s</i>	[es]
G g	<i>G g</i>	[dʒi:]	T t	<i>T t</i>	[ti:]
H h	<i>H h</i>	[eitʃ]	U u	<i>U u</i>	[ju:]
I i	<i>I i</i>	[ai]	V v	<i>V v</i>	[vi:]
J j	<i>J j</i>	[dʒei]	W w	<i>W w</i>	[ˈdʌb ju:]
K k	<i>K k</i>	[kei]	X x	<i>X x</i>	[eks]
L l	<i>L l</i>	[el]	Y y	<i>Y y</i>	[wai]
M m	<i>M m</i>	[em]	Z z	<i>Z z</i>	[zed]

Буквы, звуки, правила чтения

	Гласные	Согласные	Буквосочетания
Буквы	<i>e, a, i, y</i>	<i>b, c, d, f, g, h, k l, m, n, p, r, s, t, v, w, z</i>	<i>sh, ch, tch, th, ck</i>
Звуки	[i:, e, ei æ, ə, ai, i, j]	[b, s, k, t, g, f, l, d, h, m, p, r, t, n, v, w, z]	[ʃ, tʃ, θ, ð, k]

Правила чтения букв и буквосочетаний				Упражнения
Буквы	Звуки	Примеры	Примечания	Прочитайте вслед за преподавателем
Ее	[i:]	me, be, eve, seem	в открытом слогe	leg, me, mete, melt, see, tell, be, fee, we, best, he, hen, Pete, kettle, well, rent, mess, let, send, set, we, men, bend, meet
	[e]	met, sell, settle	в закрытом слогe	
Аа	[ei]	aie, take, table	в открытом и условно-открытом слогах; перед согласной +le	tale, at, lab, 'fable, 'batt- le, 'data, as'sist, 'beta, affect, ape, date, fame, lamp, lass, same, and stable, bat, bade, lad, 'delta, sad, flame, fat, male, mass
	[æ]	hat, rattle	в закрытом слогe	
	[ə]	'data	в безударном положении	
Ии	[ai]	nine, tie, bible, kind, mild	в открытом и условно-открытом слогах; перед согласной +le; перед ld, nd	find, line, mind, fit, him, ride, lie, 'little, win, bit, bite, 'kitten, kite, kid, hit, 'giggle, till, 'idle, slide, win, 'bible, wist, die, mint, mind
	[i]	miss, middle, did	в закрытом слогe	
Уу	[ai]	my, type, try	в открытом и условно-открытом слогах	by, dry, tyke, style, 'dan- dy, yet, 'baby, 'symmetry, 'fifty, yes, 'silly, glyde, 'pity, 'lazy, dye, 'daddy, 'entity
	[i]	system, lady	в закрытом слогe и в безударном положении на конце слова	
	[j]	yet, yell	в начале слова	

Правила чтения букв и буквосочетаний				Упражнения
Буквы	Звуки	Примеры	Примечания	Прочитайте вслед за преподавателем
Cc	[s]	cent, cite, fancy, race	перед e, i, y	cab, can, space, crest, black, scent, cent, 'cycle, 'cable, cake, neck, ice, 'pencil, cyne, 'cattle, stick, nice, scant, sick, 'cyclist, 'icy
	[k]	cable, back clad	в остальных случаях	
Gg	[dʒ]	gent, age gym, gipsy	перед e, i, y	page, leg, cage, gym, stage, big, get, wage, give, gin, pale, grave, be'gin, grim, bag, gem, 'gently
	[g]	glad, lag, gap	в остальных случаях и в словах give, get, begin	
Ch	[tʃ]	chess, chest, satch	Но: [ʃ] machine; 'chemist, mechanics [k]	chime, lynch, inch, catch, ma'chine [ʃ], match, chat, change, inch, chin, French, 'chemist [k], school [k], me'chanics [k]
Sh	[ʃ]	fish, shelf		shame, sham, fresh, shy, she, wish, 'shabby, fish, shade, flash
Th	[ð]	this, then, bathe	в служебных словах и между двумя гласными	thick, tenth, this, that, depth, three, bathe, these, thin, thick, theft, thank, theme, with, w'i'thin, the
	[θ]	thank, fifth	в остальных случаях	

Слова урока

Прочитайте вслед за преподавателем данные интернациональные слова и назовите их русские эквиваленты.

plan n, v, effect [i'fekt] n, v, ellipse [i'lips] n, lamp n, fact n, test n, v, idea [ai'diə] n, 'planet n, film n, face n, v.

Прочитайте вслед за преподавателем следующие слова.

change [tʃeɪndʒ] n изменение, перемена; v изменять, менять

age [eɪdʒ] 1. возраст; 2. век, период

shape [ʃeɪp] n форма; v придавать форму

page [peɪdʒ] страница

this [ðɪs] этот, эта

these [ði:z] эти

pen ручка, перо

pencil [pensl] карандаш

place n место; v размещать, помещать

side сторона
length [leŋθ] длина
help *n* помощь; *v* помогать
and и
time 1. время; 2. раз
same тот же самый
best лучший
child [tʃaɪld] ребенок
children [ˈtʃɪldrən] дети
man (мн. men) 1. человек;
2. мужчина
table 1. стол; 2. таблица
big большой
bag сумка, портфель
hand *n* рука; *v* вручать
little мало, маленький

red красный
name *n* имя; *v* называть
thin худой, тонкий
nice милый, приятный
size размер
wide широкий
width [waɪð] ширина
fine 1. прекрасный;
2. тонкий
map карта
set *n* множество, набор; *v* ус-
танавливать
data [ˈdeɪtə] (мн.) данные;
datum (ед.)
type [taɪp] *n* тип, вид; *v* пе-
чатать

Грамматика:
Существительное. Понятие об артикле. Местоимение.
Прилагательное.

I. Прочитайте вслед за преподавателем. Обратите внимание на интонацию и ударение.

a big lamp	the best test	a nice little child
a red pen	the same effect	a little red lamp
a simple plan	the thin film	a big nice man
a nice place	the best idea	a nice simple name
	the same fine set	
	the little black table	
	the same best place	
	the same simple fact	

II. Прочитайте вслед за преподавателем. а) Обратите внимание на произношение указательных местоимений и окончаний множественного числа.

this plan — these plans	this fact — these facts
this idea — these ideas	this lamp — these lamps
this table — these tables	this type — these types
this size — these sizes	
this page — these pages	
this change — these changes	

б) Обратите внимание на отсутствие неопределенного артикля перед существительным во множественном числе.

a thin hand — thin hands
a big man — big men
a little child — little children
a nice face — nice faces

a red planet — red planets
 the same length — the same lengths
 the best map — the best maps

III. Сравните данные группы слов. Обратите внимание на два способа выражения понятия принадлежности.

the child's name	— the name of the child
the man's help	— the help of the man
the ellipse's change	— the change of the ellipse
the test's effect	— the effect of the test
the planet's size	— the size of the planet
the pens' length	— the length of the pens
the films' width	— the width of the films

и.

Лабораторное занятие I

IV. Повторите вслед за диктором.

- [i:] — me, be, mete, eve, scene, these, fee, theme, Pete, she, deed, feel;
 [e] — fetch, chest, shed, sent, cent, scent, edge, fence, wet, led, well;
 [ei] — bade, cable, race, lace, wage, late, 'data, shape, able, stage;
 [æ] — sham, rat, 'rattle, as, shall, mass, yam, 'battle, catch, at;
 [ə] — 'data, 'delta, 'beta, a'mid, a'side, a'wake, ad'vise, 'biss;
 [ai] — wide, rise, rice, kind, find, wise, ice, dine, 'idle, child;
 [i] — wit, did, kill, him, miss, think, thrift, fifth, thick;
 [ai] — dry, type, style, 'cycle, dye, cry, by, glyde, tyke;
 [i] — 'icy, gym, crypt, 'baby, 'lady, myth, 'sherry, 'merry, 'marry;
 [j] — yet, yes, yen, yelk, yell, yoke;
 [s] — mice, scene, cats, ster 'cent', sent, cent, dress, fence, mass;
 [z] — his, has, rise, pens, lags, dies, tables, these;
 [k] — cat, black, act, catch, cry, 'cycle, pack, back, crest, 'accent;
 [dʒ] — edge, fledge, age, bridge, 'gently, badge, gym, gin, change;
 [g] — leg, grave, get, give, be'gin, 'English, grind, glad, fog;
 [ə] — theft, tenth, fifth, thin, depth, myth, three, thank;
 [ð] — the, this, these, bathe, them, then, with, wi'thin;
 [ʃ] — fish, she, shake, wish, fresh, shame, sham, flash, shine;
 [tʃ] — inch, lynch, chime, chase, chest, child, ditch, catch.

V. а) Повторите вслед за диктором группы слов.

[s—ə]	[z—ð]	[ð—ə]
sin—thin	wise—with	this—myth
sink—think	zip—this	that—depth
sick—thick	zed—then	with—math
miss—Smith	rise—rhythm	that—theft

б) Прослушайте и повторите данные пары слов.

[i:—i]	[i—e]	[æ—e]	[ai—ei]	[t—d]
he—hit	till—tell	land—lend	site—same	bit—bid

be—bit	miss—mess	man—men	rice—race	bet—bed
see—sit	pin—pen	and—end	wide—wade	hit—hid
Pete—pit	lid—led	sat—set	wine—wane	hat—had

[k—g]	[s—z]	[w—v]	[f—v]
back—bag	rice—rise	wine—vine	fine—vine
lack—lag	caps—cabs	went—vent	fan—van
Dick—dig	backs—bags	wise—vice	life—dive
pick—pig	hence—hens	west—vest	safe—save

в) *Повторите вслед за диктором. Обратите внимание на произношение окончаний множественного числа существительных.*

[z] — pencils, plans, sides, times, tables, ideas, hands;

[s] — sets, maps, types, facts, lengths, thanks;

[iz] — places, dresses, sizes, dishes, changes, fishes, pages, catches.

VI. *Прослушайте и повторите слова урока.*

VII. *Прослушайте и повторите упр. I, II, III.*

Домашнее занятие I

VIII. *Напишите во множественном числе данные группы слов.*

a) a thin pencil, a fine test, a nice place, a simple shape, a big ellipse, a nice child, a little hand, a red planet, a simple fact, a black bag, a big map, a nice set;

b) the best size, the same red planet, the thin film, the best age, the same shape, the wide side, the same set, the little red lamp, the same age, the thin red pen, the best type, the same changes.

IX. *Измените данные выражения по образцу.*

Sp.: The name of this man.

St.: This man's name.

a) the length of the test, the width of the side, the map of this planet, the type of the ellipse, the width of the films, the hand of the child, the faces of these children, the shape of these planets, the name of the planet.

Sp.: This man's table.

St.: The table of this man.

b) the child's age, the test's effect, these children's plans, the map's width, the planets' sizes, the man's name, the pen's length, the sets' size, the tables' width.

Аудиторное занятие II

X. *Прочитайте последовательно вслух слова со звуками:*

[k], [s] — fact, nice, check, scene, cent, cat, place, scent, black, same, cell, pencil, cable, site, effect, face, black, scant, crest;

[g], [dʒ] — age, glad, change, big, get, page, bridge, give, range, game, angle, grind, gym, gate, gin, cage;

[i:], [i], [e] — let, till, he, these, best, well, will, thin, we, west, scent, bee, bet, bid, these, this, me, met, mete, 'daddy, gym, seed, length, bit, egg, edge, meet, hid, Pete, cent, wet, then, theft, baby;

[ei], [ai] и [i] — type, tape, by, hid, hide, mile, a'biss, male, mill, mile, mist, ale, time, name, side, thin, same, sine, 'table, 'title, tittle, 'little, 'icy, wide, plane, pile, child, face, fine, age, simple, place, 'lady, dye, 'fifty, 'data, date, size;

[tʃ], [ʃ] — child, she, chest, chess, shelf, witch, wish, catch, cash, fresh, shade, chick, shift, chin, shine, chime, 'China.

XI. Прочитайте последовательно существительные, данные во множественном числе, сначала с окончанием [s], затем [z] и [iz].

plans, pages, classes, names, lamps, ideas, places, planets, films, facts, pens, pencils, sides, tests, lengths, ellipses, times, ages, hands, hats, sets, faces, planes, bags, backs, sizes, changes, wishes, patches.

XII. Выслушайте преподавателя и дайте русский эквивалент услышанного (см. раздел для преподавателя).

XIII. Выслушайте преподавателя и измените сказанное им по образцу.

a) T.: The film's length.
St.: The length of the film.

b) T.: The width of the side.
St.: The side's width.

XIV. Скажите услышанное во множественном числе (работайте в паре).

a little red planet, a nice face, a thin black pen, a nice set of pencils, a thin film, a big child, a big idea, a simple fact, a fine place, a red pencil;

the same idea, the best type, the same size, the same page, the best shape, the simple name, the little thin hand, the same side;

this big black bag, this nice little child, this fine map, this big change, this simple test.

Лабораторное занятие II

XV. Прослушайте и повторите.

theft—thrill

myth—math

thick—thrift

fifth—tenth

think—thank

depth—width

this—with this—is this

them—with them—is then

that—with that—is that

XVI. Прочитайте данные слова и сравните ваше чтение с последующим чтением их диктором. Повторите правильный вариант.

it, take, did, mill, fat, mile, pipe, cage, ride, dry, bind, them, lest, bat, bade, wise, stage, brave, 'rifle, rise, wise, wave, crime, hat, hate, thin, plate, fly, 'dandy, mind, with, mild, with'in, cable, Swede, sky, shy, edge, egg, blame, meet, mete, met, file, little, thy, 'cattle, 'cable, length, 'idle, width, idea, think, 'tittle, 'title, 'riddle, mild, 'able, as, bathe, is, these, its, send, sand, 'settle, see, seem.

XVII. Повторяйте вслед за диктором группы слов. Обратите внимание на ритм.

the man and the child, a pen and a pencil, the test and the data, the length and the width, the size and the shape, the time and the place, the hand and the face;

this little red lamp, this thin black pencil, this big black bag, this little nice child, this big fine man.

XVIII. Измените по образцу.

Sp.: The man's hand.

St.: The hand of the man.

the film's idea, the man's child, the children's plan, these planets' sizes, the man's face, the children's help, these pencils' length.

Sp.: The shape of the table.

St.: The table's shape.

the time of the test, the change of the plan, the size of the page, the face of the child, the shape of the hand, the place of the map, the effect of these tests, the age of the planet.

Домашнее занятие II

XIX. Выпишите последовательно слова со звуками:

[e], [æ], [i:], [i] — plan, length, thin, stiff, lag, rat, shell, fit, fan, eve, me, gym, mete, mad, miss, children, ass, sit, at, neck, black, cell, gin, get, give, glad, icy, need, Pete, see;

[k], [s], [z] — cite, size, scent, 'cable, lick, bags, these, fence, lack, clad, cent, face, shapes, since, cynk, mice, rise, click, wise, place, hands, maps, tips;

[dʒ], [g] — age, gent, glad, dig, range, wage, give, gin, egg, edge, wig, badge, bag, get, gem, stage, change, 'gentle, gave;

[ei], [ai], [i] — 'cycle, 'bible, 'lable, ate, mate, 'title, 'tittle, 'brittle, 'able, ice, male, mite, 'rifle, 'riddle, mild, 'middle, mist, mice.

XX. Напишите по-английски.

а) небольшой черный портфель; простое милое имя; широкая красная пленка; небольшая помощь; приятное время; тонкая рука; простой факт;

б) тот же самый размер; те же изменения; лучшие данные; лучшие страницы; та же самая страница; та же длина; то же множество;

в) изменение этого плана; размер этих карт; форма этого большого стола; возраст этой планеты; помощь этого человека; лица этих детей; набор карандашей и ручек; данные этих тестов; место стола; набор фактов; имена этих детей; размер и форма эллипса; типы и размеры планет.

Аудиторное занятие III

XXI. Прочитайте контрольное упражнение.

else, swim, hidden, able, mice, pipe, list, hell, mete, mate, mat, we, wet, made, vane, fine, fate, fat, tab, tackle, five, wide, fame, frick, risk, rise, wise, west, wist, them, web, bells, chime, shine, ship, pitch, pike, kite, hill, catch, chest, dyne, pygmy, gym, with, thin, these, then, tyke, sell, mass, sat, sad, set, scent, cent, scan, lynch, yet, mystic, by, try, trifle, stifle, tittle, stable, stipple, edge, egg, gentle, gladly, glimps, bathe, fifth, with, snatch, china, match, ass, apple, idle, crash, sham, shame, theme, prime, prim, cattle, wet, dive, vend, legs, spend, spent.

XXII. Прочитайте вслух данные слова, сравните количество букв и звуков в каждом слове.

change, effect, width, child, age, these, little, face, page, shape, idea, table, icy, face, scent, ellipse, dye, lazy, seem, child, black, red, pencil, place.

XXIII. Скажите по-английски.

а) имя этого человека; форма руки ребенка; воздействие этих фактов; лампы этого типа; идея этого текста; изменение эллипса; лица детей; изменение планов; время перемен; ширина и длина этих страниц; эти тексты; набор карандашей и ручек; размер карты; место этого стола; возраст ребенка;

б) красивое имя; простой тест; широкая пленка; то же время; тот же размер и форма; маленькие дети; лучшее место; та же сторона; тот же вид (тип) множеств; лучший вид помощи; те же идеи и факты; лучшие страницы.

УРОК 2

Аудиторное занятие I

Буквы, звуки, правила чтения

	Гласные	Буквосочетания	
		гласных и согласных	согласных
Буквы	o, u	ar, or, ir, er, ur	ng, nk
Звуки	[ɔ], [ou], [ju:], [u:]	[a:], [ɜ:], [ə:]	[ŋ], [ŋk]

Правила чтения букв и буквосочетаний				Упражнения
Буквы	Звуки	Примеры	Примечания	Прочитайте вслед за преподавателем
Oo	[ou]	so, bone, noble	в открытом и условно-открытом слоге; перед <i>ld</i> ; перед согласной + <i>te</i>	rope, 'bottle, got, done, love, note, home, so, hop, off, cold, no, tone, old, some, 'noble, son, cost, hope, rode, go, hold, month, cot, lost, come
	[ɔ]	hot, log	в закрытом слоге	
	[ʌ]	some, love, brother	перед <i>m, n, v, th</i> в ударном слоге	
Uu	[ju:]	huge, tune	в открытом и условно-открытом слоге	use, us, 'tunic, 'tunnel, 'union, up, fuse, huge, true, due, fuss, 'duty, 'student, rude, 'music, 'pupil, mule, tub, cute, tune, brute, flute, cup, must, jury
	[ʌ]	but, bug	в закрытом слоге	
	[u:]	rule, blue	в открытом и условно-открытом слоге после <i>l, r, /</i>	
ar	[a:]	arm, car		farm, card, sharp, charm, march, mark, arm, harsh, part, hard, harm
or	[ɔ:]	or, corn		fork, borne, lord, north, 'orbit, cord, horse, form, port
er ir ur	[ə:]	term firm turn		her, dirt, first, nerve, fir, burn, urn, 'mercy, 'circle, hurt, germ, thirst, third, fur, firm, serve, nurse, stir, curve, burst, verse
ng	[ŋ]	long, ring	в конце слова	spring, bang, sink, strong, lung, rang, brink, sing, English, drink, ring, thank, thing, bank, tank
	[ŋg]	angle	в середине слова	
nk	[ŋk]	ink, brink		

Слова урока

Прочитайте данные интернациональные слова и назовите их русские эквиваленты.

stop *n, v*, student ['stju:dənt] *n*, method ['meəəd] *n*, result [ri'zəlt] *n, v*, college ['kɒlɪdʒ] *n*, problem ['prɒbləm] *n*, meeting. ['mi:tiŋ] *n*.

Прочитайте вслѣд за преподавателем следующие слова.

hold [hould] (held [held]) зѣ-
держать
make [meik] (made) 1. делать;
2. заставлять
cut [kat] (cut) *в* резать, пере-
секать; *п* разрез
give [giv] (gave [geiv], given
[ˈgivn]) давать
show [ʃou] (shown *p.p.*) [ʃoun]
в показывать; *п* представ-
ление
go [gou] (went, gone [ɡɒn])
идти
study [ˈstʌdi] *п* занятие, ис-
следование; *в* изучать,
учиться
find [faɪnd] (found) [faʊnd]
находить
note [nəʊt] *п* записка, замеча-
ние; *в* замечать
send (sent) посылать
try [traɪ] пытаться, пробовать,
испытывать

family [ˈfæmili] семья
take [teɪk] (took [tuk], taken
[ˈteɪkən]) брать, взять
short [ʃɔ:t] короткий
open [ˈoʊpən] *в* открывать; *adj*
открытый
long [lɒŋ] длинный
girl [ɡɜ:l] девушка, девочка
boy [bɔɪ] юноша, мальчик
home [haʊm] дом
close [klaʊz] *в* закрывать, за-
мыкать; [klaʊs] *adj* близ-
кий, закрытый
please [pli:z] пожалуйста
to [tə] 1. предлог направления;
2. частица-признак инфини-
тива глагола
be [bi:] (was [wɒz], were [wə:],
been [bi:n]) быть
old [əʊld] старый
come [kʌm] (came, come) при-
ходить

Грамматика:

Местоимения личные, притяжательные и указательные (that, those)

Глагол. Повелительное наклонение

Личные местоимения

Число	Именительный падеж	Объектный падеж
Единственное	I — я you — вы (ты) she — она he — он it — оно, он, она (для неодушевл. предметов)	me — меня, мне you — вас, вам (тебя, тебе) her — ее, ей him — его, ему it — переводится в зависимости от ро- да предметов
Множественное	we — мы you — вы they — они (для одушевл. и для неодушевл. предметов)	us — нас, нам you — вас, вам them — их, им

Притяжательные местоимения

Личные местоимения	Притяжательные местоимения
I she he it we you they	my — мой her — ее his — его its — ее, его our — наш your — ваш their — их

I. Прочитайте вслед за преподавателем, имитируя интонацию и ритм.

- a) this fact—these facts that result—those results
 this place—these places that method—those methods
 this idea—these ideas that problem—those problems
 this hand—these hands that boy—those boys
- b) Help the child. Help him. Make these changes. Make them.
 Name the man. Name him. Try those methods. Try them.
 Find the page. Find it. Send these data. Send them.
 Change the plan. Change it. Stop the girl. Stop her.
 Hold that lamp. Hold it. Open that bag. Open it.
- c) Try to find it. Try to open it. Try to study it.
 Try to stop it. Try to face it. Try to change it.
 Try to take it. Try to hold it. Try to make it.
- d) Hold my map. Study his plan. Take her pencil.
 Change its name. Open your bag. Find their plan.
 Try our idea.
- e) Give me my pencil. Show him his place. Give her her plan.
 Show them their data. Give us our place.
- f) Do not (don't) change the test. Do not (don't) send the child.
 Don't take the note. Don't change the shape. Don't stop the boy. Don't be long.
- g) Let him open the note. Let her study those data. Let me show you our method. Let them go to college. Let us study these problems. Let her go home.
- h) Do not (don't) let her change it. Do not (don't) let them go.
 Don't let him try it. Don't let us send it. Don't let her stop them.

II. Прочитайте вслед за преподавателем. Обратите внимание на перемещение прямого и косвенного дополнений.

Show us your method.	— Show your method to us.
Give them that map.	— Give that map to them.
Show him your result.	— Show your result to him.
Send her that note.	— Send that note to her.

Лабораторное занятие I

III. Прослушайте и повторите вслед за диктором.

- [ou] — lone, bold, so, smoke, noble, vote, so, code, globe, yoke, bone;
 [ɔ] — rod, cross, not, mock, moth, boss, log, hot, block, dodge, bottle;
 [ʌ] — love, none, ton, above, front, come, money, son, some, among;
 [ju:] — mule, 'student, huge, dune, duel, use, tune, due;
 [ʌ] — up, bus, tub, plus, cut, shut, thus, but;
 [u:] — blue, clue, truce, rule, brute, flute, blues, crude;
 [a:] — farm, start, charm, car, art, hard, card, part, arm, alarm;
 [ɔ:] — fort, nor, fork, North, forth, born, orbit, normal;
 [ə:] — ferm, fur, dirt, turn, term, curl, germ, urge, purse, nerve;
 [ŋ] — song, bring, long, sing, ring, wing, string, strong, sang, fang;
 [ŋk] — ink, link, bank, sink, think, thank, blank.

IV. Прослушайте и повторите группы слов, сопоставляя звуки.

[ɔ—ou]	[ɔ—ɔ:]	[e—ə:]
rob—rope	hot—hord	ten—term
not—note	cot—cort	det—dirt
hop—hope	pot—port	bent—burnt
dot—dote	sot—sort	get—girl
[ʌ—a:]	[ŋ—ŋk]	[ʌ—ju:]
hut—hart	thing—think	cub—cube
cut—cart	bring—brink	cut—cute
bud—bard	rang—rank	us—use
bug—bargе	ring—rink	hug—huge
[ɔ—ɔ:—ou]	[n—ŋ—ŋk]	[ou—ɔ—ʌ]
not—North—note	sin—sing—sink	tone—top—ton
lot—lord—lone	pin—ping—pink	sole—sob—some
clock—cork—cone	win—wing—wink	code—cod—come
cod—cord—code	ran—rang—rank	lone—lod—love

V. Прослушайте слова и повторите их. Обратите внимание на произношение окончаний множественного числа.

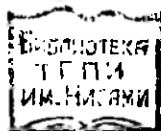
stops, facts, students, results, notes; problems, methods, hands, girls, homes, boys; colleges, changes, places, ellipses, pages, studies, families.

VI. Повторите вслед за диктором слова урока.

VII. Повторите вслед за диктором.

- a) this note—these notes that result—those results
 this study—these studies that boy—those boys
 this college—these colleges that problem—those problems
 this method—these methods that family—those families
 b) Stop him. Find her. Take them. Send it. Help us.
 c) Plan these tests. Take these data. Open those notes. Study these methods. Close those bags. Send these data. Study these results. Hold these meetings.

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d) Try to send it. Try to help them. Try to find her. Try to study them. Try to close it.

e) Help me to hold it. Help them to study it. Help her to make it. Help him to open it. Help us to find him.

f) Give me my pen. Give her her notes. Show him his film. Give us our data. Show them their place.

g) Don't hold this meeting. Don't open the bag. Don't show them the note.

h) Let me change the method. Let him go to college. Let us take the boy home. Let them stop the meeting. Let her change the time. Let us find the place.

i) Don't let them change the width. Don't let us stop the man. Don't let him study these results. Don't let her take the pen.

VIII. *Повторите вслед за диктором. Обратите внимание на место в предложении прямого и косвенного дополнений.*

Show me your results.

— Show your results to me.

Give them our data.

— Give our data to them.

Send her his note.

— Send his note to her.

Домашнее занятие I

IX. *Заполните пропуски соответствующими притяжательными местоимениями.*

Give me ... pen.

Give *me* *my* pen.

Show him ... place. Send her ... film. Give them ... data. Show me ... note. Show him ... result. Give her ... plan. Send us ... map. Hand her ... note.

X. *Измените данные предложения по образцу.*

Give *him* this long pencil.

Give this long pencil *to* him.

a) Show *them* our old plan. Give *him* your best pencils. Send *us* his best film. Hand *them* the result of the test.

Show that old map *to me*.

Show *me* that old map.

b) Show the same set of maps *to him*. Hand your homework *to the teacher*. Give the best place *to the child*. Send the thin film *to them*.

XI. *Измените данные предложения по образцу.*

Hold it.

Don't hold it.

Make it. Open it. Close it. Find it. Stop it. Try it. Send it. Test it. Type it. Name it. Show it. Plan it. Change it.

Аудиторное занятие II

XII. Прочитайте последовательно слова со звуками:

[ŋ], [ŋk], [ŋg] — link, 'single, bang, 'English, 'angle, drink, ring, 'England, blank, think, thing;

[ou], [ɔ], [ʌ] — some, sole, sob, come, lock, 'noble, love, hop, hope, a'bove, a'long, son, hold, 'open;

[ju:], [ʌ], [u:] — blue, tube, rule, true, but, tub, fume, fuss, fuse, us, use, 'tulip, cut, cute;

[a:], [ɔ:], [ə:] — far, for, form, torn, turn, burn, art, corn, hurt, myrrh, card, term, first, firm, chord.

XIII. Прочитайте вслух данные предложения, дайте русский эквивалент и сделайте обратный перевод (работайте в паре).

Open the map. Face these facts. Make a long cut. Find the length and the width. Hand him the note.

Don't send the child home. Don't send them your results. Don't change the size. Don't try their method. Don't close the box.

Study the student's result. Show me the girl's place. Find the size of the box. Take this set of maps.

Don't let them take the boy's side. Don't let her give them this set of long pencils. Don't let him send the children home. Don't let them study that old method. Don't let him stop the test.

1. Try to test it. Let me try to test it. 2. Try to find him. Let me try to find him. 3. Try to face these facts. Let him try to face these facts. 4. Try to change it. Let us try to change it. 5. Try to study the problem. Let her try to study the problem.

1. The size of this page. Its size. 2. The change of the length. Its change. 3. The name of the place. Its name. 4. The result of their study. Its result. 5. The age of the child. Its age.

XIV. Попросите вашего соседа по парте выполнить просьбу преподавателя.

T.: Let Nick open the bag.

St.: Nick, open the bag, please.

T.: Don't let Nick open the bag.

St.: Please, Nick, don't open the bag.

Let Nina take the red pen. Don't let Pete go home. Let Ann change the plan. Don't let Mike open the note. Let Nina try to help them. Don't let Pete test this method. Let Ann study the problem. Don't let Pete stop the boy.

XV. Скажите услышанное во множественном числе (см. раздел для преподавателя).

XVI. Переведите данные предложения со слуха. Работайте в паре.

1-й студент
(читает):

Take the red bag and hold it.

1. Open that girl's note.
2. Help this man's family.
3. Study these students' results.
4. Find this girl's home.
5. Close that boy's bag.
6. Hold that man's child.
7. Show us this student's film.

Домашнее занятие II

XXI. *Выпишите последовательно слова со звуками:*

[ɔ:], [ʌ], [ou] — hold, cost, son, open, got, gole, home, glove, college, close, hot, hope, some, come, love, smog, stove;

[ju:], [ʌ], [u:] — true, use, but, tune, student, bulb, pupil, crude, hug, huge, rule, blue, fruit, cruise, mule, unit, up, butt, bugle.

XXII. *Измените предложения в соответствии с образцом.*

Give me ... pen. (he).

Give me *his* pen. Give *his* pen to me.

Show us ... film. (you). Sand them ... plan. (he). Show me ... child. (they). Hand them ... data. (we). Send him ... result. (she). Give her ... place. (you). Hand him ... test. (I).

XXIII. *Напишите по-английски.*

1. Постарайтесь показать им результат этого исследования.
2. Попробуем найти семью этого ребенка.
3. Попробуйте показать им данные этого теста.
4. Дайте я попробую закрыть портфель этой девочки.
5. Заставьте его изменить свой план.
6. Заставьте их дать вам свои данные.
7. Позвольте мне испытать свой метод.
8. Пусть они покажут свои результаты.
9. Давайте покажем им свои места.
10. Помогите ей найти ее набор карандашей.
11. Пусть она не помогает ему.
12. Пусть они не останавливают мальчика.
13. Не посылайте детей домой.
14. Пусть он не дает им широкую пленку.
15. Не заставляйте их менять план их исследования.
16. Не пытайтесь говорить с ним о колледже.

Аудиторное занятие III

XXIV. *Прочитайте контрольное упражнение.*

lost, depth, bird, on, drunk, drank, spur, lot, lone, nerve, serve, hue, true, rude, shirt, short, hurt, horse, curb, cort, firm, form, must, dull, hut, space, rifle, witty, cake, stuff, nod, cope, serf, shirt, scorn, some, love, front, among, wage, edge, change, pure, eve, pine, glad, sale, hang, link, thirty, duty, along, sole, sock, catch, chest, saddle, lable, rattle, fable, mind, mild, gypsy, cycle, scent, cat, face, file, farm.

XXV. *Прочитайте вслух данные слова, сравните количество букв и звуков в каждом слове и назовите их.*

method, college, little, try, take, circle, show, brother, close, long, make, change, duty, turn, cycle, huge, nut, curve, use, up.

XXVI. *Возразите. Замените при этом существительное местоимением. Работайте в паре.*

T.: Let the boy go. (he).

St.: Oh, no. Don't let him go.

Let the girl send it. (she). Let the students try it. (they). Let the man close it. (he). Let the children take it. (they). Let the boy study it. (he).

XXVII. *Измените предложения в соответствии с образцом.*

T.: Go and open the box. (he).

St.: Let him go and open the box.

Go and find her. (we). Go and close it. (she). Go and try it. (they). Go and change it (I). Go and send it. (he). Go and take it. (she). Go and stop them. (I).

XXVIII. *Скажите по-английски.*

изучение этих данных; семьи этих детей; проблемы тех семей; идеи этих людей; места этих студентов; возраст этих планет; изменение того плана; длина и ширина этих страниц.

1. Покажи им лучшее место. 2. Дай ему тот же самый длинный карандаш. 3. Давайте попробуем их метод. 4. Пусть он покажет нам факты. 5. Пусть он пойдет и поможет им. 6. Пусть они придут и возьмут результаты теста. 7. Попытайтесь помочь этим детям, пожалуйста. 8. Позвольте мне послать им этот набор карт. 9. Покажите мне их дом, пожалуйста. 10. Пусть они изучат ваш метод и ваши результаты. 11. Не заставляйте его идти, пожалуйста. 12. Не посылайте детей домой. 13. Не изменяйте размер карты. 14. Не прекращайте это исследование. 15. Не заставляйте ее показывать вам свои записи. 16. Пусть он не пытается сделать это. 17. Давайте не пойдем домой. 18. Пусть они не изучают эти старые данные. 19. Позвольте я попробую открыть этот портфель. 20. Пусть она не посылает им эту записку.

УРОК 3

Аудиторное занятие I

Буквы, звуки, правила чтения

	Согласные	Буквосочетания
Буквы	j, x	ee, ea, a+st, a+ss, a+lf, a+ll, a+lk, a+lt, wa+n, wa+s, wa+t, wa+r, wo+r, wr; wh
Звуки	[dʒ], [ks], [gz]	[i:], [e], [ə:], [a:], [ɔ:], [ɔ], [wə:], [wə:], [r], [w]

Правила чтения букв и буквосочетаний				Упражнения
Буквы	Звуки	Примеры	Примечания	Прочитайте вслед за преподавателем
ee	[i:]	need, feet		seem, keep, meet, fleet, feed, deem, seem
ea	[i:]	sea, mean	читается первая гласная как в алфавите	seam, eat, earn, breath, beam, heat, clean, beat, eating, Earth, wealth, 'steady, feast
	[e]	head, death, health	иногда перед d, th, lth	
	[ə:]	learn	перед буквой r	
a+sp a+st a+ss a+sk a+lm a+lf	[a:]	fast, class, mask calm, half	 в сочетаниях a+l+ $\begin{cases} m \\ f \\ ce \end{cases}$ буква l не произносится	ask, last, glass, grasp, task, blast, flask, cast, palm, calf, vast, basket, clasp, halve, brass
a+lk a+ll a+lt	[ɔ:]	all, salt, talk	в сочетании a+l+k буква l не произносится	false, wall, ball, talk, halt, walk, small, chalk, also, stalk, fall, call
wa+n wa+s wa+t	[wɔ]	was, want, watt		watch, wash, wasp, wand, watt, wan
wa+r	[wɔ:]	war		warm, ward, warn, wart, 'warble, 'warden, warp
wo+r	[wɔ:]	world		worse, work, worm, worth, 'worthy, worst
wr	[r]	write	буква w в буквосочетании wr не произносится	wring, wrong, wrap, wrest, wrung, wrim, wrote, wrack, wrink
wh	[w]	when, whim	в буквосочетании wh не произносится буква h, но в сочетании wh+o не произносится w wh+o = [hu:]	why, while, whip, whose [hu:], what, why, whale, white, whoop [hu:p], which, whole [hou], whom [hu:m]
lj	[dʒ]	just		joke, jump, job, jar, 'jungle, jam, jist, jet, June, jazz

Правила чтения букв и буквосочетаний				Упражнения
Буквы	Звуки	Примеры	Примечания	Прочитайте вслед за преподавателем
Хх	[gz]	ex'ist ex'am	перед ударной гласной	ex'clude, box, next, ox, ex'cite, ex'act, ex'pell, 'complex, ex'pect, ex'cu- se, axis, ex'ceed, 'exile, ex'ist
	[ks]	fox, ex'pect	в остальных случаях	

Слова урока

Прочитайте данные интернациональные слова и попытайтесь назвать их русские эквиваленты.

text *n*, real [riəl] *adj*, check *n, v*, 'segment *n*, box *n*.

Прочитайте вслед за преподавателем следующие слова.

speak [spi:k] (spoke [spouk],
spoken [spoukən]) гово-
рить, разговаривать
read [ri:d] (read [red]) читать
only ['ounli] *a* единственный;
adv только
paper ['peipə] 1. статья, науч-
ная работа; 2. бумага;
3. газета
every ['evri] каждый
well [wel] хорошо
tell (told) сообщать, сказать,
рассказывать
word [wə:d] слово
some [sʌm] *a* некий, некото-
рый; *pron* некоторое коли-
чество, несколько
other ['ʌðə] другой
another [ə'ʌðə] один, какой-то
другой
work [wə:k] *n* работа; *v* рабо-
тать
next 1. следующий; 2. соседний;
3. будущий
rise (rose, risen) подниматься,
вставать
early [æ:li] *a* ранний; *adv* рано
see (saw [sɔ:], seen) видеть
today [tə'dei] *n* сегодняшний

do [du:] (did, done [dʌn]) де-
лать
think [θɪŋk] (thought [ɔ:t])
думать
really ['riəli] в самом деле, дей-
ствительно
write [rait] (wrote [raʊt]), writ-
ten ['ritn]) писать
yesterday ['jestədi] *n* вчераш-
ний день; *adv* вчера
ask [a:sk] 1. просить; 2. спра-
шивать
end *n* конец; *v* заканчивать
now [naʊ] теперь, сейчас
at *prep* в, у, около
for [fɔ:] *prep* для, за; *conj* так
как, поскольку
from *prep* 1. от; 2. из
can (could [kud]) уметь, мочь
must должен, обязан
may [mei] (might [maɪ]) мочь,
иметь разрешение
need [ni:d] *n* надобность,
нужда
need *v* 1. нуждаться в чем-то;
2. быть должным
what [wɒt] что
when [wen] когда
yes [jes] да

день; *adv* в наше время
 meet (met) встречать(ся)
 call [kɔ:l] *v* 1. звать; 2. назы-
 ваться; *n* призыв, зов

по [nou] нет
 about [ə'baʊt] *prep* о, об; *adv*
 приблизительно, около
 in *prep* в, на, через

Грамматика:

Модальные глаголы can, must, may, need

1. Прочитайте вслед за преподавателем, имитируя интонацию и ритм. Одновременно старайтесь понять смысл предложений.

a) You can help them. They can plan it. We can find the length. He can find the width. She can go to college. I can study these facts.

She must stop them. I must go home. You must type the note. He must hand in the test. We must face this problem. They must find the size.

She may take my place. He may send this film. You may try my pen. They may open the box.

He could show you their method. They could try his idea. I could change the shape of the box. We could give them some time. She could help the child.

We might give them the best places. You might try to send the children home. They might change their plans. She might find that little girl.

Can you really make her go? Must we help that family? May I take your pencil? May I help you? Can you give me the same place?

I cannot (can't) show you those data. He could not (couldn't) give them his plan. We need not (needn't) show them the result. You must not (mustn't) change the shape and the size of it. You need not go.

b) Can you show me the result of the test?

Could they study at home?

Must I go and find her?

May I take this map?

Yes, I can.

No, I can't (cannot).

Yes, they could.

No, they couldn't (could not).

Yes, you must.

No, you needn't (need not).

Yes, you may.

No, you mustn't (must not).

c) Who can tell me about it?

Who must study it?

Who may come?

What can you give the child?

What must she type?

What may she take?

When must they come?

What could he try?

I can.

We must.

He may.

A set of pencils.

The note.

Our data.

Early.

Our method.

Запомните порядок слов в утвердительном и вопросительном предложениях.

	They	can do	this work	now.
	Can	they do	this work	now?
	Who	can do	this work	now?
What	can	they do	—	now?
When	can	they do	this work	

Лабораторное занятие I

II. Слушайте и повторяйте за диктором.

- [a:] — brass, half, dance, grass, glance, fast, clasp, class, task, mask;
 [ɔ:] — all, halt, small, call, false, falt, salt, chalk, also, wall;
 [i:] — seed, seat, mean, meet, lean, beam, seen, leave, heap, peel;
 [ə:] — early, earn, learn, earth, earnest, earl;
 [e] — head, bread, spread, ready, steady, dead;
 [w] — wash, what, watch, want, was, wattle;
 [wə:] — worse, worst, worth, worthy, world, worship;
 [r] — write, wrong, wrist, wrack, wrap, wrung;
 [hu:] — whose, who, whom;
 [dʒ] — just, 'subject, 'object, Ju'ly, jump, 'jury, 'jungle;
 [ks] — ex'press, ex'pose, ex'cuse, 'expert, ex'clude, ex'change, ex'port
 (v), 'export (n);
 [gz] — e'xalt, ex'am, ex'act, ex'ist, ex'ert.

III. Слушайте группы слов и повторяйте их за диктором.

a)

[ɔ:—ə:]
 short—shirt
 horn—hurt
 born—burn
 torn—term

[ɔ:—ou]
 halt—hold
 fall—fold
 call—cold
 ball—bold

[wɔ:—wə:]
 war—work
 warm—worse
 warn—worth
 ward—word

[i:—i]
 seat—sit
 lean—link
 need—nib
 seen—sin

[e—ə:—ɔ:]
 ten—tern—torn
 det—dirt—dorn
 fen—fern—form
 met—'myrtle—'mortal

b) whale, while, whim, whip, wan, 'wallop, white, whelm, when, why, who, whom, whose, whole, what;

c) wrap, wring, wry, wrest, wrung, wrote, wrist, wren.

IV. Повторите вслед за диктором слова урока.

V. Повторите вслед за диктором следующие предложения.

He can write this paper. They can plan the result. We can speak about it. I can tell you the time.

You must rise early. He must check the result today. We must see them now. They must do it well.

You may take another pen. He may write his paper today. She may change some words in the text. You may give him the girl's name.

They could come yesterday. I could see every student. She could change only the length of the box. We could meet them at college yesterday.

They might try to change the plan of their work. She might stop him. He might try to speak to her. I might come early. You might take the paper from the table.

1. Can you change the text?—Yes, I can. 2. Can he find time for this work?—No, he can't. 3. Must we rise early to day?—Yes, you must. 4. Must he speak to her about the plan?—No, he needn't. 5. May I take another pencil?—Yes, you may. 6. May I go early?—No, you mustn't.

1. Who can send the student's papers?—I can. 2. Who must speak at the meeting?—They must. 3. Who may take your data?—You may. 4. When could they meet her?—Yesterday. 5. What must you study?—This problem. 6. Who might try to see them?—I might.

VI. Ответьте на вопрос диктора.

Sp.: Can he go to college? (Yes, No).

St.: Yes, he can. (No, he can't).

Sp.: Must he do it? (Yes, No).

St.: Yes, he must. (No, he needn't).

Sp.: May I take this note. (Yes, No).

St.: Yes, you may. (No, you mustn't).

May I show them this text? (No). Must he write his paper today? (No). Can he face this fact? (Yes). Must she rise early? (No). Can you meet them now? (No). Must he check the result? (No). May I help them? (No). Could he speak at the meeting yesterday? (Yes).

Домашнее занятие I

VII. Переспросите.

I must ask him every word.

Must you really ask him every word?

I can speak to him now. We must do this work for him. They could meet yesterday. She may work at home today. You must come early. They could see the red planet well. I can help them to find the same place. He can write this paper and give it to you. They must end the work today. You can take only this thin film. You may take his set of pencils. The students could work well. She must come next time.

VIII. Напишите вопрос, воспользовавшись вопросительным словом, данным в скобках.

They can tell us his name. (who, what).

Who can tell us his name?

What can they tell us?

They can change their plan now. (who, when, what). You might give us an idea. (who). The student could write his test paper yesterday. (when, who, what). He must speak about every fact. (who). You may try another method. (what). They can change the end of the film. (who, what).

IX. Измените предложения в соответствии с образцом.

I can meet the girl

Let me meet the girl.

They can rise early and do the work today. She must write every word of this text. We must find the girl's family. They must speak at the meeting. I can ask him about the changes in his paper. He may come early. Some students must write their test today. She can meet them now.

Let me ask him about it.

I can ask him about it.

Let me speak with him about it. Let him ask them about these facts. Let her show you the result of that work. Let us ask them to come early today. Let them change the place of the meeting. Let her only read this text now.

Аудиторное занятие II

X. Прочитайте последовательно слова со звуками:

[i:], [e], [æ:] — early, eat, earn, meat, mean, met, wheat, wealth, head, heat, meal, mete, earl;

[ks], [gz] — ex'act, ex'ile, ex'amine, ex'ist, ex'clude, ex'pect;

[ə:], [ɔ:] — word, ward, warm, worm, world, worst, war, 'warden;

[ɔ:], [ɒ] — watt, want, all, falt, wall, was, also, watch, call, 'wallop, wan;

[dʒ], [tʃ] — jug, teach, junk, June, chest, jute, jut, page, catch, joke, judge, 'jolly, join, jet, jar, 'jelly, chin, change;

[w] и произносимой буквой w — wrest, west, who, went, whom, wrap, wring, well, whim, wreck, work, war, wrong.

XI. Прочитайте вслух данные предложения и дайте русские эквиваленты (работайте в паре).

These students can study the same problem. They must rise early and go to college. I must write my paper today and send it. We must speak only about their method. We must try to do the work in time. You may tell me about your work some other time. She could come yesterday. They must help you. You may need my help.

Can you show me another text? May I give them the girl's name? Must they come early? Must she check the students' test-works? Can you change the end of this paper? Must we find her and tell her about it? Could you see the children yesterday? Can you meet them today? Can he do this work well? Must I find the length and the width?

You cannot send these data now. I cannot meet that old man today. They could not change the time of the meeting yesterday. You need not tell the students about this test. She could not make him face that fact. The child need not rise early today. You must not speak to her about her work. She need not ask him about his family. I could not do my homework yesterday.

XII. *Ответьте на вопросы (работайте в паре). (Не забудьте заменить местоимение, если это необходимо по смыслу.)*

Can you see the child? (Yes, no)

Yes, I can. (No, I can't)

a) Must you go now? (No). Can I help you? (No). Must he hand the paper in today? (No). Must we change the shape of it? (Yes). May I read the note, please? (No). Could they speak about the meeting? (Yes). May I take the short pencil? (Yes). Must we change the plan of our work? (No). May I ask them about the result of their work? (No). Must I meet the child? (No).

What can they see? (a set of old maps)

They can see a set of old maps.

b) What must I do now? (help them). When could they do their homework? (yesterday). Who can try to study this problem? (the students). When must she come home? (in time). What can you plan? (our time). What must you give them? (our best film). What can he show them? (the method of his work). Who can find that place? (I). When can you read this paper? (now). Who can speak at the meeting? (You).

XIII. *Выполните упражнение по образцу (см. раздел для преподавателя).*

T.: He needn't find the size of the box.

1st st.: Ему не нужно определять размер коробки.

2nd st.: But he must find the size of the box.

Лабораторное занятие II

XIV. *Прочитайте данные слова и сравните ваше чтение с последующим чтением их диктором.*

ask, for, some, every, meet, work, what, other, college, see, call, another, need, speak, write, word, come, early, yesterday, really, rise, about, do, speak, who, hurt, fall, half, heal, salt, small, mean, subject, love, worth, want, expect, learn, exact, wrist, hole, head, noble, firm, worse, write, false, watch, exam, wash, ready, true, also, earn, blue, use, but, huge.

XV. *Выслушайте диктора и переспросите.*

Sp.: You may take these data.

St.: May I *really* take these data?

He can read English well. The boy must rise early and go to college. We could see the result of their work. You must try to speak to the man. He can find time to help them. They must change the end of the show. We must write the paper now. She can hand them the note today. You could ask them to come early.

XVI. Дайте краткие ответы.

Sp.: Must I go now? (Yes, no)

St.: Yes, you must. (No, you needn't)

Sp.: May I take another pen? (Yes, no)

St.: Yes, you may. (No, you mustn't)

Must we study these old data? (No). May I change the next word? (Yes). May I show them these changes? (No). Must he take another text? (No). May I speak to her? (No). Must I read my paper now? (No). May I ask him her name? (No).

XVII. Ответьте на вопрос, воспользовавшись словом в скобках.

Sp.: Who can make those changes? (I)

St.: I can make these changes.

a) Who can ask her about the child? (he). Who can go to college? (the boy and the girl). Who could give them this idea? (he). Who can send this paper to them? (I). Who must rise early? (the children). Who must speak to this student? (we). Who may go early? (she). Who can meet me? (I).

Sp.: What can you show us? (the result of our work)

St.: We can show you the result of our work.

b) When could he come home? (early). What must you read today? (this long paper). When can they take these texts from him? (today). What could they plan? (the result of their work). What must we find? (the size of the box). What can they do at home? (read, write and speak English). When must they come to college? (today). What can I do for you? (help me).

Домашнее занятие II

XVIII. Выпишите последовательно слова со звуками:

[ə:], [ɔ:], [ɔ:] — wall, want, work, all, call, was, war, small, worth, warn, false, wash, worm, walk, talk, tall;

[ks], [gz] — exact, exist, fox, expect, box, text, ax, exam, example;

[i:], [e], [ə:] — meet, meat, learn, health, earn, neat, bread, feet, spread, meal, earth.

XIX. Задайте вопрос (напишите его), используя вопросительное слово.

They must find the boy's family. (who, what)

Who must find the boy's family?

What must they find?

You may take my best pencil. (who, what) They could meet him yesterday. (who, when) She can speak English well. (who) We must study their method now. (who, what, when). You can ask the man to come today. (who) He must rise early and do the work. (who, when) They might change the method. (who, what).

XX. Напишите по-английски.

а) 1. Мы должны найти свое место. 2. Ей не нужно писать и посылать ему эту записку. 3. Мальчику нельзя идти домой сейчас. 4. Мы не можем заставить их работать. 5. Ребенок должен прийти и познакомиться с другими детьми.

б) 1. Когда вы можете найти время поговорить с девушкой? 2. Нужно ли нам в самом деле читать этот текст? 3. Когда ему нужно вставать сегодня? 4. Кто может помочь вам написать эту статью? 5. Можно мне спросить его о методе его работы? 6. Что они могли сделать вчера?

в) 1. Вам не нужно встречать ее сегодня. 2. Вам не следует (вы не должны) говорить им об этом методе. 3. Он не мог изменить текст статьи. 4. Ей нельзя (она не должна) показывать ему эту записку. 5. Мы не можем изменить время и место встречи. 6. Он не умеет хорошо говорить по-английски.

г) 1. Пусть он придет. 2. Не заставляйте его делать этого. 3. Давайте покажем ей комплект (набор) карандашей мальчика. 4. Позвольте мне помочь вам. 5. Не берите красный карандаш, возьмите черный карандаш.

Аудиторное занятие III

XXI. Прочитайте контрольное упражнение.

write, cycle, mash, mask, axe, joke, mother, jot, clash, clasp, earn, mean, head, meet, want, war, chest, learn, object, tube, dug, who, wrap, whom, exact, jam, verb, firm, word, call, expect, kind, old, gipsy, cage, smoke, kid, kite, fate, fall, whim, jar, mild, wrist, turn, ring, link, jungle, lean, why, halt, feather, bread, join, rise, yell, love, thank, fifth, car, some, see, huge, jazz, judge, wallop.

XXII. Прочитайте данные слова. Сравните количество букв и звуков в каждом слове и назовите их.

word, whim, rise, meet, wrist, speak, come, tell, bread, who, when, feather.

XXIII. Переспросите (работайте в паре).

I can tell you his name.

Can you really tell me his name?

He can help the boy today. We can show you the place. She must come and speak to me. You can take the boy's pen. They could change

the test a little. You can take the student's paper and read it. I must see the film now.

XXIV. *Выслушайте преподавателя. Переспросите и уточните, воспользовавшись его подсказкой (см. раздел для преподавателя).*

T.: They can study this problem now. (who, when, what).

St.: Who can study this problem now?

When can they study this problem?

What can they study now?

XXV. *Выслушайте преподавателя и скажите то же самое, используя иной способ передачи отношений принадлежности.*

T.: The needs of the family

St.: The family's needs.

T.: This boy's pencil.

St.: The pencil of the boy.

The student's paper. The length of the pen. The end of the pencil. The size of the box. The words of this man. The time of the test. The boy's idea. The place of the meeting. The width of the page. The child's family.

XXVI. *Скажите по-английски.*

1. Мне надо решить ту же самую задачу. 2. Когда он сможет показать нам это место текста? 3. Покажите мне длину и ширину вашей карты. 4. Я не могу рассмотреть следующее слово. 5. Все дети этой семьи должны вставать рано. 6. Вам не нужно менять время и место теста. 7. Можно мне помочь вам? 8. Можете ли вы дать мне другую ручку? 9. Ему не нужно идти сегодня в колледж. 10. Пусть он не пытается говорить с ней об этом. 11. Можно мне спросить вас о семье этой девочки? 12. Идите и закройте ту длинную коробку. 13. Давайте изменим место нашей встречи. 14. Пусть он пошлет нам другую пленку. 15. Когда мне можно взять ваши данные? 16. Кто может помочь ей сделать ее домашнюю работу?

УРОК 4

Аудиторное занятие I

Буквы, звуки, правила чтения

Буквосочетания	oo, ou, ow, oa, ai, ay, au, aw, eu, ew, qu, gh
Звуки	[u:], [u], [au], [ou], [ei], [æ:], [ju:], [kw], [f]

Правила чтения буквосочетаний				Упражнения
Буквосочетания	Звуки	Примеры	Примечания	Прочитайте вслед за преподавателем
oa	[ou]	boat, load		soap, road, foam, coat, loan, coast, throat
oo	[u]	book, hood	перед k, иногда перед d	look, pool, took, soot, cook, hood [u], shook, proof, soon, mood [u:]
	[u:]	moon, hoof	в остальных случаях	
ou	[au]	out, stout	но: иногда ou = [ʌ] 'double, 'country	house, about, cloud, loud, round, pound, 'double, 'couple, young [jʌŋ], 'trouble
ow	[ou]	low, slow	обычно в конце слова	flow, arrow, follow, brown, slow, town, show, 'elbow, blow, throw, how, now, allow
	[au]	brown, town	обычно в середине слова и в словах how, now, allow	
ai	{ei}	ail, mail	в начале и середине слова	aim, chain, stay, faint, lay, main, say, brain, ray, way, fail, play, clay
ay		day, bay	в конце слова	
au	{ɔ:}	pause, fault		saw, raw, shawl, cause, lawn, 'August, draw, launch, 'auto, 'laundry
aw		dawn, law		
eu	{ju:}	'Euclid		new, few, pew, 'neutral, feud, 'feudal [fju:dl]
ew		dew		
qu	{kw}	quick, quest, quant	qu + a в закрытом слове = [kwɔ]	quite, quit, quartz, quote, 'liquid, quant, 'quarter, quill, quick, 'equal, queen, quad
		quart	qu + ar = [kwɔ:]	

Правила чтения буквосочетаний				Упражнения
Буквосочетания	Звуки	Примеры	Примечания	Прочитайте вслед за преподавателем
gh	[f]	laugh [lʌf]	иногда gh не произносится fought [fɔ:t]	tough [tʌf], enough [i'naʃ], rough [rʌf], thorough [θu:ʃ], though [ðəʊ]

Слова урока

Прочитайте вслед за преподавателем данные интернациональные слова и назовите их русские эквиваленты.

class [kla:s] *n*, university [ju:ni'və:siti] *n*, 'sentence *n*, school [sku:l] *n*.

Прочитайте вслед за преподавателем следующие слова.

ready ['redi] *a* готовый; be ready быть готовым

ill [il] больной; be ill быть больным

maths [mæθs] (*сокр.*) математика

ago [ə'gəʊ] *adv* тому назад

or [ɔ:] *conj* либо, или

desk письменный стол

small [smɔ:l] маленький, небольшой

large [la:dʒ] большой

teach [ti:tʃ] (taught [tɔ:t]) обучать

teacher ['ti:tʃə] учитель

book [buk] книга

note-book блокнот

also ['ɔ:lsəʊ] тоже, также

room [ru:m] 1. комната; 2. место, пространство

house [haʊs] 1. дом, здание; 2. размещать, вмещать

young [jʌŋ] молодой

late *a* поздний; be late опаздывать

easy ['i:zi] легкий

be sorry ['sɔ:ri] сожалеть

good [gʊd] хороший

translate [tra:ns'leit] переводить

too [tu:] *adv* 1. слишком; 2. также, тоже, к тому же

here [hiə] *adv* 1. здесь; 2. сюда

there [ðeə] *adv* 1. там; 2. туда

where [weə] 1. куда; 2. где

last [la:st] *v* длиться; *a* последний, прошлый

tomorrow [tə'mɒrəʊ] *n* завтрашний день; *adv* завтра

year [jiə] год

why [wai] *adv* почему, зачем

then [ðen] *adv* 1. тогда; 2. затем

new [nju:] новый

bad плохой

over ['əʊvə] *pron* над; *adv* через; be over заканчиваться

task задача, задание

but *conj* но, а, тем не менее; *prep* за исключением

week [wi:k] неделя

begin [bi'gin] (began, begun) начинать

English ['ɪŋɡlɪʃ] английский

soon [su:n] *adv* вскоре, скоро

Грамматика:
Глагол to be. Present, Past, Future Indefinite

I. Прочитайте вслед за преподавателем, обратите внимание на изменение глагола to be.

a) This is their place. This is also their place. These (they) are their places. That is his child. That is his child too. Those (they) are his children.

This was an old text. This was also an old text. These (they) were old texts. That was my set of pencils. That was my set of pencils too. Those (they) were my sets of pencils.

This will be a school. This will also be a school. These (they) will be schools. That will be a good result. That will be a good result too. Those will be good results.

b) It's a boy. His name is Pete. He is Pete. It's Pete. It's a girl. Her name is Ann. She is Ann. It's Ann. It's a child. His name is Bob. He is Bob. It's Bob.

These are students. Their names are Pete and Ann. They are Pete and Ann.

c) I am your teacher. I'm in this classroom. I'm at my table. You are my students. You are in the classroom too. You are at your desks. Nina is also a student. She is in the same classroom. She is at her desk too. Mike is a student. He is also in this room. He is at his desk. Nina, Mike and you are students. You are my students. You are at your desks. You are students. You are in this classroom. You are at the lesson. It's an English lesson.

d) I was a teacher last year. You were school-children last year. Nina was a school-girl. Mike was a school-boy. You were at school last year.

e) I shall (I'll) be at home tomorrow. You will (you'll) be at the University tomorrow. Ann will be at the University too. Dick will also be at the University.

II. Прочитайте вопросы и краткие ответы. Обратите внимание на порядок слов в вопросительном предложении (общий вопрос) и в отрицательном предложении.

Am I your teacher?	{	Yes, you are.
		No, you are not (arn't).
		You are not our teacher.
Are you a student?	{	Yes, I am.
		No, I am not (I'm not).
		I am not a student.
Is he at home?	{	Yes, he is.
		No, he is not (isn't).
		He's not at home.
Is it your book?	{	Yes, it is.
		No, it is not (isn't).
		It's not my book.
Are we in your room?	{	Yes, you are.
		No, you are not (aren't).
		You aren't in my room.

Are they at college?	{	Yes, they are. No, they are not (aren't). They aren't at college.
Was it your result?	{	Yes, it was. No, it was not (wasn't). It wasn't my result.
Were you a student last year?	{	Yes, I was. No, I was not (wasn't). I wasn't a student last year.
Was he at home last week?	{	Yes, he was. No, he was not (wasn't). He wasn't at home last week.
Were they late yesterday?	{	Yes, they were. No, they were not (weren't). They weren't late yesterday.
Shall I be a student next year?	{	Yes, you will. No, you will not (won't). You won't be a student next year.
Will you be early tomorrow?	{	Yes, I shall. No, I shall not (shan't). I shan't be early tomorrow.
Will they be ready in time?	{	Yes, they will. No, they will not (won't). They won't be ready in time.

III. Прочитайте данные предложения, обращая внимание на структуру вопросительных предложений различного типа.

Where	He Is Who is	is he is he?	at his desk. at his desk? at his desk?	
What	They Are Who are	are they are they?	students. students? students?	
When Where	We Were Who were were	were you was you you	at home at home at home at home? —	yesterday. yesterday? yesterday? — yesterday?
Where When	She Will Who will will	will be she be will be she be she be	at college at college at college — at college?	next year. next year? next year? next year? —

Лабораторное занятие I

IV. Слушайте и повторяйте.

- [ou] — boat, load, flow, loan, low, coat, 'fellow, grow, snow, road;
 [au] — brown, round, ounce, down, clown, pound, house, about, ground;
 [ɔ:] — pause, fault, 'August, hawk, law, raw, saw, auto, 'audit, draw, cause;
 [ju:] — new, 'dewy, 'feudal, deuce, 'Euclid, 'Newton, neutral, dew, few;
 [u:] — too, loop, roof, cool, noon, soon, room, food, fool, hoof, stool, stoop;
 [u] — cook, book, took, hook, crook, wood, hood, foot, stood;
 [ei] — day, May, pail, pay, way, wail, tail, stain, play, plain, rain;
 [kw] — quest, quant, quit, quite, quiz, quick, quote, equal, request, quart, squad, quarrel, squash;
 [f] — rough, enough, tough;

непроизносимое

сочетание *gh* — through [əru:], although [ɔ:lðou], though [ðou].

V. Повторяйте вслед за диктором группы слов, сравнивая противопоставляемые звуки.

[ei—ai]	[ei—ai]	[ou—ɔ]	[ɔ:—ou]
mail—mile	stay—sly	road—rod	law—low
chain—chime	lay—lye	coat—cot	saw—sow
sail—sile	way—why	coast—cost	awful—own
pain—pine	bay—buy	soap—sob	draw—throw
[ɔ:—ou]	[kwi—kwɔ—kwe]		
cause—low	quill—quad—quest		
fault—flow	quick—quant—quell		
flaunt—flow			
auto—own			
[ju:]			[kwɔ:]
few—feud			quartz
new—feudal			'quarter
dew—deuce			quart
pew—'Euclid			'quarrel

VI. Повторите вслед за диктором слова урока.

VII. Повторите вслед за диктором упр. I, II, III урока.

VIII. Слушайте диктора и подтвердите его слова.

Sp.: He is a student. Ann is also a student. (they).

St.: Yes, they are students.

1. She is young. The man is young too. (they). 2. I am in the small room. You are also in the small room. (we). 3. The boy was at home then. The girl was also at home. (the boy and the girl). 4. I am

ready. She is ready too. (we). 5. Nick will be late. She will also be late. (they). 6. My lesson was over. Your lesson was over too. (our). 7. Ann was at college last year. I was also at college last year. (we). 8. This text will be short. That text will also be short. (these texts).

IX. Ответьте на вопросы.

Sp.: Are you ready? (Yes, no).

St.: Yes, I am. I'm ready.

No, I am not. I'm not ready.

Are you at the lesson? (Yes). Is it a lesson in maths? (No). Is it an English lesson? (Yes). Is Nick in the classroom? (Yes). Was he at the University yesterday? (No). Was he ill? (Yes). Was Nina at the University yesterday? (No). Was she ill too? (Yes). Were Ann and Pete late for the English lesson? (No). Are they ready for the lesson? (Yes). Will they be here tomorrow? (Yes). Will the lesson be over soon? (Yes).

Домашнее занятие I

X. Напишите предложения упр. I (a—e) в вопросительной и отрицательной форме.

XI. Напишите вопрос, воспользовавшись вопросительным словом в скобках.

The boys were at college last year. (who, when). Ann's teacher is in the classroom now. (who, when, where). It was easy to find these words in the text. (what, where). They will be late tomorrow. (who, when). It will be easy to translate this book. (what, why). The man was young then. (who). The lesson will soon be over. (what, when). The box was open. (what, why). The children were in the house then. (who, when).

XII. Заполните пропуски соответствующей формой глагола 'to be'.

I ... a student now. I ... at home today. It ... my room. My room ... small but it ... nice. I ... at my desk. It ... large and black. These ... my books and those ... my note-books. This ... a set of pens and pencils. I ready to begin my work. I must do my homework. It ... not easy. I must write some sentences. I must also read and translate an English text. I must ... ready for my tomorrow's lesson.

Pete ... at college yesterday. He ... at his English lesson. Nina and Ann ... at the same lesson. They ... ready for the lesson. They could read and translate easy English texts. They could write the words of the lesson. It ... not easy. I ... not at the University yesterday. I ... ill. When the lesson ... over the students could go home.

We shall ... at the University tomorrow. We must ... early there. We must not ... late. Our teacher will also ... at the University. He must tell us about the results of our test-work in maths.

Аудиторное занятие II

XIII. Прочитайте последовательно слова со звуками:

[ei], [ai] — mail, mate, day, file, fail, clay, fame, tyke, fine, way, chain, mate, try, aim, lie, bay, mine, way;

[ou], [ɔ:], [ɒ] — road, law, rod, rode, low, code, awful, coat, auto, saw, so, sob, got, soap, own, grow, cause, cot, pause, draw, go, August;

[ju:], [u:] — few, true, due, fuse, rude, new, crew, sue, Newton, flue, blue, rule, fuel.

XIV. В каждом предложении дайте недостающие временные формы *Indefinite*, соответственно относя действие к прошедшему, будущему и настоящему. Помните о необходимости изменить обстоятельство времени.

T.: I am a student now (*last year, next year*).

St.: I was a student *last year*.

I'll be (shall be) a student *next year*.

I am your teacher now. (*next year*). You are my students now. (*last year*). He will be at home tomorrow. (*today, yesterday*). They are ready. (*tomorrow, yesterday*). She was ill last week. (*now*). We are at the University. (*yesterday*). The lesson is over. (*soon*). That is a large house. (*next year*). He is well now. (*soon*).

XV. Возразите и уточните (работайте в паре).

1st st.: Is it a desk? (*a table*).

2nd st.: No, it isn't. It's a table.

a) Are they pencils? (*pens*). Was he a teacher last year? (*a student*). Were their rooms large? (*small*). Is it a long sentence? (*short*). Is this the length of the box? (*the width*). Was the man young? (*old*). Were they new films? (*old*). Was it the same paper? (*another*). Is it a big family? (*small*).

1st st.: Must I do it now? (*tomorrow*)

2nd st.: No, you needn't. You must do it tomorrow.

b) Can he go to the University? (*college*). May I come tomorrow? (*today*). Could you find that long red pencil? (*short black*). Can she see the children now? (*tomorrow*). Must she speak to the child? (*man*). Can we see the rooms today? (*in a week*). May I take the new book? (*the old book*). Can you translate these easy texts? (*read them*). Must we find the width? (*the size*). Can I try this method? (*another*). Can you speak English? (*read*).

XVI. Ответьте на вопросы (работайте в паре).

1st st.: Was it a book or a *note-book*?

2nd st.: It was a *note-book*.

a) Are they *students* or teachers? Is it an old or a *new method*? Were they *good* or bad houses? Is their family large or *small*? Will she be late or *early*? Were the results ready yesterday or a *week ago*?

Will it be the length or *the width*? Were the texts long or *short*? Was the film good or *bad*? Is the man *young* or old?

1st st.: Must you *open* the box or close it?

2nd st.: I must *open* the box.

b) Can you be ready *now* or tomorrow? Must we find a small or a *large* room for her? Must we send them the plan or *the result of our work*? May I read your paper or *his paper* now? Must the students translate this text or *another text*? Can you give me this book or *some other book*? Could he be at college or *at home* yesterday? Must we do our homework *today* or tomorrow? Can we hold a meeting this week or *next week*?

XVII. *Выслушайте преподавателя и переспросите его (см. раздел для преподавателя).*

T.: She is a good student.

St.: Is she *really* a good student?

XVIII. *Выполните упражнение, воспользовавшись образцом (в работе участвует преподаватель и два студента.).*

T.: He is at the University today. (who, where).

1st st.: Who is at the University today?

2nd st.: He is.

1st st.: Where is he today?

2nd st.: At the University.

XIX. *Прежде чем приступить к чтению текста, прочитайте вслед за преподавателем слова урока.*

XX. *Послушайте чтение текста преподавателем, внимательно следя за интонацией, ритмом и ударением. Постарайтесь понять содержание текста.*

At the Lesson

This is our University. We are in the University now. This is our classroom. It is large. Our teacher is in the classroom. She is young and nice. She is at her table. Her books and note-books are on the table.

We are in the same classroom. We are at an English lesson. We are at our desks. They are new desks. Our books and note-books are on the desks. We are ready for the lesson. It's time to begin. We must open our books and note-books. We must read, write and speak English at the lesson. We can read and translate easy English texts now. We could not do it some time ago. We can write short sentences in English. It is not easy to speak English but we must try. Our teacher is ready to help us. It will be nice to read, write and speak English well.

XXI. Найдите в тексте и прочитайте вслух ответы на следующие вопросы.

Is it an English lesson or a lesson in maths? Is your teacher at her desk? Where are your books and note-books? Could you read and speak English some time ago? Can you read and translate easy sentences now? Is it easy to speak English?

Лабораторное занятие II

XXII. Прочитайте данные слова и группы слов и сравните ваше чтение с последующим чтением их диктором. Повторите правильный вариант.

new, blue, goat, boat, law, load, brown, aim, stay, 'awful, pool, 'Europe, few, quest, flow, tray, try, hoof, quant, hook, though, moon, moan, oak, low, cue, laugh, flew, soap, dew, due, quick, quart, 'August, raw, row, vail, vile, enough, 'neutral, deuce.

[i:—i]

keen—kin

reel—rill

least—list

meal—mill

[æ—a:]

back—bark

badge—barge

chat—chart

shack—shark

[e—ə:]

ten—turn

Bess—birth

best—burst

men—myrtle

[a:—ʌ]

charm—chum

march—much

harm—hum

bark—buck

[e—æ]

set—sat

wreck—rack

then—than

treck—track

[ɔ:—ɒ]

your—lost

forks—fox

dawn—don

hawk—hock

XXIII. а) Слушайте текст урока, следя по книге;

б) Слушайте текст, в паузах повторяя отрезки текста;

в) Послушайте текст, не глядя в книгу, стараясь понять его со слуха.

XXIV. Услышав предложение, задайте уточняющий вопрос, воспользовавшись вопросительным словом.

Sp.: The teacher is in the classroom. (where).

St.: Where is the teacher?

The classroom is large. (what). Our teacher is at her table. (where). She is young. (who). She is nice. (who). Her books are on the table now. (when). You are at the desks. (where). Our note-books are on the tables. (where). They are ready for the lesson. (who). You must open your books. (what). You must read and translate. (who). I can write easy sentences in English. (what). Our teacher is ready to help us. (who). She can teach us to speak English well. (who). Students must work at their English. (who).

XXV. Возразите и уточните.

Sp.: The man is a student. (teacher).

St.: The man is not a student. He is a teacher.

1. The girls are at home. (at the University). 2. These students are in our classroom. (their). 3. The girl's pencil is short. (long). 4. The desk was red. (black). 5. The children were ready. (late). 6. The test will be over tomorrow. (next week). 7. The boy could speak English. (read). 8. The girl must translate this text. (those texts). 9. The students may take our data. (the old). 10. The table was in the room. (the desk).

XXVI. *Прослушайте и измените предложения в соответствии с образцом, производя необходимые замены.*

Sp.: The lesson is easy. (the texts)

St.: The texts are *also* easy.

1. He is in the room. (they). 2. She was at home. (the girls). 3. The boy will be a student. (Pete and Bob). 4. I was ready. (you). 5. You were late. (he). 6. The book is on the desk. (the pens). 7. The boys were there. (the girl). 8. The children were in the house. (she). 9. I shall be a teacher next year. (they). 10. My lessons were over. (their lesson).

XXVII. *Ответьте на вопросы по тексту урока. Запишите ваши ответы с помощью знаков: + (утвердительные) и — (отрицательные).*

Are you at college? Are you at the University? Is your teacher in the classroom? Are her books on the table? Is it an English lesson? Must students be ready for their lessons? Can students write simple sentences now? Is it easy to speak English well? Can your teacher help you? Is she ready to help you?

Домашнее занятие II

XXVIII. *Выпишите последовательно слова со звуками:*

[u], [u:], [ju:] — true, blue, tool, book, moon, new, shook, pool, few, flue, deuce, noon, rule;

[au], [ou], [ɔ:] — law, snow, cause, auto, boat, out, load, stout, brown, flow, town, slow, raw, round, own, how, coat, now;

[ei], [ai] — aid, mile, mail, bay, by, try, main, mine, my, mice, may, dine, day, say, side, stay, cry.

XXIX. *Задайте вопрос, ответом на который является данное предложение. Запишите вопрос.*

1. The boy and the girl are in the next room. 2. The teacher may ask you to come tomorrow. 3. Those words were in her note-book. 4. He could not translate those sentences. 5. The students' books were open. 6. They must study another problem. 7. You must change the plan of your test. 8. He must rise early. 9. She can go to college next year. 10. He may be late for his class today. 11. The paper will be ready in time. 12. The children were in the small house. This house is next to their school. 13. I was at college last year. 14. He could not come early yesterday.

XXX. Прочитайте диалоги. Выучите их наизусть.

Dialogue I

— Why are you here, Nina?	— I am at my English lesson.
— Is your teacher in the classroom?	— No, she isn't. But she'll soon be here. She won't be late.
— Are you ready for your lesson?	— I am.
— Can you read and translate the text of the lesson?	— Yes, I can. It's easy.

Dialogue II

— Can you read the new text, Mike?	— I am sorry, I can't. I am not ready for today's lesson.
— Why aren't you ready?	— I was ill last week. But I'll be ready for the next lesson.

Dialogue III

— Pete, can you come to my place today?	— I'm sorry, I can't.
— Why can't you?	— I must do my homework. I could come tomorrow.
— Come tomorrow then.	— O. K! I'll be there.

XXXI. Напишите по-английски.

а) Я дома. Я должна начать свой день рано сегодня. Я должна пойти в университет. Я должна быть там вовремя.

б) Наши занятия окончены. Сейчас рано и мы можем пойти и посмотреть хороший новый фильм. Затем я должна пойти домой и сделать уроки на завтра.

в) Я не мог рассказать вам о методе их работы вчера. Было поздно. Я могу сделать это сегодня. Возьмите блокнот и начинайте записывать. Вы можете взять мою ручку.

г) Вы будете завтра дома? Когда я могу прийти и повидать вас? Могу ли я показать вам свою статью? Покажите мне ее сегодня.

д) Почему студенты должны переводить этот текст? Дайте нам другой текст, пожалуйста. Он легкий? Он длинный?

е) Вы были студентом в прошлом году? Когда вы были в школе? Теперь вы студент? Вы должны приходить в университет каждый день? Когда вы должны вставать? Легко вставать рано? Эта девушка тоже студентка?

Аудиторное занятие III

XXXII. Прочитайте контрольное упражнение.

quench, blow, because, flow, new, took, cloud, quake, quits, Euclid, veil, grey, quart, ground, cause, quota, faith, day, dye, dyke, digit, own, gown, how, saw, due, dew, deuce, sause, deem, look, shook, ail, stout, boat, foot, food, pond, fool, blow, flew, deem, sea, idle, dead, job, birth, early, dance, ask, age, steady, axe, shame, sharp, cycle, short, term, scent, sent, scant, use, tail, well, heavy, fork, ward, even, wave, fix, exact, wrong, yell, yet, worn, switch, scale, wait, fat, fate, talk, who, whose, when, quart, these, think, spring, turn, string, system.

XXXIII. Прочитайте вслух текст 'At the Lesson'.

XXXIV. Ответьте на вопросы преподавателя по тексту.

XXXV. Просмотрите тексты диалогов еще раз (см. домашнее задание). Попробуйте побеседовать, взяв диалоги за основу. Помните пролями.

УРОК 5

Аудиторное занятие I

Буквосочетания, звуки, правила чтения

Буквосочетания	<i>ai+r, ei+r, a+re, ee+r, ea+r, e+re, i+re, u+re, kn, gn, ign, s+ure, ss+ure, s+ual, ci, ti, tion, sion</i>
Звуки	[eə], [iə], [aɪə], [juə], [ʃ], [ʒ], [aɪ]

Правила чтения буквосочетаний				Упражнения
Буквосочетания	Звуки	Примеры	Примечания	Прочитайте вслед за преподавателем
<i>ai</i> <i>+r</i> <i>ei</i>	[eə]	'chair 'their		'air, 'fair, 'pair, 'stair, 'airy
<i>a+re</i>	[eə]	'care	в конце слова	'fare, 'bare, 'dare, 'share, 'stare, 'mare, 'wary
<i>ea</i> <i>+r</i> <i>ee</i>	[iə]	'clear 'deer	но: <i>ea+r+согласная=[э:]—learn</i>	'tears, 'ear, 'rear, 'fear, 'jeer, 'veer, learn, earn, queer, spear, earth, 'near, deer, leer

Букво-сочетания	Звуки	Примеры	Примечания	Прочитайте вслед за преподавателем
sion	[ʃən]	'tension	после согласной	'pension, 'session, 'fission, 'Russian, di'vision, col'li-sion
	[ʒən]	de'cision -	после гласной	
e+re	[iə]	'here	но: в словах <i>there, where</i> e+re = [eə]	'mere, 'sere, 'here, 'cere
i+re	[aɪə]	'fire		'hire, 'tired, 'wire, 'dire, 'shire, 'tyre
u+re	[juə]	'pure		'lure, 'cure, 'pure, 'fury, en'dure, 'dure
kn	[n]	know [nou]	k перед n не произносится	know, knew, knelt, knee, knife
gn	[n]	sign [sain]	но: <i>signal</i> [gn]	a'align, gnat, sign, de'sign
igh	[ai]	night [nait], right [rait]	gh не произносится. Вспомните: walk [wɔ:k], write [rait], when [wen], who [hu:], though [ðou]	light, fight, bright, eight [eit], knight
s+ure ss+ure	[ʃ]	en'sure 'pressure	часто после согласной	as'sure, 'surely, 'fissure, 'sure
ual s+ure	[ʒ]	'measure [meʒə]	обычно после гласной	'measure, 'treasure, 'pleasure, 'usual
ci ti	[ʃ]	'special 'spatial	перед гласной	'mention, 'action, 'crucial, 'social
tion	[ʃən]	'notion		'nation, 'action, 'fiction, po'sition

Обратите внимание на случаи чтения слов, в которых наблюдается встреча гласных, т. е. последовательность двух гласных звуков, относящихся к различным слогам. Например: *театр, реакция*. Сравните: *theatre* ['eɪətə], *reaction* [ri:'ækʃən]. Такое явление называется *зиянием*.

В отличие от диграфа, где следующие подряд гласные относятся к одному слогу и читаются как дифтонг (mail [meɪl]), при зиянии соседние гласные читаются каждая в отдельности (create [kri:'eɪt]).

Иногда ударение падает на первую гласную зияния, а вторая редуцируется: 'cru|el, the|ory, 'vi|a, 'di|alogue, 'qui|et, 'cle|ar, the|atre, 'po|et, 'tri|al, 'ri|ot, 'di|al.

В других случаях ударение падает на вторую гласную зияния: di'ameter, ge'ometry, bi'ography, ge'ology, cre'ate; 'real—re'al-ity; 'theatre—the'atrical; 'theory—theo'retical.

Слова урока

Прочитайте вслед за преподавателем данные интернациональные слова и попытайтесь понять их значение.

Russia ['rʌʃə] *n*, Soviet ['souviət] *a*, Union ['ju:njən] *n*, foundation [faun'deɪʃən] *n*, faculty *n* ['fækəlti], founder ['faundə] *n*, poet [pəʊɪt] *n*, address [a'dres] *n, v*, complex ['kɒmpleks] *a, n*, modern ['mɒ:dən] *a*, laboratory [lə'bɒrətəri] *n*, conference ['kɒnfərəns] *n*, theatre ['θiətə] *n*, mechanics [mi'kæniks] *n*, mathematics [mæθimæ'tiks] *n*, cybernetics [saɪbə'netiks] *n*, lecture ['lektʃə] *n*, discuss [dis'kʌs] *v*, interesting ['ɪntrɪstɪŋ] *a*, chemical ['kemɪkəl] *a*, hall [hɔ:l] *n*.

Прочитайте вслед за преподавателем.

great [greɪt] великий, большой
first [fɜ:st] *num* первый; *adv*
сначала

various ['veəriəs] *a* различный
building ['bɪldɪŋ] здание
square ['skweə] *n* 1. квадрат;

2. площадь; *a* квадратный
hill [hɪl] холм, гора
beautiful ['bjʊ:təfʊl] прекрас-
ный

main [meɪn] главный
among [ə'mʌŋ] *prep* среди,
между

research {ri'sə:tʃ} исследование
library ['laɪbrəri] библиотека
dining-room [daɪnɪŋ] столовая
hostel ['hɒstəl] общежитие
postgraduate ['pəʊst'grædʒuɪt]
аспирант

facility [fə'sɪlɪti] (*мн.*) 1. удоб-
ства; 2. оборудование

two [tu:] *num* два

eight [eɪt] восемь

sixteen ['sɪks'ti:n] шестнадцать

science ['saɪəns] наука

scientist ['saɪəntɪst] *n* ученый

scientific [saɪən'tɪfɪk] научный

attend [ə'tend] 1. посещать;
2. внимать

branch [brɑ:ntʃ] ветвь, ответ-
вление, область

quite [kwaɪt] вполне, совершен-
но, совсем

few [fju:] немногие, немного

number ['nʌmbə] число, коли-
чество

part [pɑ:t] *n* часть; *v* де-
лить(ся)

solve [sɒlv] *v* решать

one {wʌn} *num* один; *n* единица

only ['əʊnli] *a* единственный;
adv лишь, только

much [mʌtʃ] *n* многое; *a* много

many ['meni] *n* многие; *a* много

any ['eni] 1. любой; 2. какой-
нибудь

how [haʊ] как, каким образом

which [wɪtʃ] который

very ['veri] *adv* очень
 humanities [hju:'mænitiz] гу-
 манитарные науки.
 outstanding [aut'stændiŋ] вы-
 дающийся

whose [hu:z] чей
 with [wið] с, со
 such [sʌtʃ] такой, подобный
 kind *n* тип, вид, род; *a* славный,
 добрый

Notes

1. a number of — целый ряд, несколько
2. a lot of — много, масса
3. take part (in) — принимать участие
4. quite a few — довольно много
 at first — вначале
 how many (much)? — сколько?
 what kind of? — какого рода?

Грамматика:

Оборот there is (there are)

Наречия much, many, few, a few, little, a little

I. Прочитайте вслед за преподавателем. Сравните, какая информация представляется существенной в каждом из предложений сопоставляемых пар.

The teacher's desk is in the room.

The students are in the classroom.

The lecture was interesting.

Some results were new.

The seminar will be tomorrow.

There is the teacher's desk in the room.

There are students in the classroom.

There was an interesting lecture yesterday.

There were some new results.

There will be a seminar tomorrow.

II. Прочитайте вслед за преподавателем.

a) There is a young man at the table. There is a good film on today. There are some easy texts in this book. There are some nice girls in this class. There are many Universities in the Soviet Union.

b) There was a seminar on mechanics yesterday. There was an interesting lecture on mathematics last week. There were a lot of small houses here last year. There were very few new words in this text.

c) There will be another seminar on cybernetics tomorrow. There will be quite a few students at the seminar. There will also be an English lesson.

d) Is there a lecture on mechanics today? Was there a meeting at the University? Were there many students at the meeting? Will there be time for this work? Will there be another seminar next week?

e) There is no (not any) (isn't any) time for this lecture today. There are no (not any) (aren't any) large rooms in this building. There was no (not any) (wasn't any) English lesson last week. There

will be no (will not be any) (won't be any) new books in our library next week.

f) Is there a film on the table?

Are there students in the room?

Was there a place for you?

Were there changes in the plan?

Will there be a meeting tomorrow?

Yes, there is.

No, there is not (isn't).

Yes, there are.

No, there are not (aren't).

Yes, there was.

No, there was not (wasn't).

Yes, there were.

No, there were not (weren't).

Yes, there will.

No, there will not (won't).

III. Прочитайте данные предложения, обращая внимание на порядок слов в вопросительных предложениях различного типа.

	There	is	a lecture	at my college	today.
	Is	there	a lecture	at my college	today?
What	is	there	—	at my college	today?
When	is	there	a lecture	at my college?	

	There	were	seminars	in this room	yesterday.
	Were	there	seminars	in this room	yesterday?
What	was	there	—	in this room	yesterday?
When	were	there	seminars	in this room?	

		There	will be	a meeting	here	tomorrow.
Will		there	be	a meeting	here	tomorrow?
What	will	there	be	—	here	tomorrow?
When	will	there	be	a meeting	here?	

Лабораторное занятие I

IV. Слушайте и повторяйте за диктором.

- [eə] — chair, care, fare, rare, square, share, air, pair, fair;
 [iə] — here, ear, mere, fear, dear, deer, tear, year, rear, beer;
 [ə:] — learn, heard, search, earth;
 [aiə] — tired, wire, tyre, spire, re'quire, en'tire, at'tire;
 [juə] — pure, cure, se'cure, in'dure, pro'cure;
 [ʃ] — 'special, 'section, 'function, a'cacia, 'pension, 'patient, 'mission, official, 'mention;
 [ʒ] — di'vision, il'lusion, oc'casion, 'vision, con'clusion, re'vision;
 непровозносимые — fight, fright, know, knew, sign, knight, might, буквы и букво- thought.
 сочетания

V. Слушайте и повторяйте вслед за диктором группы слов. Обратите внимание на сопоставляемые звуки.

[eə—ei]	[eə—a:]	[ə:—eə]	[eə—aiə]
chair—chain	care—cart	fir—fair	tare—tire
fair—fail	fare—farm	furs—fares	hair—hire
hair—hail	bare—barn	earn—air	ware—wire
air—aim	stare—start	curl—care	spare—spire
stair—stain	dare—dark	stir—stair	dare—dire

[ju:—juə]	[ai—aiə]	[iə—eə—aiə]
few—fury	fine—fire	mere—mare—mire
dew—during	time—tired	here—hair—hire
pew—pure	spine—spire	dear—dare—dire
Euclid—Europe	type—tyre	spear—spair—spire
cue—cure	lie—lyre	pear—pair—perspire

[i:—iə]
she—shear
gee—jeer
pea—pear
he—hear
queen—queer

VI. Сравните группы слов, повторяя их за диктором.

- [ai] — sight—site; might—mite; bright—bride; right—ride; light—lime; fight—fine; night—nine; line—align; sine—sign;
 [ɔ:] — born—bought; torn—taught; orgy—ought; door—daughter; for—fought; sord—sought;
 [r] — write—right; wrist—risk; writ—rid; wring—ring; wretch—rent; wrote—rot; wry—rye.

[e—ei—æ]	[e—æ—ʌ]	[i—e—æ]
pen—pain—pan	beg—bag—bug	sit—set—sat
less—lace—lass	flesh—flash—flush	lid—led—lad
men—main—man	hem—ham—hum	did—dead—dad

VII. *Повторяйте вслед за диктором.*

- {f} — 'crucial, 'racial, e'lection, 'ocean, suf'ficient, 'mission, 'passion, 'Russia, ref'lection;
{3} — 'measure, di'vision, de'cision, 'leasure, pro'vision, 'pleasure, 'usual, 'usually.

VIII. *Прочитайте слова контрольного упражнения (урок 4, упр. XXXII) и сравните ваше чтение с чтением диктора. Повторите правильный вариант.*

IX. *Прочитайте вслед за диктором слова урока.*

X. *Услышав вопрос, заданный диктором, подтвердите услышанное или возразите.*

Sp.: Is there a lecture on mechanics today? (Yes, no).

St.: Yes, there is.

No, there isn't.

Is there a new department there? (Yes). Is there a lecture on mathematics today? (No). Are there modern laboratories at this college? (Yes). Will there be a seminar on cybernetics tomorrow? (Yes). Will there be another meeting? (No). Was there an English lesson last week? (Yes). Were there students at the teacher's table? (No).

XI. *Скажите то же самое, используя иную форму отрицания.*

Sp.: There is no time for this work.

St.: There isn't any (is not any) time for this work.

There was no help from them. There were no schools here last year. There are no new words in this text. There is no need for this test now. There will be no classes next week. There will be no papers ready for tomorrow.

XII. *Ответьте на вопросы, воспользовавшись словами в скобках.*

Sp.: What is there in the box? (a set of pens)

St.: There is a set of pens.

How many faculties are there at this college? (two). What is there in this square? (some modern buildings). Who is there in the room? (some of our students). What was there in the conference hall at that time? (a meeting). What will there be next week? (a seminar). What lesson will there be tomorrow? (an English lesson).

Домашнее занятие I

XIII. *Прочитайте каждое предложение упр. II (а, б, с) и напишите: а) в прошедшем времени; б) в будущем; с) в настоящем. Не забудьте соответственно заменить обстоятельственные слова.*

XIV. *Напишите отрицательные ответы на все вопросы упр. II (d). Ответ должен быть полным, с использованием отрицания 'no' или 'not any'.*

XV. *Задайте и запишите: а) общий вопрос, б) уточняющий вопрос (what, where ...).*

There is a large building in that square. (what kind of)

Is there a large building in that square?

What kind of building is there in that square?

There are various methods of research in their lab. (in whose lab). There are also two faculties for humanities in this college. (how many). There was a beautiful little book in his hands. (what kind of). There will be another branch of research in this chemical lab. (what). There are many dining-rooms in the main building of the University. (in which building). There were a few outstanding scientists at the conference yesterday. (who). There is one family in every house. (how many). There will be a good film on next week. (when).

XVI. *Задайте вопрос, ответ на который можно найти в самом предложении, т. е. вопрос по существу предложения.*

He can give you their new address. There is a beautiful theatre and a concert hall in this square. There are a lot of books in the man's library. They can discuss scientific problems in their lab. The student's hostel is in the main building. This outstanding scientist may speak at the conference tomorrow. This great scientist is one of the founders of a new branch of mathematics. We must come to our classes early. Postgraduates can take part in the work of scientific seminars. There was a very interesting man among them.

Аудиторное занятие II

XVII. *Прочитайте последовательно слова со звуками:*

[æ], [iə] — air, pair, deer, mere, fair, fare, near, dear, queer, prepare, repair, tear, here, there, where, appear, share, ear, stair;

[aɪ], [aɪə] — wire, tyre, type, en'tire, 'vital, fire, 'cycle, re'quire, in'quire, mile, spite, de'sire, 'rifle;

[juə], [ju:], [u:], [ə:] — cure, 'curly, 'ruler, 'music, tune, 'during, huge, blue, burst, 'curate, 'cubic, true, lure, 'Europe, 'jury, 'feudal;

[f], [ʒ] — 'social, official, de'cision, di'vision, 'Russian, 'usually, ma'gician, 'measure, 'pension, o'pression, il'lusion, 'leasure.

knap—nap

knick—Nick

knell—Nell

knack—snack

knot—not

knew—new

knife—life

knit—nit

knag—nag

XVIII. *Услышав сказанное, переспросите (работайте в паре).*

1st st.: We are University students.

2nd st.: Are you really University students?

We are at the University. This is our department of Mechanics and Mathematics. We are at the lesson. It's an English lesson. Our classroom is very large. There is the teacher's table in it. There are also the students' desks in the classroom. The teacher is at her table.

The students are at their desks. They are quite ready for the lesson. Students can read and translate various texts. They can also try to speak English. They must write a lot of new words. It's not easy to read, write and speak English well. Students must work a lot at their English.

XIX. *Выслушайте преподавателя, согласитесь с ним, но используйте иную форму отрицания (см. раздел для преподавателя).*

T.: *There are not any* young men in their lab.

St.: *No, there are no* young men in their lab.

XX. *Выслушайте преподавателя и задайте вопрос, воспользовавшись словом в скобках (второй студент должен уточнить информацию).*

T.: There are two students at the desk. (how many).

1st st.: How many students are there at the desk?

2nd st.: There are two students.

XXI. *Прежде чем приступить к чтению текста, прочитайте вслеп за преподавателем слова урока.*

XXII. *Внимательно слушайте чтение текста преподавателем, следя за интонацией, ритмом, ударением. Постарайтесь понять содержание текста.*

Moscow University

Moscow University is the oldest (срапейший) University in Russia. The year of its foundation is 1755 (seventeen fifty five). M. V. Lomonosov, the great Russian scientist and poet was the founder of Moscow University.

The first building of the University was in Red Square. There were a number of¹ study rooms and also the first chemical laboratory in the building then. Now there are two addresses of Moscow University. In Marx Avenue [ʻævinju:] 20 (twenty) we can find its old beautiful buildings. On the Lenin Hills there is a complex of its modern buildings. The main building of the University is among them. There are lecture halls, study rooms, modern research laboratories in it. There are also a number of libraries and reading-rooms. There is a very beautiful conference hall, the students' theatre, a number of dining-rooms, a very good hostel for students and postgraduates. There are also a lot of² other facilities.

There are seventeen (17) faculties at the University. There are eight faculties for humanities and nine for sciences. Among them there is the Mechanics and Mathematics faculty and also the faculty of Cybernetics. A great number of outstanding scientists work at these faculties. They do very important research work. Students can attend their lectures. They can also take part³ in their seminars and discuss various scientific problems with them. There are also quite a few⁴ postgraduate students at these faculties. They must do research

work and solve problems in various branches of mathematics, mechanics and cybernetics.

XXIII. *Найдите в тексте ответы на следующие вопросы.*

1. Which is the oldest University in Russia? 2. Who was the founder of Moscow University? 3. Was there a chemical laboratory in the first building of the University? 4. Where can we find the complex of modern University buildings now? 5. Are there a number of libraries and laboratories in the main building? 6. Is there a beautiful conference hall? 7. How many faculties are there at the University now? 8. Can students and postgraduates do research work?

Лабораторное занятие II

XXIV. *Прочитайте данные группы слов и слова и сравните ваше чтение с последующим чтением их диктором. Повторите правильный вариант.*

[iə—ɛə]	[i:—iə]	[iə—aɪə]	[aɪ]
rear—rare	she—shear	fear—fire	site—sight
here—hair	gee—jeer	dear—dire	lime—light
deer—dare	he—here	tear—tyre	fine—fight
hear—hare	queen—queer	deer—dire	
[aɪ]	[ɔ:]	[ʃ—ʒ]	[r]
line—align	born—bought	sure—measure	right—write
sine—sign	torn—taught	ensure—pleasure	risk—wrist
size—de'sign	for—fought	fissure—usual	rung—wrung

flight, usual, design, pure, tired, cure, near, dare, dear, assure, ear, steer, ion, fire, fair, bias, fury, lure, dial, pair, hear, here, hare, en'tire, 'diagram, their, there, during, 'period, spire, knew, tension, session, special, know, 'measure, ear, earn, learn, thought, high, sign.

XXV. *Послушайте текст и ответьте на вопросы диктора.*

This is the faculty of Mechanics and Mathematics. I am a first-year student of this faculty. There are twenty four (24) students in our academic group. There are sixteen (16) boys and eight (8) girls in our group. We are in our study room. It's large and nice. The teacher is at his table. We are at our desks. This is a very important seminar on mechanics. Then there will be a lecture on history. Next there will be an English lesson. I am not quite ready for the lesson. I could not do my homework well yesterday. I was at the students' conference and I could only come home late. There was no time to do my homework. I must try to do it today.

What faculty is this? Are you a first-year student? How many students are there in your academic group? Are you in the study room or in the lab? Is your study room large? Is the teacher in the room? Where are the students? Are you at a lecture or at a seminar? What lesson will there be next? Are you quite ready for the lesson? When could you come home yesterday? Could you do your homework well? Will you be ready for your next lesson?

XXVI. Выслушайте утверждение. Возразите и уточните.

Sp.: There are only boys in the room (some girls).

St.: No, there are not. There are some girls in the room.

1. There is one address of Moscow University. (two). 2. There is a faculty of Mechanics at the University. (Mechanics and Mathematics). 3. There are only two libraries in the main building. (many). 4. There were very few outstanding scientists at the seminar last week. (quite a few). 5. There will be only lectures tomorrow. (seminars). 6. There was only our teacher in the study room at that time. (one of our students). 7. There were only two research laboratories at this college a few years ago. (a number of). 8. There will be a large conference hall here. (a students' theatre). 9. There will be many children here. (few). 10. There are very few students in the dining-room in the morning. (quite a lot). 11. There was much time for this work (very little). 12. There are quite a few books in his library. (very few).

XXVII. а) Прослушайте текст урока, следя за диктором по книге; б) Слушайте текст, повторяя в паузах отрезки текста; в) Прослушайте текст еще раз, не глядя в книгу, стараясь понять его со слуха.

XXVIII. Ответьте на вопросы в связи с текстом урока. Запишите ваши ответы с помощью символов + или —.

1. Is Moscow University the oldest University in the Soviet Union? 2. Is it the oldest University in Russia? 3. Was M. V. Lomonosov its founder? 4. Was the first building of Moscow University large? 5. Was there a chemical laboratory in the first building of the University? 6. Are the modern buildings in Marx Avenue? 7. What kind of facilities are there in Moscow University now? 8. Is its main building beautiful? 9. Can students and postgraduates take part in scientific seminars?

Домашнее занятие II

XXIX. Выпишите последовательно слова со звуками:

[eə], [iə], [ə:] — fair, af'fair, learn, dear, dare, earn, here, earth, beer, hear, share, spear, there, chair, spare;

[aiə], [ai] — spire, spite, de'fy, 'dial, re'quire, ap'ply, de'sire, fire, 'idle, try, wire, 'ion, i'dea;

[juə], [ju:], [u:], [ə:] — 'fury, 'rural, 'mural, 'jury, huge, se'cure, 'Newton, 'furnish, blue, true, chew, purse, cure, en'dure, curl;

[ʃ], [ʒ] — 'usually, 'special, de'vision, 'social, 'pressure, in'clusion, 'mission, as'sure, 'pleasure, 'measure.

XXX. Уточните информацию. Запишите ваш вопрос.

Zelinsky was the founder of our chemical laboratory. (who)
Who was the founder of our chemical laboratory?

1. They can do interesting research in their lab. (what kind of).
2. We can go to the dining-room after (после) classes. (when).
3. There are various useful facilities in the main building. (what kind of).
4. The Lenin library is the best library in the Soviet Union. (which).
5. You must see this beautiful film. (what).
6. They could attend his interesting lecture last week. (whose).
7. I must go to the library and take another book. (where).
8. There are two large rooms and one small room in this house. (how many).
9. You must see the beautiful building of the Bolshoi Theatre in Sverdlov square. (what).
10. There was a big meeting in the conference hall yesterday. (what).

XXXI. *Задайте (запишите) вопросы, ответы на которые заключаются в данных предложениях.*

1. There are various modern buildings in this square. 2. Students could attend lectures of outstanding Soviet scientists at the University. 3. Cybernetics is a very important branch of mathematics. 4. The main building of the college was quite modern and beautiful. 5. There are study rooms, libraries and research laboratories in various buildings of the University. 6. The hostels and the dining-rooms are also in the main building. 7. There will be a conference on some important problems of mechanics next week. 8. There will be an interesting film tomorrow at the students' club. 9. They could not solve that easy problem. 10. He was ill and could not come.

XXXII. *Прочитайте диалоги. Попытайтесь запомнить их содержание с тем, чтобы на уроке участвовать в беседе по теме диалогов.*

Dialogue I

— Say, Nick, is Moscow University the oldest University in Russia?	— Yes, it is. And it is the best.
— What is the year of its foundation?	— It's 1755 (seventeen fifty five). M. V. Lomonosov was its founder.
— Was the first building of the University in today's Marx Avenue?	— No, it wasn't. It was in Red Square. It was only a small building. There were some study-rooms and a chemical laboratory.

Dialogue II

— Say, Ann. Can I ask you to help me?	— Oh, yes. What can I do for you?
— It's my first visit (приезд) to Moscow.	— Oh, is it? Then you must find it interesting.
— Yes, it is very interesting. Tell me, where is the modern building of Moscow University?	— It isn't one building. There are a number of buildings and the main building is among them. You must go and see it. It's very beautiful.

- I must really find time for it today.
- Oh, thank you (спасибо). That'll (that will) be fine. Can you show me the great conference hall?
- I can come with you and show you the main building, its libraries, some study rooms and some labs.
- I can. And also the theatre and the dining-rooms. Let's go now, shall we?

Аудиторное занятие III

XXXIII. Прочитайте контрольное упражнение.

special, specialist, action, mention, retire, due, discussion, Europe, sure, invasion, social, position, hair, official, hare, here, efficient, pleasure, enspire, pair, cure, conspire, review, measure, tension, gnome, daughter, right, wring, flight, align, knelt, gnaw, collision, treasure, pressure;

pen—pain—pan, less—lace—lass; flesh—flash—flush; lid—led—lad; did—dead—dad; beg—bag—bug; right—write; risk—wrist, rot—wrote; loan—lown; bud—bird; bust—burst; so—saw; low—law; cold—call; rear—rare; here—hair.

XXXIV. Прочитайте вслух текст 'Moscow University'.

XXXV. Ответьте на вопросы преподавателя по тексту урока.

XXXVI. Просмотрите тексты диалогов (упр. XXXII) и попробуйте побеседовать на их тему. Поменяйтесь ролями.

XXXVII. Прочитайте текст и передайте его содержание по-английски. Вы можете добавить кое-что от себя и воспользоваться текстом упр. XXV.

Я студентка механико-математического факультета. Это мой первый год в университете. В нашей группе (group [gru:p]) 16 (sixteen) мальчиков и 8 (eight) девушек. Мы должны приходить на занятия каждый будний день (week-day). Каждый день бывают лекции и семинары. Когда наши занятия заканчиваются, мы можем идти в столовую, в библиотеку или домой. Вчера была очень интересная лекция в конференц-зале, но я не могла пойти. Я была больна.

УРОК 6

Аудиторное занятие I

Грамматика:

Основные способы словообразования

Глагол 'to have'. Числительные

Словообразование с помощью суффиксов: -ion, -ssion, -ation, -or, -er, -ment, -ful, -less, -ly.

а) Суффиксы существительного:

-ion — to express — *expression* — выражение
 -ssion — to transmi(t)* — *transmission* — трансляция, передача
 -ation — to inform — *information* — информация
 -or — to operat(e) — *operator* — оператор
 -er — to work — *worker* — рабочий
 -ment — to develop — *development* — развитие

б) Суффиксы прилагательного:

-ful — help — *helpful* — полезный
 -less — help — *helpless* — беспомощный

в) Суффиксы наречия:

-ly — eas(y) — *easily* — легко

1. Прочитайте вслед за преподавателем.

to inform — *information*, to demonstrat(e) — *demonstration*, to
 translat(e) — *translation*, to emi(t) — *emission*;
 to inform — *informer*, to teach — *teacher*, to write — *writer*, to
 read — *reader*, to speak — *speaker*;
 to argu(e) — *argument*, to place — *placement*;
 use — *useful* — *useless*, meaning — *meaningful* — *meaningless*,
 work — *workless*, home — *homeless*, child — *childless*;
 eas(y) — *easily*, logical — *logically*, simpl(e) — *simply*, active —
actively

Слова урока

Прочитайте вслед за преподавателем данные интернациональ-
 ные слова и попытайтесь назвать их русские эквиваленты.

international [ˈɪntəːnæʃənl] *a*, discussion [dɪsˈkʌʃən] *n*, construc-
 tion [kənˈstrʌkʃən] *n*, football [ˈfʊtbɔːl] *n*, basket-ball [ˈbɑːskɪtbɔːl] *n*,
 sister [ˈsɪstə] *n*, brother [ˈbrʌðə] *n*, doctor [ˈdɒktə] *n*, active [ˈæktɪv]
a, music [ˈmjuːzɪk] *n*, centre [ˈsentə] *n*, *v*, apartment [əˈpɑːtmənt] *n*,
 comfortable [ˈkʌmfətəbl] *a*, concert [ˈkɒnsət] *n*, piano [ˈpjænəu] *n*.

Прочитайте вслед за преподавателем следующие слова.

second [ˈsekənd] <i>n</i> ум второй; <i>n</i> секунда	grandmother [ˈgræn,mʌðə] ба- бушка
vacation [vəˈkeɪʃn] каникулы, отпуск	father [ˈfɑːðə] отец
summer [ˈsʌmə] лето	mother [ˈmʌðə] мать
after [ˈɑːftə] <i>prep</i> после, вслед за; <i>conj</i> после того как	happy [ˈhæpi] счастливый
town [taʊn] город	fond [fɒnd] любящий
half [haːf] половина	(be) fond of любить
group-mate одноклассник	share делить (с кем-либо), раз- делять
team [tiːm] группа, отряд	bright [braɪt] 1. умный; 2. яр- кий

* В скобки взяты буквы, выпадающие при прибавлении суффикса или пере-
 ходящие в другую букву.

site [sait] площадка, местоположение
 camp [kæmp] *n* лагерь; *v* располагаться лагерем
 farm [fa:m] ферма
 state [steit] *n* 1. состояние, положение; 2. государство; *v* сообщать, заявлять, утверждать
 month [mʌnə] месяц
 often ['ɔ:fən] часто
 leave [li:v] (left) покидать, оставлять
 season ['si:zn] время года, сезон
 rather [ra:ðə] *adv* пожалуй; охотнее, лучше
 woman ['wʊmən] (*pl.* women ['wɪmɪn]) женщина
 far [fa:] *adv* далеко; *a* далекий

French [frentʃ] французский
 evening ['i:vniŋ] вечер; *in the evening* вечером
 free [fri:] *a* свободный; *v* освобождать
 play [plei] *n* игра; *v* играть
 since [sɪns] так как
 nearly ['ni:li] почти
 sorry ['sɔ:ri] сожалеющий
 miss [mis] 1. скучать; 2. пропускать (занятия)
 lazy ['leizi] ленивый
 all *n* все; *a* весь
 like [laɪk] подобный, похожий
 (be) like быть подобным
 like любить (кого-то, что-то), нравиться
 myself [maɪself] *pron* сам
 by myself сам по себе
 game [geɪm] игра
 say [sei] (said [sed]) сказать

Notes

1. construction site (team) — строительный объект, площадка (отряд)
2. I'll be missing them — Я буду скучать по ним
3. I am fond of — Я очень люблю, мне очень нравится
4. very much like — очень похожа
5. all day long — весь день

Времена года (seasons): winter ['wɪntə] зима, spring [sprɪŋ] весна, summer ['sʌmə] лето, autumn ['ɔ:təm] осень.

Месяцы (months): January ['dʒænjuəri], February ['februəri], March [ma:tʃ], April ['eɪprɪl], May [meɪ], June [dʒu:n], July [dʒu:'laɪ], August ['ɔ:gəst], September [sep'tembə], October [ɒk'təʊbə], November [nou'vembə], December [di'sembə].

Числительные (Numerals)

Количественные

- 1 One [wʌn]
- 2 Two [tu:]
- 3 Three [θri:]
- 4 Four [fɔ:]
- 5 Five [faɪv]
- 6 Six [sɪks]
- 7 Seven [sevn]
- 8 Eight [eɪt]
- 9 Nine [naɪn]

Порядковые

- (the) first [fɜ:st]
- (the) second ['sekənd]
- (the) third [θɜ:d]
- (the) fourth [fɔ:θ]
- (the) fifth [fɪfθ]
- (the) sixth [sɪksθ]
- (the) seventh
- (the) eighth
- (the) ninth

10 Ten [ten]	(the) tenth
11 Eleven [i'levn]	(the) eleventh [i'levenə]
12 Twelve [twelv]	(the) twelfth [twelfə]
13 Thirteen ['æ:ti:n]	(the) thirteenth ['æ:ti:nə]
14 Fourteen ['fɔ:ti:n]	(the) fourteenth
15 Fifteen ['fif'ti:n]	(the) fifteenth
16 Sixteen ['siks'ti:n]	(the) sixteenth
17 Seventeen ['sevn'ti:n]	(the) seventeenth
18 Eighteen ['ei'ti:n]	(the) eighteenth
19 Nineteen ['nain'ti:n]	(the) nineteenth
20 Twenty ['twenti]	(the) twentieth ['twentiə]
21 Twenty one	(the) twenty first 21st
30 Thirty ['æ:ti]	(the) thirtieth ['æ:tiə]
40 Forty ['fɔ:ti]	(the) fortieth ['fɔ:tiə]
50 Fifty ['fifti]	(the) fiftieth
60 Sixty ['siks'ti]	(the) sixtieth
70 Seventy ['sevnti]	(the) seventieth
80 Eighty ['eiti]	(the) eightieth
90 Ninety ['nainti]	(the) ninetieth
100 Hundred ['hʌndrɪd]	(the) hundredth
1000 Thousand ['əʊzənd]	(the) thousandth
Million ['mɪljən]	(the) millionth

23 twenty three — the twenty third

46 forty six — the forty sixth

587 five hundred (and) eighty seven

801 eight hundred and one

3578 three thousand five hundred (and) seventy eight

7.425.629 seven million four hundred twenty five thousand six hundred and twenty nine

Обратите внимание:

one hundred, two hundred, six hundred

но: hundreds of books

five thousand

но: thousands of men

twenty eight million

но: millions of children

Даты читаются так:

1698 — sixteen ninety eight

1970 — nineteen seventy

1881 — eighteen eighty one

1705 — seventeen o five

1919 — nineteen nineteen

1900 — nineteen hundred

II. Прочитайте вслед за преподавателем. Обратите внимание на изменение глагола 'to have' в зависимости от лица, числа и времени.

a) We have very little time today. They have few lectures this week. He has much work now. She has quite a few books at home. You have your vacation in September. We have a new teacher of French.

b) I have got (I've got) a set of nice pencils for you. He has got (he's got) this information. They have got (they've got) very interes-

ting results of the test. You have got (you've got) another seminar tomorrow.

c) They had a large apartment in Kiev. She had an English lesson yesterday. He had only a month for his work. I had my vacation last June. We had a very important discussion with this scientist.

d) I shall (I'll) have a lot of time for this work. They will (they'll) have little changes in their paper. She will (she'll) have a music lesson tomorrow. You will (you'll) have an important meeting next week.

e) I have no (not any) (I haven't got any) seminars today. He has no (not any) (he hasn't got any) vacation this year. She had no (not any) sisters or brothers. They had no (not any) children. They will have no (will not have any) place for their camp.

f) Have you (have you got) a good library? Had they a large laboratory? Has your sister (has she got) a new piano? Will your teacher have much work tomorrow? Shall I have your data next week?

Обратите внимание на изменение порядка слов в вопросительном предложении.

	My brother	has	an old	map	at home.
	Who	has	an old	map	at home?
	Whose brother	has	an old	map	at home?
	Has	your brother	an old	map	at home?
Where	has	your brother	an old	map?	
What kind of map	has	your brother	—	—	at home?

	The girl	will	have	a music lesson	now.
	Who	will	have	a music lesson	now?
	Will	the girl	have	a music lesson	now?
What lesson	will	the girl	have	—	now?
When	will	the girl	have	a music lesson?	

Лабораторное занятие I

III. а) Вспомните правила чтения гласной *a*. Прочитайте данные слова и группы слов и сопоставьте ваше чтение с последующим чтением их диктором.

[æ]	[ei]	[a:]	[εə]	[ɔ:]
at	lame	ask	bare	call
mass	able	pass	pair	talk
began	painter	father	stare	always
matter	play	after	stair	law
as	same	farm	vary	author
[ɔ:]	[ei]			
chalk	plain—play			
talk	gain—gay			
naught	claim—clay			
caught	stain—stay			

Но: *ai*, *au* в неударном положении = [i]: 'holiday, 'mountain, 'yesterday, 'captain.

[ei—ai]	[æ—ʌ]	[æ—ʌ—a:]
late—light	batter—butter	bat—but—bark
rate—right	ran—run	stack—stuck—stark
whale—while	sang—sung	jag—jug—jar
knaves—knives	gnat—nut	ham—hum—harm
sane—sign	lack—luck	lack—luck—lark

б) Прочитайте вслед за диктором упр. I.

IV. Слушайте и повторяйте: а) слова урока; б) названия времен года; в) названия месяцев; г) числительные.

V. Послушайте, как звучит краткий отрицательный ответ с глаголом 'have'. Повторяйте за диктором.

Have you a sister? No, I have not (haven't). Had you any time for the children? No, I had not (hadn't). Has he a library at home? No, he has not (hasn't). Will you have a meeting? No, we will not (won't, shan't).

Have you got French books? No, I haven't (got any). Has she got children? No, she hasn't (got any).

VI. Ответьте на вопросы.

Sp.: Have you a lecture? (Yes, no)

St.: Yes, I have.

No, I haven't.

Have you any idea about this film? (No). Has she a large family? (Yes). Had you a nice apartment in your home town? (Yes). Will you have a discussion tomorrow? (No). Has she got a little brother? (No). Shall I have your plan next week? (Yes). Have they a faculty of cybernetics at their University? (No).

VII. *Услышав утверждение, задайте вопрос, воспользовавшись вопросительным словом в скобках.*

Sp.: He has a nice room at the hostel (who, where, what kind of).

St.: Who has a nice room at the hostel?

Where has he a nice room?

What kind of room has he at the hostel?

The girl has some important work. (who). This man has a lot of old books at home. (where). We shall have various computers here next year. (what kind of). This woman had a nice apartment in the centre of the town. (where). I had a very comfortable place. (what kind of). My sister had very interesting information yesterday. (whose sister).

VIII. *Измените предложения по образцу.*

Sp.: *There are* many books in my library. (I)

Sp.: *I have* many books in my library.

There are some new films in our lab. (we). There is little time for the construction. (they). There are some easy English texts in the book. (you). There is a nice room in this apartment. (he). There is a set of pens and pencils on the table. (she). There is a beautiful theatre in our town. (we).

Домашнее занятие I

IX. *Прочитайте каждое предложение упр. II (a, b, c, d) и напишите: a) в прошедшем времени, b) в отрицательной форме, c) в будущем времени, d) в настоящем времени. Не забудьте там, где это необходимо, изменить обстоятельство времени.*

X. *Задайте и запишите: a) общий вопрос; б) уточняющий вопрос. Помните о местоимениях.*

We have a new theatre in our town. (what kind of)

Have you a new theatre in your town?

What kind of theatre have you in your town?

1. This woman has a very nice face. (who). 2. I had little time for my music lesson yesterday. (when). 3. They have a faculty of Physics there. (what faculty). 4. She will have a lot of free time next month. (when). 5. They will have a football match in a few days. (what). 6. The scientists had their discussion in the conference hall. (where). 7. He has a lot of problems to solve. (who). 8. His sister has a small family. (whose sister).

XI. *Задайте и запишите вопросы относительно лица, указанного в скобках.*

She has a little child. (you)

Have you a little child?.

1. They have a long vacation in summer. (he). 2. He has a sister. (you). 3. They have an important meeting in the evening. (he). 4. They had a football match yesterday. (you). 5. My friend has music lessons. (you). 6. We shall have a discussion next month. (they). 7. I have got a French lesson this week. (he). 8. She has got a lazy little brother (you). 9. They had a winter camp not far from this town. (we). 10. He has a comfortable apartment. (they).

XII. Напишите отрицательные ответы, используя отрицания 'no' или 'not any'.

1. He has got a nice room in the hostel. 2. They have got a long discussion. 3. He has a very old grandmother. 4. They had a short meeting. 5. They will have three rooms in their apartment. 6. You had a lecture on physics yesterday. 7. She has a seminar in maths today.

XIII. Задайте и запишите общий вопрос.

1. I can come only in the evening. 2. There is a very good state farm near that town. 3. We must have a music lesson today. 4. I am fond of this writer. 5. We shall be free next month. 6. You may miss your family. 7. This old man is a very good doctor. 8. My sisters are fond of active games. 9. He is very much like his father. 10. She is a very bright student. 11. I could not go to my home town for my vacation. 12. There were nearly all the students of their group at the meeting. 13. The boy's mother is rather a young woman. 14. He was sorry to be late.

Аудиторное занятие II

XIV. Прочитайте контрольное упражнение.

has, plant, mask, male, bath, half, arm, play, aim, bare, hair, raw, chair, chain, tail, because, August, air, dare, bake, wage, scale, way, chalk, cause, gas, sharp, branch, call, care, bay, large, say, card, lad, all, fail, again, last, language, rather, father, pass, clay, captain, yesterday, holiday, obtain.

XV. Задайте вопросы, ответами на которые могут служить предложения упр. XI и XII.

XVI. Услышав сказанное преподавателем, переспросите, уточняя интересующую вас подробность.

T.: They have their examination in June. (*when*)

St.: *When* have they their examination?

XVII. Ответьте отрицательно на вопрос преподавателя.

T.: Have you German books?

St.: No, I haven't. I have no (haven't any) German books.

XVIII. *Прежде чем приступить к чтению текста, прочитайте вслед за преподавателем слова урока.*

XIX. *Внимательно слушайте чтение текста преподавателем, следя за интонацией, ритмом, ударением. Постарайтесь понять содержание текста.*

About my Family and Myself

I am Peter Pavlov. I am seventeen (17). I am a second-year student at the faculty of Mechanics and Mathematics at Moscow University. It is the end of August and I am in my home town in Novgorod now. I have a two-week vacation after my work in the international student's camp near Smolensk. Some of my group-mates and I were at this camp in July and in the first half of August. We had a lot of work at a construction site¹ at one of the state farms. The work was *not easy but it was important and useful* (полезной). We were happy since we could help the collective farmers with their work. In the evening, when we were free from work, we could play football and basket-ball and other games. We often had interesting discussions and improvised (импровизированные) concerts. We really had a very good time there.

Now the summer is nearly over. In a few days I must leave home and go to Moscow. I'll be there on the twenty ninth of August. I mustn't be late for my studies at the University.

I shall be sorry to leave my family. I'll be missing² my grandmother, mother, father, my sister and my brother. My grandmother is rather an old woman. She is nearly seventy. She is very nice and kind. I'm fond of³ her. My mother is a young woman. She is thirty nine years old. She is a teacher of French. My father is about forty five. He is a doctor. My sister is a schoolgirl. Her name is Kate. She is twelve. Kate is an active and bright girl. She is very much like⁴ my mother. My little brother is a boy of seven. He is very good at music and he is ready to play the piano all day long⁵. I can also play the piano a little but I am rather lazy about it.

We have a big apartment not far from the centre of the town. There are four rooms in it. Three of the rooms are rather large. The fourth room is not very big. It's very nice and comfortable. I share it with my brother.

XX. *Найдите в тексте ответы на следующие вопросы.*

1. How old is Peter? 2. Is he a student or a schoolboy? 3. Has Peter a two or a three-week vacation? 4. Was the work at the state farm easy? 5. When must Peter go to Moscow? 6. How big is his family? 7. Has he a brother? 8. How old is his father? 9. What is his sister Kate fond of? 10. How many rooms have they? 11. What kind of room have Peter and his brother? 12. Is he at home or at the University now?

Лабораторное занятие II

XXI. Прочитайте данные слова и группы слов, сопоставляя ваше чтение с последующим чтением их диктором.

map—maple	rate—rattle	star—stare—stair
cab—cable	bate—battle	hard—hare—hair
lap—laple	scale—scatter	darn—dare—dairy
lab—lable	late—latter	part—pare—pair
paint—pay	auto—saw—call	
mail—may	August—raw—wall	
sail—say	author—law—walk	
raid—ray	cause—jaw—talk	
late—light	batter—butter	chuck—chalk
whale—while	sang—sung	nut—naught
knaves—knives	gnat—nut	cut—caught
sane—sign	lack—luck	tuck—talk

XXII. а) Прочитайте каждое число, а затем сравните ваше чтение с дикторским.

100, 102; 14—40, 15—50, 16—60;

количественные числительные: 17, 29, 37, 44, 58, 62, 71, 86;

порядковые: 9, 5, 8, 7, 11, 13, 21, 22, 33, 44, 55, 120;

даты: 1972 г., 1948 г., 1793 г., 1412 г., 1156 г., 1927 г., 1950 г.

б) Прослушайте и повторите.

Winter months are: December, January, February.

Spring months are: March, April, May.

Summer months are: June, July, August.

Autumn months are: September, October, November.

в) Прослушайте данные слова и повторите их. Постарайтесь понять их значение и напишите перевод этих слов. Затем проверьте правильность перевода по словарю.

instrument, doctor, actively, reactor, secretly, position, timeless, transformation, generator, transportation, controller, occupation, endless, helpful.

XXIII. Выслушайте вопросы и ответьте по образцу.

Sp.: Ann has a short vacation, and *you*? (long)

St.: I have a long vacation.

- а) 1. I shall have a month for this work, and *he*? (three weeks).
2. We had a lot of new words in our text, and *you*? (only a few).
3. They have two children, and *she*? (one child). 4. He has three rooms in his apartment, and *they*? (four). 5. I have my vacation in August, and *she*? (in July). 6. You have one brother, and *she*? (two).
7. They had rather a big room in the hostel, and *you*? (very small).

Sp.: How many computers have you in your lab? (2)

St.: We have two computers.

b) 1. How many students are there in the room? (15). 2. How many texts can students read this week? (3). 3. How many music lessons has he a week? (2). 4. How many English books have you at home? (about 30). 5. How many of those words could the student translate? (10). 6. How many problems must you solve at the meeting? (one). 7. How long will you be at the University tomorrow? (all day long). 8. How long will your sister be in Minsk? (about one week).

XXIV. а) *Прослушайте текст урока, следя за диктором по книге;* б) *Слушайте текст, повторяя в паузах отрезки текста;* в) *Прослушайте текст еще раз, не глядя в книгу, стараясь понять его со слуха.*

XXV. *Ответьте на вопросы, используя текст урока. Запишите ваши ответы с помощью знаков + или — или нужной цифры.*

1. How old is Peter? 2. Is he a student? 3. Was he a student last year? 4. Is he a Muscovite? 5. Is he from Leningrad? 6. Has he a large family? 7. How big is his family? 8. Has he a sister and a brother? 9. Is his mother a doctor? 10. Is his father a teacher? 11. How old is his mother? 12. Is his sister very much like their mother? 13. Have they got a big apartment? 14. Are all the rooms in their apartment large? 15. Is Peter fond of music? 16. Can he play the piano?

XXVI. *Прослушайте диалоги. Попытайтесь понять и запомнить их содержание с тем, чтобы участвовать в беседе по теме диалогов на следующем занятии в аудитории.*

Dialogue 1

— Say, Peter, will you be here tomorrow?	— Yes, I shall.
— Will Bob be at the University too?	— No, he won't. He is ill. He must be at the doctor's in the morning. And what is it?
— We must have a meeting one of these days (на днях).	— What will the meeting be about?
— It'll be about our work in the construction team of the international students' camp next summer.	— Will that be in July?
— In July and August, for about six weeks.	— How many students of our group can go?
— Five or six. And only boys. The work will not be easy. Can you and Bob come?	— I can't speak for Bob but I'll be happy to come. When can we meet tomorrow?
— We can meet after the lectures.	— Very well then. Let's meet after the lectures and discuss it all.
— O. K! See you tomorrow.	

Dialogue II

- What are your plans for the summer vacation, Nina?
- What town are you from?
- I'm from Smolensk.
- Yes, it's an old Russian [rʌʃən] town.
- Yes, there is. I'll be in this camp in July and in August and may be I can go home for a few days.
- They will. And my little brother too.
- I have no plans for July but in August I may go home for two weeks.
- I am from Tomsk, and you?
- Smolensk is very old, isn't it? (He так ли).
- There is an international students' camp not far from Smolensk.
- Oh, your mother and father will be happy to have you at home.

Домашнее занятие II

XXVII. *Задайте и запишите вопросы, уточняя информацию.*

1. There are a lot of beautiful old buildings in Moscow. (what kind of). 2. We also have many new modern buildings. (what kind of). 3. Some of them are in the centre of Moscow. (where). 4. In the centre of the city [ˈsiti] we can also see theatres and concert halls. (what, where). 5. Yesterday I was at the Bolshoi theatre. (when). 6. It was Sunday (what). 7. They had a ballet on [ˈbælei]. (what). 8. It was rather long and I could only get home late in the evening. (when). 9. The ballet was very beautiful. (what kind of). 10. I was fond of the music of the ballet. (what).

XXVIII. *Выразите несогласие с утверждением и уточните. Запишите ваш ответ.*

June is a winter month. (summer)

No, it's not. It's a summer month.

1. We have eighteen faculties at the University. (seventeen). 2. She has her vacation in September. (August). 3. Her grandmother is rather a young woman. (old). 4. He is a very active child. (lazy). 5. They had a three-room apartment. (two). 6. He is fond of music. (football). 7. Your mother is a teacher of French. (English). 8. Students of our group must work on the state farm in June. (July and August). 9. There are many international students' camps not far from your town. (only one). 10. There was a beautiful new theatre there. (old).

XXIX. *Задайте вопросы, ответы на которые содержатся в данных предложениях.*

Every week-day I must rise early. I must go to the University. I need not go there on Sunday. Today I have one lecture. There is

also a seminar and an English class. After my classes are over I can go to the dining-room. After that I can go home or to the library. I have a lot of homework for tomorrow. In the evening I'll be free. I can go to the theatre, or to some concert.

XXX. Прочитайте текст. Вы должны уметь устно передать его содержание применительно к себе. Воспользуйтесь вопросами, данными после текста.

I am Betty Podolsky. I'm eighteen. I am a first-year student at the faculty of cybernetics. There are 25 students in our academic group. Some of them are Muscovites but there are many students from other towns and cities of the Soviet Union. I am from Pskov. My family is in Pskov now. My family is not very large. There are four of us. Mother, father, my little brother and I (me). I have no sisters. My mother is a pianist. My father is a doctor. My brother is a schoolboy. He is 14. He is a very bright and active boy. He is fond of music and can play the piano very well. I am missing my family and my home town, but I cannot go there now. I can go there only after my exams in January. I'll have my vacation then.

1. What is your name? 2. How old are you? 3. Are you a first or a second-year student? 4. Are you a Muscovite? 5. What town are you from? 6. Have you got a big family? 7. How many of you are there? 8. Have you got brothers or sisters? 9. What is your mother? 10. What is your father?

Аудиторное занятие III

XXXI. Прочитайте данные слова и назовите их русские эквиваленты.

simple—simply, easy—easily, nice—nicely, open—openly, week—weekly, month—monthly, active—actively, to translate—translator, to give—giver, to work—worker, begin—beginner;

demonstration, constructions, dissertation, segmentation, roomless, workless, fatherless, motherless, helpful, helpless, changeless, argument, placement.

XXXII. Прочитайте вслух текст 'About my Family and Myself'.

XXXIII. Ответьте на вопросы преподавателя по тексту.

XXXIV. Просмотрите тексты диалогов (см. упр. XXVI). Побеседуйте на тему диалогов. Поменяйтесь ролями.

XXXV. Прочитайте текст и передайте его содержание по-английски. Вы можете добавить кое-что от себя и воспользоваться текстом упр. XXX.

Меня зовут Лена (Helen). Я студентка. Мои занятия окончены и теперь я могу поехать домой на каникулы в маленький город на Волге (on the Volga). Некоторые из наших студентов в Смоленске.

Они в международном студенческом строительном отряде. Мне очень жаль (I'm sorry), что я не могла поехать туда. Я была больна после своих экзаменов. Я побуду дома две или три недели, и затем я собираюсь быть в Москве. Во второй половине августа я должна работать в одной из библиотек университета. В университете много библиотек и они должны быть готовы к новому учебному году.

Я буду счастлива повидать свою семью через несколько дней. Я хорошо проведу время с моей мамой, папой и маленькой сестрой.

УРОК 7

Аудиторное занятие I

Грамматика:

Словообразование

Времена группы Indefinite (Active Voice)

Понятие о нестандартных глаголах

Словообразование с помощью суффиксов: *-ance, -ence, -ity, -ous, -al, -ic(al)*.

а) Суффиксы существительного:

-ance — to as'sist — as'sistance — помощь

-ence — to 'differ — 'difference — различие

-ity — 'active — activity — активность

б) Суффиксы прилагательного:

-ous — fam(e) — 'famous — знаменитый

-al — e'motion — e'motional — эмоциональный

-ic(al) — 'histor(y) — his'toric(al) — исторический

I. Прочитайте вслед за преподавателем.

'conference, 'distance, 'substance, 'permanence, 'preference; sta'bility, simp'licity, u'tility; 'national, professional, 'phisical, 'chemical; ar'tistic, 'basic, auto'matic(al), аса'demic.

Слова урока

Прочитайте вслед за преподавателем данные интернациональные слова и попытайтесь назвать их русские эквиваленты.

'German *a*, demo'cratic *a*, re'public *n*, theatre *n*, nationality [næʃə'næliti] *n*, 'different *a*, west *n*, exercise ['eksəsaɪz] *n, v*, journal ['dʒə:nl] *n*, period ['piəriəd] *n*, periodical [piəri'ɒdikəl] *n*, museum [mju:'ziəm] *n*, faculty ['fækəlti] *n*, 'monastery *n*, 'stadium *n*, park *n*, 'phisics *n*, а'tomic *a*.

Прочитайте вслед за преподавателем следующие слова.

'letter *n* 1. буква; 2. письмо
sometimes ['sʌmtaɪmz] иногда
friend [frend] *n* друг, приятель

ancient ['eɪnjənt] *a* древний
lovely ['lʌvli] *a* прелестный,
очаровательный

be back *v* возвращаться
 be away [ə'wei] *v* отсутство-
 вать; *adv* far away далеко
 know [nou] (knew [nju:],
 known [noun]) *v* знать
 want [wənt] *v* хотеть
 since [sins] *conj* так как, по-
 скольку; *prep* с (с тех пор
 как)
 independent [,indi'pendənt] *a*
 независимый
 room-mate *n* сосед по комнате
 country ['kʌntri] *n* 1. страна;
 2. деревня, загородная
 местность
 light [lait] *n* свет; *v* освещать
 get (got) *v* добывать, получать
 get up *v* вставать, подниматься
 get to *v* добираться (до)
 o'clock [ə'klɒk] время на часах
 course [kɔ:s] курс, ход
 usual ['ju:ʒuəl] *a* обычный
 usually *adv* обычно
 morning ['mɔ:nɪŋ] *n* утро
 in the morning утром
 shower ['ʃaʊə] *n* душ
 breakfast ['brekfəst] *n* завтрак
 afternoon ['ɑ:ftə'nu:n] *n* время
 после полудня; in the after-
 noon после полудня
 dinner ['dɪnə] *n* обед
 have dinner обедать
 walk [wɔ:k] *n* прогулка; *v* гу-
 лять, идти пешком
 round [raʊnd] *n* круг; *a* круг-
 лый
 rest *n* покой; *v* отдыхать
 look [lʊk] *n* взгляд; *v* смотреть
 through [θru:] *prep* через,
 сквозь
 day день; day off *n* выходной
 день

green *a* зеленый
 'matter ['mætə] *n* 1. сущность,
 материя; 2. дело
 parent ['peərənt] *n* родитель
 research [ri'sə:tʃ] *n* исследова-
 ние
 field [fi:ld] *n* 1. область (нау-
 ки); 2. поле
 truth [tru:ə] *n* истина
 hope [haʊp] *n* надежда; *v* на-
 деяться
 ticket ['tikit] *n* билет
 if *conj* если
 term [tə:m] *n* 1. срок; 2. се-
 местр
 'terminal *a* 1. конечный; 2. се-
 местровый
 before [bi'fɔ:] 1. до, перед;
 2. прежде чем
 cinema ['sinimə] кино
 mind [maɪnd] *n* мысль, мнение;
v 1. помнить; 2. возражать
 regard [ri'ga:d] *n* 1. уважение;
 2. взгляд; *v* 1. смотреть на;
 2. рассматривать
 library ['laɪbrəri] библиотека
 Muscovite ['mʌskəvaɪt] москвич
 hostel ['hɒstəl] общежитие
 week-end конец недели
 last *v* длиться; *a* 1. последний;
 2. прошлый
 'credit-test *n* зачет
 night [naɪt] *n* ночь, вечер
 success [sək'ses] *n* успех
 Sunday ['sʌndi] *n* воскресенье
 Monday ['mʌndi] *n* понедель-
 ник
 Tuesday ['tju:zdi] *n* вторник
 Wednesday ['wenzdi] *n* среда
 Thursday ['θə:zdi] *n* четверг
 Friday ['fraɪdi] *n* пятница
 Saturday ['sætədi] *n* суббота

Notes

1. to tell the truth
2. as a matter of fact
3. take their course
4. all of us
5. it does not take us long

- по правде говоря
- кстати, между прочим
- проходят курс, занимаются
- все мы
- это не требует много времени

6. take a walk	— совершаю прогулку
7. look through	— просматриваю (книги, журналы)
8. get back	— возвращаюсь
9. I should like	— я бы хотел
10. tonight	— сегодня вечером
11. after all	— в конце концов
12. make up your mind	— решай(ся)
13. best regards	— привет (кому-нибудь)
14. I can't help it	— ничего не могу поделать

11. Прочитайте следующие предложения. Обратите внимание на изменение глагола-сказуемого в зависимости от лица, числа и времени.

a) My room-mate gets up early. I also get up early. She plays the piano well. You also play the piano well. We live in our home town. They also live in their home town.

b) Mother helped me to do the work. They discussed various aspects of the problem. Our teacher came early this morning. He played football yesterday. You did your homework well.

c) I shall meet my friend tomorrow. He will write another paper. They will change the method of their work. We shall begin the experiment tomorrow. You will leave the town next week.

d) I do not (don't) speak English well. He does not (doesn't) live in the hostel. You do not (don't) have breakfast early. She does not (doesn't) like such music. They do not (don't) miss lectures.

e) I did not (didn't) find my brother in the hostel. We did not (didn't) like the concert yesterday. They did not (didn't) take part in our work. He did not (didn't) write me a letter last month.

f) We shall not take part in the discussion. He will not pass his exam. I shall not go to the dining-room after my English class. These students will not do research in your laboratory.

g) Do you do research in this field? Do they study various problems in their lab? Does he work a lot at his English? Does she help her mother about the house? Does your brother play basket-ball well?

h) Did you see her at the theatre? Did your friend come to your place last night? Did they leave early yesterday? Did she have dinner with you the other day (на днях)?

i) Will you come to the main building? Will they hold the meeting in the conference hall? Will the students work on the state farm in the summer? Shall I help you with this work? Shall we go now?

Сравните структуру вопросительных предложений различного типа.

Where When	Does does does	He Who he he he	works at the University now. works at the University now? work at the University now? work now? work at the University? →Yes, he does. →No, he does not.
Whom When	Did did did	My sister Who Whose sister my sister my sister my sister	helped him yesterday. helped him yesterday? helped him yesterday? help him yesterday? help yesterday? help him? →Yes, she did. →No, she did not.
Where When	Will will will	They Who they they they	will come here soon. will come here soon? come here soon? come soon? come here? →Yes, they will. →No, they will not.

Лабораторное занятие I

III. а) Прочитайте данные слова и группы слов и сравните ваше чтение с последующим чтением их диктором. Вспомните правила чтения гласной *e*.

[e]	[i:]	[ə:]	[iə]	[ei]
felt	legal	certain	hear	eight
head	seem	search	here	grey
ready	easy	early	period	they
method	even	heard	steer	weight
breath	recent	mercy	serious	convey
[i:—e]			[iə—ə:]	
heal—health			hear—heard	
heat—head			near—earn	
steam—steady			clear—learn	
heal—heavy			ear—earth	

б) Обратите внимание на чтение согласных *c*, *g*.

scene, cure, cat, coil, crook, choice, scent, scant, cow, cycle, crowd, cent;

change, brig, bridge, globe, glide, gym, glad, age, gypsy, gold, page.

в) *Обратите внимание на чтение окончаний:*

1. *3-го лица единственного числа глагола:*

[s] — wants, lasts, likes, puts, makes, marks, helps, starts, hopes, notes;

[z] — controls, answers, solves, attends, works, dies, buys, tries, tells, sends, fails, sides, shows, goes, programs;

[iz] — places, closes, crosses, finishes, rises, passes, studies, changes.

2. *прошедшего времени глагола:*

[t]
like—liked
hope—hoped
help—helped
ask—asked
cross—crossed

[d]
call—called
change—changed
enter—entered
handle—handled
perform—performed

[id]
divide—divided
end—ended
record—recorded
select—selected
result—resulted

IV. *Прочитайте за диктором упр. I.*

V. *Слушайте и повторяйте слова урока.*

VI. *Слушайте и повторяйте упр. II (a—i).*

VII. *Выслушайте диктора и скажите, что кто-то еще делает то же самое.*

Sp.: I speak English in class. (he)

St.: He also speaks English in class.

a) We translate easy texts. (she). I do physics. (he). You do research. (he). They go to college. (she). I take part in this work. (he). You live in a nice room. (she).

b) He lives in the centre of the city. (I). She plays the piano very well. (you). He misses a lot of lectures. (you). She reads, writes and speaks French. (they). Their room-mate rises early. (we).

VIII. *Ответьте на вопросы.*

Sp.: Do you read English? (Yes, no)

St.: Yes, I do. No, I do not (don't).

a) Do you attend his lectures? (Yes). Do you come to the University every day? (No). Do they translate easy texts? (Yes). Does he like modern music? (No). Does she live in Moscow? (Yes). Does he do mathematics? (No).

Sp.: Did they come in time? (Yes, no)

St.: Yes, they did. No, they did not.

b) Did you discuss these changes? (Yes). Did he find that book in the library? (No). Did she come in the evening? (Yes). Did you go to the theatre last night? (No).

Sp.: Will you come tonight? (Yes, no)

St.: Yes, I shall. No, I shall not. (shan't).

c) Will you see him tonight? (No). Will she help her grandmother? (Yes.) Will he give you the information? (Yes). Will they do research next year? (No).

Sp.: Shall I help you? (Yes, No)

St.: Yes, please, do. No, please, don't.

d) Shall I come to your place? (Yes). Shall I tell him about it? (No). Shall I read? (Yes). Shall I translate? (No).

IX. *Переспросите, выразив сомнение.*

Sp.: He works a lot. (worked, will work)

St.: Does (did, will) he really work a lot?

He speaks English very well. She likes classic music. She plays the piano beautifully. He lives in their apartment. His day begins early.

She helped her friends to finish the test. They asked me about my family. He changed the first part of his letter. I placed the book on the table.

They will come next week. I shall meet him at his place. (у него дома). They will help the children to do it. I shall miss you. She will play the piano at the concert.

X. *Возразите и уточните.*

Sp.: Does he speak German? (French)

St.: No, he doesn't speak German. He speaks French.

Does she do cybernetics? (mechanics). Do they live in Moscow? (in Kiev). Does he live in the hostel? (at home). Do you usually have dinner at home? (dining-room).

Did they ask you about the child? (his mother). Did you work with him yesterday? (three days ago). Did they change the place of the meeting? (the time). Did she attend his lectures? (seminars).

Will you rise early on your day off? (late). Will they speak English with that scientist? (French). Will he do physics at college? (mathematics). Will she go to the library? (reading-room).

Домашнее занятие I

XI. *Прочитайте каждое предложение упр. II (a—i) и напишите: а) в прошедшем времени; б) в будущем времени; в) в настоящем времени; d, e, f) в утвердительной форме; h, i) в настоящем времени. Не забудьте изменить обстоятельство времени.*

XII. *Ответьте на вопросы и запишите ваши ответы.*

Does the man live *in Moscow* or in Smolensk?

The man lives *in Moscow*.

Does the school year begin in *September* or in October? Does the boy's mother teach *French* or English? Does the academic term last

three or *four* months? Do they go to *college* or to the University? Do you take a shower *in the morning* or in the evening?

Did they have dinner after *the second lecture* or after their English class? Did he speak English or *German* at the conference? Did your room-mate get up late or *early* on his day off? Did you write your test-work with *a pen* or with a pencil?

Will you meet him or *his girl-friend*? Will she leave tonight or *tomorrow night*? Will the boy play football or *basket-ball*?

XIII. *Задайте вопросы, воспользовавшись вопросительными словами, данными в скобках.*

1. One of my group-mates wants to take his terminal exam next Monday. (when). 2. She finished school last June. (when). 3. The test lasted two weeks. (why). 4. We wanted to know the truth about the state of their research work. (what). 5. They took a long walk round the main building of the University. (when). 6. My boy-friend got two tickets for the theatre tonight. (how many). 7. He could not take a shower in the morning. (why). 8. I had breakfast at 7 o'clock in the morning. (when). 9. He usually has dinner early in the evening. (when). 10. She usually walks home after classes. (why). 11. He hopes to help this lovely child. (when). 12. We usually hold our meetings in the main conference hall. (where). 13. I shall go home in the afternoon. (why). 14. There is a round building in this part of the town. (what kind of). 15. He did not see his parents last summer. (why). 16. They will do their morning exercises in the park. (why). 17. Saturday and Sunday are his days off. (why). 18. They will play some light music at the concert tonight. (where). 19. There is a lovely green park near the boy's house. (what kind of). 20. This ancient monastery is a museum now. (what). 21. I saw the results of their research in one of the periodicals on Monday. (where). 22. They discussed the results of research in the field of atomic physics. (when). 23. Children of different nationalities lived in this camp in the summer. (where). 24. She went to the library on Tuesday and Friday. (where). 25. He did not work in the lab on Wednesday and Thursday. (why).

XIV. *Задайте и запишите вопросы относительно лица, указанного в скобках.*

He lived in a big city at that time. (you)

Did you also live in a big city at that time?

1. My room-mate came home late last night. (you). 2. I know very little about this ancient town. (he). 3. He looked through these journals yesterday afternoon. (your group-mates). 4. He made up his mind to take up physics. (you). 5. I went to see my doctor last week. (your friend). 6. Our students' team usually works at that construction site in summer. (their group). 7. We must know the truth about the result of this research. (they). 8. I usually take a walk in the evening. (your brother).

XV. Ответьте на вопросы отрицательно и уточните.

Did you get up at 8 o'clock? (7)

No, I did not. I got up at 7 o'clock.

1. Did you read a book in the reading-room? (a journal). 2. Do you take a shower in the evening? (in the morning). 3. Does he have breakfast at home? (in the dining-room). 4. Will you go to the stadium? (park). 5. Did you speak to your teacher? (my class-mate). 6. Does your friend do atomic physics? (mechanics).

Аудиторное занятие II

XVI. Прочитайте контрольное упражнение.

mere, theft, kneel, they, rear, hear, teach, head, gently, meet, earn, clear, hero, grey, queer, eat, steady, seen, sea, eight, secret, spread, length, verse, weight, breath, bread;

cage, grow, gap, gent, glory, gender, green, log, stage, gay, edge, angle, bridge;

cute, care, concern, acclaim, accept, curtain, cube, coal, cruel, pen-
ce, clear, accent, decree, close, scene, face, accord, acute, accuse, acci-
dent, account, acid, ace.

XVII. Задайте возможно большее количество вопросов к каждому предложению упр. XIII.

XVIII. Задайте вопросы, воспользовавшись вопросительным словом, предложенным преподавателем.

T.: He will go to the East in the summer. (where)

St.: Where will he go in the summer?

XIX. Ответьте отрицательно на вопрос преподавателя.

T.: Does he get up early?

St.: No, he doesn't. He doesn't get up early.

XX. Прежде чем приступить к чтению текста 'A Letter to a Friend', прочитайте вслед за преподавателем слова урока.

XXI. Внимательно слушайте чтение текста преподавателем, следя за интонацией, ритмом, ударением. Постарайтесь понять содержание текста.

A Letter to a Friend

Dear Peter!

I'm back to Moscow after my short vacation at home. I'm so sorry you were away from Smolensk and I could not see you this time. I had so much to speak to you about. I wanted to tell you about my life in Moscow. Well, I shall try to do it in this letter.

You know, since I am not a Muscovite I live in the students' hostel. To tell the truth¹, I am happy about it, since I like to be in-

dependent. In the hostel I share a room with two other boys. One of them is from Tallinn. His name is Matty. The other boy is from Galle, a town in the Federal Republic of Germany. He is German. His name is Paul. As a matter of fact² they are not only my room-mates but also my good friends. So you see, students of various nationalities and from different countries take their course³ at Moscow University.

We have a very nice and comfortable room. It's also very light, since it faces West. All of us⁴ are early risers. We usually get up at 7 o'clock. After the usual morning exercises and a shower we have breakfast. Since we don't like to be late for our classes we try to come to the University a little before 9 o'clock. We usually have lectures and seminars in the morning and sometimes in the afternoon. After classes we have dinner at the students' dining-room. It does not take us long⁵. Then I usually take a walk⁶ round the University building. I like to do it by myself. That's my idea of a good rest. After that I go to the reading-room and look through⁷ journals and periodicals. On Tuesday and Friday I also do my English homework in the reading-room. I get back to⁸ my room in the hostel rather late in the evening.

On my day off, that is on Sunday, I usually go to the centre of Moscow. There is so much to see and there are so many places to go to. There are old and modern theatres, concert halls, various museums, beautiful ancient monasteries among them. There are also lovely green parks and stadiums.

Today is Sunday. I should like⁹ to go to some theatre with my girl-friend. Her name is Ann. She is a lovely girl, very nice and bright. She is also a student. She does physics. As a matter of fact her parents are also physicists. Her father does research in the field of atomic physics.

I hope we shall get tickets for the theatre tonight¹⁰. If we do not get the tickets we can go to the cinema. There are some new films on.

You know, Pete, I have a very good idea. After all¹¹ Smolensk is not so far away from Moscow. You can come here for the week-end. If you can't come now, may be you will come at the end of January. I must take my terminal exams in January. As you know our first term lasts from the first of September through October, November and December. In December we have our credit-tests and if we take them successfully we can take our exams. The exams are usually over by the 24th of January. Then we are free. Make up your mind¹² and come to Moscow. I'll be happy to see you here. You will meet my friends and we shall have a very good time together.

My best regards¹³ to your parents.

Yours, Alex.

XXII. Найдите в тексте ответы на следующие вопросы.

Why could not Alex see his friend in Smolensk? What did Alex want to speak to Peter about? Is Alex a Muscovite? Where does he live in Moscow? What towns are his room-mates from? What kind of

room have the boys in the hostel? When do they usually get up? When and where do they usually have dinner? Why does Alex go to the library? Where does he go to on his day off? What is the name of his girl-friend? What kind of girl is she? What are her parents? Whom can Pete meet in Moscow in January? Will Alex be happy to see his friend in Moscow?

Лабораторное занятие II

XXIII. Прочитайте данные группы слов, сопоставляя ваше чтение с последующим чтением их диктором. Повторите правильный вариант.

be—bet	Pete—pet	her—hear	dew—deuce
we—wet	these—then	term—tear	new—'neutral
she—shelf	scene—scent	fern—fear	few—'feudal
deer—here	deed—deal—dead	rein—trey	
cheer—sphere	beet—beat—breath	vein—grey	
beer—mere	heel—heal—health	veil—they	

XXIV. Слушайте и повторяйте. Постарайтесь догадаться о значении данных слов. Уточните правильность понимания их по словарю.

'difference, im'portance, 'gravity, sim'plicity, 'scrupulous, ar'tistic, he'roic, mathe'matical, 'distance, 'substance, el'liptic, sym'bolic, as'sistance, e'lastic, 'comic, 'sceptical.

XXV. Замените в предложении действующее лицо.

Sp.: I speak English. (he)

St.: He also speaks English.

You live in a nice apartment. (she). He knows them well. (I). We got up early. (she). I shall ask him about his exam. (she). They do research. (he). We attend lectures. (she). She translates easy texts. (they). She left Moscow. (they). He will read and write English. (I). She takes music lessons. (I). You do maths. (he). He takes part in amateur concerts. (You). They will need your help. (I). You wrote it nicely. (he). We shall walk home. (they). He came late. (we).

XXVI. Ответьте на вопросы.

1. Where do you work? (at the University). 2. What did they discuss yesterday? (the plan of their future work). 3. When will you make up your mind about the college? (very soon). 4. When did the boy have breakfast? (early in the morning). 5. How does he speak French? (very well). 6. Whom did you see at the conference? (some young scientists). 7. What kind of information did they get? (very important). 8. Who will take part in the work of the Seminar class? (some of our students).

XXVII. Выслушайте вопрос диктора и ответьте.

Sp.: On Monday I have two lectures, and you?

St.: I also have two lectures on Monday.

a) 1. You were late for your class on Saturday, and Ann? 2. She wanted to help them on Friday, and you? 3. They will come on Tuesday, and she? 4. You left school last year, and your brother? 5. They are fond of light music, and he? 6. You know German and English, and your sister? 7. Your friend usually takes a walk after dinner, and she? 8. I look through scientific journals after classes, and you? 9. She hopes to go to the East in the summer, and they? 10. She passed her exams successfully, and you? 11. She took a course in history, and he?

Sp.: He teaches English, and you? (mechanics)

St.: I don't teach English. I teach mechanics.

b) 1. I shall go to the theatre tonight, and you? (tomorrow). 2. I attended his lecture, and you? (Seminar class). 3. We held a scientific conference last October, and they? (last November). 4. They will go to the library on Wednesday, and you? (Thursday). 5. I handed in my test-paper three days ago, and he? (only yesterday). 6. I had dinner rather early in the afternoon, and you? (in the evening). 7. She got a letter on Wednesday, and he? (Sunday).

XXVIII. а) *Прослушайте текст урока, следя за диктором по книге;* б) *Слушайте текст, повторяя в паузах отрезки текста;* в) *Послушайте текст еще раз, не глядя в книгу, стараясь понять его содержание со слуха;* г) *Ответьте на вопросы по тексту урока. Запишите ваши ответы с помощью символов + или —.*

1. Could Alex see his friend in Smolensk? 2. Did he want to see him? 3. Is Alex a Muscovite? 4. Does he live in the students' hostel? 5. Is he sorry about it? 6. Does he share a room with one boy? 7. Are his room-mates from Vietnam? 8. Are there students of various nationalities at Moscow University? 9. Do students from different countries come to the Soviet Union? 10. Do students usually have seminars in the evening? 11. Do they have dinner after classes? 12. Does Alex look through journals and periodicals in the reading-room? 13. Does he go to the centre of Moscow every week-day? 14. Is his girl-friend's name Nina? 15. Are her parents doctors? 16. Does Alex hope to get tickets for the theatre?

XXIX. *Послушайте данные диалоги. Попытайтесь понять и запомнить их содержание с тем, чтобы участвовать в беседе по теме диалогов на следующем занятии в аудитории.*

Dialogue I

— Hello, Alex!

— Oh, hello, Nick. How are you?

— Very well, thank you (спасибо). And how are you?

— I'm fine. I only came back to Moscow after my summer vacation yesterday.

— Oh, did you? And I came a few days ago. But to tell the truth I'm not happy about it.

— Why? What's the matter?

— I had a very short vac at home. Only two weeks.

— That's not very long, is it?

Dialogue II

— Say, Nick, when do you usually rise in the morning?

— At about 7 o'clock. And you?

— I don't rise so early. Only at 8 o'clock.

— But you have very little time for your morning exercises, the shower and your breakfast.

— Oh, it doesn't take me long to have breakfast and a shower.

— And what about your morning exercises?

— I don't do them. I'm too (слишком) lazy in the morning.

— That's too bad.

— I know, but I can't help it¹⁴.

Домашнее занятие II

XXX. Напишите русские эквиваленты данных английских слов. Затем уточните их значение по словарю.

inter'ference, 'preference, as'sistance, corres'pondence, 'elegance, 'competence, 'distance, 'substance; re'alinity, ac'tivity, 'unity, sta'bility, popu'larity; 'national, e'motional, 'social, 'special, theo'retical, 'critical, 'vertical; syste'matic, rea'listic, sym'bohc; 'various, 'serious, 'scrupulous.

XXXI. Прочитайте текст, где есть интернациональные слова, о значении которых вы можете догадаться. Значение остальных незнакомых слов можно узнать по словарю. Задайте и запишите вопросы, воспользовавшись словом в скобках.

This is my first visit to Moscow. (whose). I hope to see a lot of interesting things here. (what). Moscow is a large industrial city. (what kind of). Yury Dolgoruky was the founder of Moscow. (who). There are a lot of beautiful ancient buildings in Moscow. (what kind of). There are opera ['ɒpərə], drama ['dra:mə] and ballet ['bæleɪ] theatres in the centre of Moscow. (what). You can find history and science museums, hundreds of libraries, many picture galleries ['gælərɪz] (картинные галереи) in this city. (where). I should like to go to the Lenin Hills. (why). One of my friends visited Moscow last year. (who). He told me a lot about his visit. (what). He saw the main building of the University on the Lenin Hills. (where). He liked it very much. (what). I hope to go there today in the afternoon. (when).

XXXII. Выразите несогласие, уточните и запишите ваш ответ.

Your room faces East. (West)

No, it does not. It faces West.

1. She usually rises at 9 o'clock. (7). 2. You take a shower in the evening. (in the morning). 3. They come to the University a little after 9 o'clock. (before). 4. You have breakfast in the afternoon. (in the morning). 5. He lives in Tallinn. (Kiev). 6. She wanted to look through some book. (journals). 7. They went to the cinema last night. (theatre). 8. His sister does physics. (mathematics). 9. It is an ancient town. (modern). 10. This man works in the field of mechanics. (cybernetics). 11. They will go to different countries. (only one country).

XXXIII. *Задайте и запишите вопросы по существу каждого предложения текста.*

My brother went to England on a short visit. He left Moscow at eleven o'clock in the morning yesterday. He was in London at two o'clock in the afternoon. It took him about three hours (час) to get to London. He will take part (принимать участие) in a very important scientific conference there. They will work in the morning and in the afternoon. In the evening he may try to go to one of the many London theatres. He may also take a walk in one of the beautiful parks of London. He wanted to go and see the National Gallery and the British Museum. It is one of the best museums in Europe.

When V. I. Lenin 'emigrated to London he liked to work in the library of the British Museum. The table at which V. I. Lenin used to (обычно) work is still (все еще) there.

There are a lot of other things to see in London. I am sure my brother will tell me all about London and Londoners.

XXXIV. *Прочитайте еще раз приведенный выше текст. Попробуйте устно изложить содержание этого текста по-английски.*

Аудиторное занятие III

XXXV. *Прочитайте данные слова и попытайтесь догадаться о значении выделенных слов.*

im'portant — im'portance, 'present — 'presence, 'scandal — 'scandalous, 'serious — 'seriously, 'logic — 'logically, automatic — auto'mation, 'system — syste'matic — syste'matically, 'various — 'variance, 'foreign — 'foreigner, 'usually — 'usual, to thank — 'thankful, 'popular — popu'larly; equal['i:kwəl] — 'equally — e'quality [i:'kwɒliti], hope — 'hopeless — 'hopeful, base — 'baseless — 'basic — 'basically.

XXXVI. *Прочитайте вслух текст 'A Letter to a Friend'.*

XXXVII. *Ответьте на вопросы преподавателя по тексту урока.*

XXXVIII. *Просмотрите тексты диалогов (см. упр. XXIX). Побеседуйте на тему диалогов. Поменяйтесь ролями.*

XXXIX. *Изложите содержание текста упр. XXXIII по-английски.*

XL. Прочитайте текст и передайте его содержание по-английски. Работайте в паре.

Меня зовут Александр. Я студент первого курса мехмата МГУ. Так как я не москвич, я живу в студенческом общежитии. У нас хорошее общежитие. Оно находится недалеко от главного здания университета. В одной комнате со мной живут еще три студента из моей академической группы. В конце августа мы все приехали из разных городов нашей страны и теперь живем вместе. Мы обычно встаем в семь часов утра и у нас есть время сделать зарядку и позавтракать. Мы стараемся не опаздывать на занятия. У нас обычно бывают лекции и семинары утром, а иногда после полудня. Затем мы идем в столовую, а потом в библиотеку.

В выходной день, в воскресенье, мы стараемся поехать в центр города. В Москве много прекрасных музеев, больших и маленьких, старых и новых. Я люблю ходить в театр, но не всегда легко достать билеты. Мой брат скоро приедет в Москву повидать меня. Я надеюсь пойти с ним в Большой театр, в Кремль и показать ему некоторые из московских музеев. Кстати говоря, это будет его первый приезд в Москву.

По правде говоря, я очень скучаю по папе, маме и сестре. Но они не могут приехать в Москву. Я надеюсь повидать их летом после моих весенних экзаменов. Я уверен, что буду счастлив увидеть свой родной город и всех моих друзей.

УРОК 8

Аудиторное занятие I

Грамматика:

Словообразование

Future Indefinite в придаточных предложениях условия и времени.
Местонимение 'it'

Словообразование с помощью суффиксов: *-ure (ture)*, *-th*, *-age (-dge)*, *-ive*, *-able (-ible)*.

а) Суффиксы существительного:

-ure — press — pressure — давление

-th — long — length — длина

-age — to us(e) — usage — использование

б) Суффиксы прилагательного:

-able (-ible) — to us(e) — usable — употребляемый; convert — convertible — обратимый

-ive — effect — effective — эффективный

1. Прочитайте вслед за преподавателем.

'pressure [ʃ], 'culture [tʃ], 'closure [3], ex'posure, length, width, depth, strength;

usage, passage, knowledge, 'stoppage;
'usable, 'readable, pre'sentable, 'visible;
'primitive, 'active, prog'ressive, im'pulsive.

Слова урока

Прочитайте вслед за преподавателем данные интернациональные слова и попытайтесь назвать их русские эквиваленты.

'final *a*, 'special *a*, 'communist *n*, 'mark *n, v*, re'sult *n, v*, 'privilege *n*, 'faculty *n*, mathematician [ˌmæθɪmə'tɪʃn] *n*, 'brilliant *a*, de'tail *n*, philosophy [fɪ'lɒsəfi] *n*, 'actually *adv*, present *n, a*, pre'sent *v*, 'future *n*, to 'publish, form *n, v*, abstract ['æbstrækt] *a*, cafeteria [ˌkæfɪ'tiəriə] *n*, 'service *n*, candidate ['kændɪdɪt] *n*, academic ['ækə'demɪk].

Прочитайте вслед за преподавателем следующие слова.

awful ['ɔ:ful] ужасный
so таким образом, так
difficult ['dɪfɪkəlt] трудный
such такой, подобный
busy ['bɪzi] занятой
defend [dɪ'fend] защищать
graduation [ˌgrædʒu'eɪʃən] окончание, завершение
past прошлый, прошедший
field [fi:ld] 1. область; 2. поле
entrance ['entrəns] вступление, вход
knowledge ['nɒlɪdʒ] знание
compete [kəm'pi:t] соревноваться
competitive [kəm'petɪtɪv] конкурсный
foreign ['fɔ:ɪn] 1. иностранный; 2. чужой, чуждый
language ['læŋgwɪdʒ] язык
manage ['mænɪdʒ] 1. управлять; 2. суметь, справляться
sure *a* [ʃuə] уверенный
be sure быть уверенным
besides [bi'saɪdʒ] кроме, за исключением
attend [ə'tend] посещать
degree [di'ɡri:] степень
because [bi'kɔ:z] так как, потому что
disposal [dɪs'pəʊzəl] размещение

learn [lɜ:n] *v* 1. изучать; 2. узнавать
certain ['sɜ:tn] *a* 1. определенный; 2. некий
'certainly *adv* конечно, несомненно
thing [θɪŋ] вещь
belong [bɪ'lɒŋ] принадлежать
run (run) *v* 1. бежать; 2. приводить в действие
advise [əd'vaɪs] совет
adviser [əd'vaɪzə] консультант, советчик
gifted одаренный
'helpful полезный
convenient [kən'vi:njənt] удобный
mean [mi:n] (meant [ment]) *v* 1. значить; 2. иметь в виду
'meaning значение
post-office ['pəʊst ˌɒfɪs] почтовое отделение
'bookstall книжный киоск
facility [fə'sɪlɪti] *pl* (мн.) удобства; оборудование
for [fɔ:] *prep* 1. в течение; 2. для
for *conj* так как, поскольку
just [dʒʌst] *a* 1. справедливый; 2. верный
just (as) *adv* как раз, именно так
before [bɪ'fɔ:] *prep* до, перед; *conj* прежде, чем

during [ˈdʒuəriŋ] во время, на протяжении
 obtain [əbˈteɪn] получать, доставать
 article [ˈɑːtɪkl̩] статья
 hear [ˈhiə] (heard [hə:d]) слышать
 sun(ny) солнце (солнечный)
 abstract *n* резюме, реферат
 hard *a* 1. твердый, жесткий;
 2. трудный
 hard *adv* 1. твердо, сильно;

2. усиленно, усердно
 far away *a* дальний
 far *adv* далеко
 provide [prəˈvaɪd] обеспечить, снабжать
 provided если, при условии
 till до тех пор
 until [ʌnˈtɪl] пока не
 unless [ʌnˈles] если не
 case [keɪs] случай
 in case в случае
 soon [suːn] вскоре

Notes

1. The thing is	— дело в том, что
2. I shall do my best	— я постараюсь
3. at my disposal	— в моем распоряжении
4. have them published	— опубликовать
5. at hand	— под рукой
6. that's about all	— вот и все
7. for the present	— сейчас

II. Прочитайте данные предложения. Обратите внимание на употребление будущего времени в придаточных предложениях, вводных союзами и союзными словами: 'if' (если), 'provided' (при условии, если), 'in case' (в случае), 'as soon as' (как только), 'after' (после того, как), 'before' (прежде чем), 'when' (когда), 'until' (пока не), 'unless' (если не).

1. They will discuss this information provided they know the result of our work. 2. I shall give him all the details of the experiment as soon as he asks me about it. 3. We shall translate this text when we learn all the words of the lesson. 4. She will take her exam in philosophy before the term is over. 5. We shall know the result of the work only after they publish the article. 6. He will certainly help you provided he knows all the facts. 7. He will speak at the scientific conference in case he hands in his paper in time. 8. If I pass my exams in June, I shall go home for a short vacation. 9. I shall not go there until I finish my work. 10. They will not go to the theatre unless they have the tickets. 11. She will not have breakfast until she takes a shower.

III. Прочитайте предложения и обратите внимание: а) на усиленную конструкцию.

It is on Wednesday that (when) I will show you my article. It was in September that (when) he had his vacation. It is my exam in philosophy that I must take next week. It was my science adviser who made me change my mind. It was very useful information that they obtained during the seminar. It was this gifted scientist whom we met at the conference.

6) на различные функции местоимения 'it'.

1. The text is not long. It is easy. 2. This is our classroom. It is large. 3. It is Monday. It is the beginning of the day. It is the 1st of September. 4. It will be interesting to see their program. 5. It was important to find the answer in time. 6. What is it? — It is a computer. 7. Who is this man? — It is a famous foreign scientist. 8. Give me my book, please, I need it.

Лабораторное занятие I

IV. а) *Вспомните правила чтения гласных i, y. Прочитайте данные слова и сравните ваше чтение с последующим чтением их диктором.*

[i]	[ai]	[ə:]	[aiə]	[aiə]	[i:]
since	mine	firm	fire	dial	field
middle	find	first	fired	riot	piece
assist	mild	circle	dire	ion	brief
till	night	bird	wire	bias	thief
simple	final	chirp	quire	diagram	believe
[i]	[ai]	[j]			
system	try	yet			
navy	type	yes			
duty	rely	young			
symbol	supply	year			
crystal	buy	beyond			

б) *Прочитайте слова, обращая внимание на сочетания согласных sh, ch.*

shelf, wish, which, witch, shine, flash, shame, chime, cheek, sheep, ship, chalk, watch, chance;

mechanics, chemical, character, technical, mechanism, school, machine.

в) *Прочитайте слова, обращая внимание на произносимые буквы и буквосочетания.*

knife, night, highly, wrong, ought, knee, flight, wrist, chalk, often, knit, eight, straight, wrote, listen, wrinkle, bright, who, whole, height, weight, through, sign, thought, written, half, should, align, foreign, doubt.

V. *Слушайте и повторяйте: а) упр. I; б) слова урока.*

VI. *Слушайте и повторяйте упр. II, III.*

VII. *Измените предложения по образцу.*

Sp.: Come early and we shall do it. (if)

St.: If you come early, we shall do it.

а) 1. Work hard and you will learn this foreign language. (if).
2. Show me your article and I shall tell you what I think about it. (as soon as). 3. Hold my bag and I shall take the box. (if). 4. Come

tomorrow and you will meet this mathematician. (when). 5. Pass your exam and you will go home. (after). 6. Write your paper and we shall speak to professor N. about its publication. (as soon as).

Sp.: Let him come and I shall help him. (when)

St.: I shall help him when he comes.

b) 1. Let us have dinner at six and we shall be in time for the concert. (if). 2. Let him go by the metro and it will take him 20 minutes to get there. (if). 3. Let Ann come and I shall ask her about her sister. (as soon as). 4. Let them find a nice place and we shall stay there for a few days. (provided). 5. Let him rise early and he will not be late for his classes. (if). 6. Let them attend his lecture and they will learn a lot of interesting things. (when).

Sp.: I'll finish my work. We'll go home. (when)

St.: When I finish my work we'll go home.

c) 1. He'll be ready. They will begin the experiment. (as soon as). 2. He'll come from Leningrad. They'll go on with their research. (when). 3. She'll take a walk round the University building. Her classes will be over. (after). 4. She'll stay. You'll discuss your plans for the summer. (if). 5. She'll give him her article. He'll have time to read it. (in case).

Sp.: I shall not come if I do not find the paper. (unless)

St.: I shall not come *unless I find the paper*.

d) 1. He will not speak at the seminar if he is not ready. (unless). 2. We shall not translate the text if you do not come. (until). 3. They will not begin the lesson if everybody is *not* ready. (unless). 4. She will play the piano well if she is not lazy. (unless). 5. I shall not solve this problem if you do not help me. (until).

VIII. Ответьте на вопросы.

Sp.: Do you want to translate *this article*?

St.: Yes, *it is this article that* I want to translate.

Are you going to see your parents *tomorrow*? Does he expect to learn English or *French* at the University? Are they going to hold the conference in Moscow or in *Minsk*? Does he do physics or *mathematics*? Do you want to go to the museum on *Friday* or on your day off? Will you have your *credit-test* or your exam next week?

Домашнее занятие I

IX. Ответьте на вопросы, используя слова в скобках. Не забудьте заменить местоимения там, где это необходимо. Запишите ваши ответы.

What will you do if you see her? (speak to her)

If I see her, *I shall speak to her*.

1. Where will you go as soon as she comes? (to college). 2. What will you do if you do not pass your exam? (take it again). 3. Where will he go after he gets the material? (to his science research advi-

ser). 4. What will she do provided she finds the place? (show it to you). 5. What will he do before he sees his teacher of English? (go to the foreign language lab). 6. When will you meet with him if he is busy today? (tomorrow). 7. What will he do as soon as he learns the result? (let us know). 8. What will she do if she does not see him? (come tomorrow).

X. *Ответьте отрицательно, уточните.*

Will you write your abstract? (article)

No, *it is my article that* I shall write.

1. Must you translate the short text? (the long text). 2. Does he deal with cybernetics? (mathematical logic). 3. Do you know English? (French). 4. Do you usually work at the library? (at home). 5. Does she usually have her English class in the evening? (in the morning). 6. Did he decide to go to the University? (to college). 7. Does his father do mathematics? (physics). 8. Did he go to college this year? (last year). 9. Did you make up your mind to do philosophy? (history). 10. Will she learn two foreign languages? (one).

XI. *Задайте вопросы, используя вопросительные слова, данные в скобках.*

1. He was awfully sorry that he was late for the theatre. (why). 2. They were busy and could not take part in the discussion. (why). 3. She is going to defend her graduation paper in February. (when). 4. It is this special problem that we are going to discuss. (what). 5. The knowledge of these facts is important and helpful. (what). 6. The entrance exams were very competitive. (why). 7. They do not teach foreign languages here. (why). 8. My brother managed to learn three foreign languages in two years. (how many). 9. They belong to our faculty. (who). 10. He is a very gifted man. (who). 11. I am sure he will attend the lecture in philosophy. (what). 12. I could not go to the stadium because I was busy on that day. (why). 13. They have very interesting information at their disposal. (who). 14. They obtained important results. (what kind of). 15. It is very convenient that the post-office is near the students' hostel. (what). 16. I do not know the meaning of these words. (what). 17. She usually looks through foreign journals in the library. (where). 18. The publication of this article means a lot for him. (why). 19. They managed to obtain important information during the discussion. (how). 20. Your future is in your own hands. (in whose).

XII. *Ответьте на вопросы и уточните.*

Is it at 7 o'clock that you have breakfast? (at 8 o'clock)

No, it isn't. *It's at 8 o'clock that* I have breakfast.

1. Is it a new film that you are going to see? (an old). 2. Was it too early when you came to the University? (too late). 3. Is it the seminar on philosophy that you are going to attend this afternoon? (on geometry). 4. Is it your science adviser whom you want to speak

to? (professor N.). 5. Is it their research work that they are going to discuss? (our research work). 6. Was it Sunday when you went to see your parents? (Saturday).

Аудиторное занятие II

XIII. Прочитайте контрольное упражнение.

a) pill, lie, white, kin, achieve, pile, prize, slight, wire, sing, mice, knife, still, wig, wine, sign, ink, ill, witch, vine, fifth, sight, gin, whim, while, vie, via, field, fire, imagine, injury, service, girl, circuit, since, science, admire, mild, mill, bind, giant, bird, violet, thief, firm;

b) typist, system, cycle, ready, yard, why, Egypt, myth, thirty, empty, type, cry, apply, imply, dirty, city, body, yell, vary;

c) rich, gosh, drench, shop, check, trash, pitch, splash, shell, fetch, ditch, dish, hush, crush, Dutch, school, mechanics, chemical, scholastic;

d) why, whole, white, wring, wreck, knit, wry, knave, knife, knap, half, sight, walk, flight, sign, foreign, eight, bright, weight, straight.

XIV. Задайте возможно большее количество вопросов к каждому предложению упр. XI.

XV. Выслушайте внимательно преподавателя. Переспросите его, воспользовавшись вопросительным словом, предложенным преподавателем.

T.: I am sorry I could not come. (why)

St.: Why are you sorry?

XVI. Ответьте отрицательно на вопросы преподавателя.

T.: Were you busy last night?

St.: No, I was not. I wasn't busy last night.

XVII. Прежде чем приступить к чтению текста, прочитайте вслед за преподавателем слова урока.

XVIII. Внимательно слушайте чтение текста преподавателем, следя за интонацией, ритмом, ударением. Постарайтесь понять содержание текста.

Peter's Letter to Nick

Dear Nick!

I am so sorry I could not write to you for such a long time. I was so awfully busy. I must tell you that the past year was very difficult for me. In the spring I took my final State examinations at Tartu University. Since I passed my exams and defended my graduation paper successfully I made up my mind to take a postgraduate course in topology at Moscow State University. You know, topology is my special field.

My task was not easy, since the entrance exams were very competitive. Those who want to take a postgraduate course must pass exams in philosophy, a foreign language, and also an examination in some special field of science. To tell the truth I worked very hard and managed to get good marks. I took my exams in October. It was only in November that I learned the result. Now I am a postgraduate student. I am so happy I can't tell you. It certainly is a great privilege to belong to the faculty among whose founders were outstanding Russian mathematicians.

The postgraduate course runs for three years. During this period I must work a lot. I shall attend lectures and the Seminar class of professor Glebov in topology. He is my science adviser. Professor Glebov is a brilliant mathematician and a very gifted man. As a matter of fact, I must meet him tomorrow and discuss with him some details of the plan of my work. I am sure his advice will be very helpful and important for me.

Besides lectures and the Seminar class in my special field I must attend lectures and seminars in philosophy. My candidate's degree examination in philosophy will be in May. And certainly postgraduate students have classes in a foreign language. In my case it is English. The thing is that¹ at school and at Tartu University I learned German. So I must actually begin to learn English. Since the knowledge of English is important for my present and future scientific work I shall do my best² to learn it well. It is only one academic year that I have at my disposal³ before my English examination in June.

During the three-year period I must try to obtain some new scientific results and have them published⁴ in the form of articles or abstracts.

Now a few words about my life in the hostel for postgraduate students. The hostel is in the main building of the University. I have a nice and comfortable room there. It faces East. It's very sunny in the morning which helps me to get up early and not to be lazy. I find it very convenient that the hostel is in the main building. In fact you have all you need at hand⁵. I mean the library, the reading-room for postgraduates, the dining-rooms and the cafeterias, the cinema, the post-office, the bookstalls and a lot of other service facilities.

Well, that's about all⁶ I should like to tell you for the present⁷. I hope to hear from you soon. My best regards to your family.

Yours, Peter.

XIX. Найдите в тексте ответы на следующие вопросы.

1. Why could not Peter write to his friend for such a long time?
2. What was he busy with in the spring?
3. What exams must take those who want to take a postgraduate course?
4. Why was Peter happy?
5. What do postgraduates usually do in the three-year period?
6. Why did he begin to learn English?
7. How long has he at his disposal for learning English?
8. What service facilities can you find in the main building of the University?

Лабораторное занятие II

XX. Прочитайте данные слова и группы слов, сопоставляя ваше чтение с последующим чтением их диктором. Повторите правильный вариант.

dim—dime	pit—pine	mint—mind
filth—file	wince—wine	milk—mild
quit—quite	mill—mile	fin—find
yet	fir—fire	cycle—'cynic
yes	spirt—spire	dyke—gym
yoke	firm—fire	'hydro—hymn
		tie—die—lie—pie
		dye—lye—rye—bye

light, design, knife, write, sign, sight, fight, who, when, often, a' lign, walk, high, gnat, right, gnaw, knee, through, thought.

XXI. Слушайте и повторяйте. Постарайтесь догадаться о значении данных слов. Проверьте по словарю.

'nature, 'pressure, 'natural, pro'gressive, ag'gressive, 'primitive, im'pulsive, ex'tensive, in'tensive, 'readable, trans'latable, 'solvable, 'sculpture, 'shortage, 'stoppage.

XXII. Послушайте вопрос диктора и ответьте, начиная свой ответ со слов 'when', 'as soon as', 'after', 'if', 'provided', 'in case'.

Sp.: When will you come? (when, to have time)

St.: When I have time.

1. When will he defend his dissertation? (after, to write it).
2. When will she go home? (when, to have vacation).
3. When is he going to look through this journal? (as soon as, to get it).
4. How soon can he present his abstract? (as soon as, to write it).
5. When will they show us the result of their research? (when, to have it).
6. When will she give us some information about the work of their lab? (after, to obtain it).
7. When will he go to his home town? (after, to graduate from the University).

XXIII. Ответьте на вопросы.

Sp.: Will she help him? (provided, to have time)

St.: Yes, provided (if, in case) she has time.

1. Will professor N. read your abstract today? (if, to come).
2. Will he attend the seminars? (provided, to find them interesting).
3. Will she learn English in one year? (in case, to work hard).
4. Will he pass his exam in French? (if, to attend his French classes).
5. Will you begin the discussion at 10 o'clock? (provided, everybody, to come).
6. Will you be busy tonight? (if, to manage to get the tickets).

XXIV. Послушайте вопрос диктора и ответьте.

Sp.: He took his entrance exams in October, and you?

St.: I also took my entrance exams in October.

a) 1. She is ready for her exam in maths, and you? 2. He is sure he will get a good mark, and you? 3. I was awfully busy last week, and you? 4. You were going to speak to your science adviser, and he? 5. He gave professor N. his article, and she? 6. She spoke to that foreign scientist at the seminar, and you?

Sp.: She went home for her vacation, and what about you?
(go to Leningrad)

St.: I did not go home for my vacation. I went to Leningrad.

b) 1. She took English lessons in the summer, and what about you? (have some rest). 2. You begin your day with morning exercises, and what about him? (a shower). 3. She came early this morning, and what about you? (quite late). 4. You know all the important details, and what about him? (very little). 5. Your sister will defend her graduation paper in March, and what about you? (next February). 6. My room faces West, and what about your room? (North).

XXV. Вслушайте вопрос и дайте отрицательный ответ.

Sp.: Can you help him now?

St.: I am afraid * I can't.

1. Can I take your article now? 2. Do you speak German well? 3. Have you got any interesting books at home? 4. Did they come in time for the lesson? 5. Were you ready with your homework? 6. Are there many foreign journals in your library? 7. Is the students' hostel near the main University building? 8. Do you usually get up early in the morning?

XXVI. а) Прослушайте текст урока, следя за диктором по книге; б) Слушайте текст, повторяя в паузах отрезки текста; в) Прослушайте текст еще раз, не глядя в книгу, стараясь понять его содержание со слуха.

XXVII. Ответьте на вопросы по тексту урока. Запишите ваши ответы с помощью символов + или —.

1. Was the past year difficult for Peter? 2. Did he take his final state examinations in the autumn? 3. Did Peter make up his mind to take a postgraduate course in topology? 4. Did he work hard? 5. Did he learn the result of the entrance examinations in October? 6. Is it a great privilege to belong to the faculty of Mechanics and Mathematics? 7. Does the postgraduate course run for five years? 8. Must postgraduates work a lot? 9. Will Peter discuss the plan of his work with his science adviser? 10. Will Peter learn French? 11. Is English important for his future scientific work? 12. Must postgraduates try to obtain some new results? 13. Does Peter live in the hostel? 14. Does his room face North? 15. Is it convenient that the hostel is in the main building of the University? 16. Are there a lot of service facilities in the building?

*to be afraid [ə'freid] — бояться

XXVIII. *Прослушайте данные диалоги. Попробуйте понять и запомнить их содержание с тем, чтобы участвовать в беседе по теме диалогов на следующем занятии в аудитории.*

Dialogue I

- Hello, Ann!
- I only came a week ago. As a matter of fact, I am a post-graduate now. Just as you are.
- That's right. You know that I do mechanics.
- It's aerohydrodynamics ['æ-rour'haidrədaɪ'næmiks].
- It is. And my science adviser is professor Smirnov.
- Oh, hello, Pete, I did not know you were in Moscow.
- Oh, isn't that fine? And you are at the faculty of Mechanics and Mathematics, aren't you?
- I certainly do. And what is your special field?
- It must be interesting.
- To tell the truth his name does not tell me much. You know that I do languages.

Dialogue II

- Say, Ann, do you live in the students' hostel?
- I live with my sister's family.
- Well, not quite. The thing is that my sister's family live in a small town of Pushkino near Moscow. I must tell you I like it there.
- Yes, I do. I actually come here every week-day. I attend lectures and seminars. I must work in the library and also at one of the labs of the Institute of Mechanics.
- I'm afraid, I haven't.
- I live in the hostel for post-graduate students. And what about you, Jane?
- So, you are a Muscovite now, aren't you?
- Oh, good for you! And you don't come to the University everyday, do you?
- You must be very busy. Have you got any time for theatres, museums, concerts?
- Oh, that's too bad. I'm sorry for you. There are so many things to see in Moscow, and so many places to go to.

Домашнее занятие II

XXIX. *Напишите русские эквиваленты данных английских слов. Затем уточните их значение по словарю.*

ob'tainable, 'natural, con'structive, 'limited, de'ductive, limi'tation, alge'braic, 'usage, ex'tensive, inte'gration, in'tegrity, associ'ation, 'hopeless, 'helpful.

XXX. *Задайте вопрос, воспользовавшись словом в скобках.*

In January and in June students are awfully busy. (why). They have their terminal examinations. (when). It is a difficult time for them since they must work very hard. (why). It is November now. (what). I think the exams are rather far away. (what). But one of my friends is going to take three of his exams in December. (why). He made up his mind to go home for his winter vacation. (when). I am sure he will pass his exams successfully. (why). He is a hard-working student. (what kind of). He attends all the lectures. (why). He does not miss seminars since he finds them very helpful. (what). He is a fourth-year student. (what year). I am sure that next year, when he graduates from the University, he will try to take a postgraduate course. (when). He is not only a brilliant student but he is also a very nice person. (what kind of). He can plan his time. (how). He works a lot but he finds time to go to theatres, museums and to the cinema. (where). He also does a lot of social (общественная) work. (what kind of). He is one of the editors (редактор) of the students' paper. (who). I am fond of my friend. (why).

XXXI. *Возразите и уточните. Запишите ваш ответ.*

He is awfully busy on Sunday, isn't he? (week-days)

No, he isn't. He is awfully busy on week-days.

1. They are going to take their final exams in the autumn, aren't they? (in the spring). 2. His special field is topology, isn't it? (algebra). 3. She does physics, doesn't she? (mechanics). 4. Your friend worked hard during these three months, didn't he? (very little). 5. The lab belonged to the mathematics department, didn't it? (physics). 6. He will see his science adviser next week, won't he? (tomorrow). 7. You are sure his advice will be helpful, aren't you? (useless). 8. The postgraduate course runs for four years, doesn't it? (three). 9. She will soon take her exam in philosophy, won't she? (in a foreign language). 10. You have two years at your disposal, don't you? (only one). 11. Your room faces West, doesn't it? (North). 12. They published two of his articles last March, didn't they? (only one).

XXXII. *Ответьте на вопросы.*

Sp.: Where will you go tonight if you have time? (to the theatre)

St.: If I have time, I shall go to the theatre tonight.

1. What will you tell him when you see him? (to come to my place). 2. What will you do as soon as you get to the University? (try to see my science adviser). 3. Whom will he speak to after he obtains the information? (professor G.). 4. What foreign language will he learn in case he takes up a postgraduate course? (English). 5. What will she do if she does not pass her exam in the spring? (take it in the autumn). 6. Where will he go before his English lesson begins? (to the foreign language lab).

XXXIII. Прочитайте текст и озаглавьте его. Задайте вопросы по существу каждого предложения.

Oxford is one of the two University towns in England. It is an ancient town some eight hundred years old. The University of Oxford is actually a collection of 48 colleges. «The University» is only an administrative centre. It arranges lectures and final examinations for the students of all the colleges. Every student has a tutor (наставник). A tutor is of great help to the student. He discusses with the student what lectures he must attend. He recommends him books for reading. He plans the student's work for him and discusses the results of his work. The tutor gives him advice on various problems and in various situations. He also helps his student in time of need. The tutorial system has certain advantages (преимущество). But some of the tutors are traditionally conservative. Their social and political ideas are foreign to many of the progressive minded (прогрессивно мыслящие) students.

XXXIV. Прочитайте текст упр. XXXIII еще раз. Попытайтесь изложить устно содержание этого текста по-английски.

Аудиторное занятие III

XXXV. Прочитайте и назовите русские эквиваленты выделенных слов.

ex'pression — to ex'press, 'product — pro'duction, popu'lation — to 'populate, to think — thinker, 'combi'nation — to com'bine, base — 'baseless, to hope — 'hopeless — 'hopeful, ready — 'readiness, to ob'tain — ob'tainable, to mean — 'meaning — 'meaningful — 'meaningless, to pre'sent — pre'sentable, to use — 'usage; 'final — fi'nality, to 'manage — 'manageable, to play — playful, 'foreign — 'foreigner, 'demon'stration — de'monstrative, lazy — lazily — laziness, solve — solvable, to attend — attendance, simple — 'simply — sim'plicity, friend — friendly, to press — pressure, to pro'gress — pro'gressive.

XXXVI. Прочитайте вслух текст 'Peter's Letter to Nick'.

XXXVII. Ответьте на вопросы преподавателя по тексту урока.

XXXVIII. Просмотрите тексты диалогов (см. упр. XXVIII). Побеседуйте на тему диалогов. Поменяйтесь ролями.

XXXIX. Изложите содержание текста упр. XXXIII.

XL. Прочитайте текст и передайте его содержание по-английски. Работайте в паре.

Меня зовут Денис. Мне 23 года. Я студент пятого курса механико-математического факультета. Через несколько месяцев я окончу университет. Я надеюсь, что буду работать в одном из исследовательских центров в своем родном городе. Моя сестра окончила тот же факультет два года назад. Она была очень хорошей сту-

денткой. После окончания университета она поступила в аспирантуру. Ее специальность — аэрогидромеханика. Ее научный руководитель профессор Марков. Он блестящий ученый и очень милый человек. Он обсуждает с моей сестрой план ее работы и рекомендует ей различные научные книги и статьи для чтения. Он всегда готов дать ей совет. Сестра посещает его семинар и находит его очень интересным и полезным. Я уверен, что она успешно закончит работу.

УРОК 9

Аудиторное занятие I

Грамматика:

Словообразование

Местоимения *some, any, no, every* и их производные

Понятие о причастии I

Словообразование с помощью суффиксов глагола: *-ify, -ise (-ize), -ate*.

- ify* — *simple* — to *simplify* — упрощать
- ize* — *symbol* — to *symbolize* — символизировать
- ate* — *formula* — to *formulate* — формулировать

1. Прочитайте вслед за преподавателем.

'unify, so'lidify, 'verify; 'activise, 'specialize, 'summarize; 'stimulate, 'regulate, 'consentrate.

Слова урока

Прочитайте вслед за преподавателем данные интернациональные слова и попытайтесь назвать их русские эквиваленты.

diffe'rential *n, a*, 'favourite *a*, 'subject *n*, hobby *n*, com'puter *n*, 'medical *a*, 'modern *a*, 'classic(al) *a*, tra'dition *n*, 'cottage *n*, 'hospital *n*, algebra *n*.

Прочитайте вслед за преподавателем следующие слова.

of course [əv'kɔ:s] конечно, разумеется
 recognize ['rekəgnaɪz] 1. узнавать; 2. признавать
 exact [ɪg'zækt] точный
 be glad радоваться
 right [raɪt] 1. правильный; 2. правый
 half [ha:f] половина
 'lucky счастливый

equation [i'kweɪʃən] уравнение
 remember [rɪ'membə] помнить, вспоминать
 familiar [fə'miliə] знакомый
 due [dju:] *n* должное
 due *a* назначенный, надлежащий
 congratulation [kən,grætju'leiʃən] (pl) поздравление
 though [ðəu] хотя

enough [i'naʃ] *a* достаточный,
adv достаточно
disappoint [,disə'pɔɪnt] *v* разо-
 чаровывать
disappointing *a* огорчительный
appointment [ə'pɔɪntmənt] на-
 значение
couple ['kʌpl] *n* пара; *v* соеди-
 нять
stay оставаться
never ['nevə] никогда
turn [tɜ:n] *v* поворачивать(ся);
n оборот, очередь
both [bəʊθ] оба
marry ['mæri] жениться, выйти
 замуж
be married быть женатым
husband ['hʌzbənd] муж
surgeon ['sɜ:dʒən] хирург
wife [waɪf] жена
unfortunately [ʌn'fɔ:tʃənətli] к
 сожалению
while [waɪl] между тем, в то
 время как
develop [di'veləp] развивать
exhibition [ˌeksɪ'bɪʃən] выставка

love [lʌv] *n* любовь; *v* любить
talk [tɔ:k] *n* беседа; *v* беседо-
 вать, разговаривать
listen ['lɪsn] слушать
argue ['ɑ:gju:] спорить, дока-
 зывать
laugh [lɑ:f] *n* смех; *v* смеяться
together [tə'geðə] вместе
keep [ki:p] (kept) хранить, дер-
 жать
thank [θæŋk] благодарить
lake озеро
'forest лес
week-end ['wi:k'end] конец не-
 дели
enjoy [ɪn'dʒɔɪ] наслаждаться,
 получать удовольствие
excellent ['eksələnt] отличный,
 превосходный
about [ə'baʊt] *adv* приближи-
 тельно, около
agreed [ə'gri:d] решено
latest позднейший, последний
thesis ['θi:sɪs] *n* (pl) theses
 ['θi:si:z] диссертация

Notes

1. to be exact	— чтобы быть точным
2. as far as I can see	— насколько я понимаю
3. as well as	— и, так же как
4. in due time	— в свое время
5. you got married	— вы вышли замуж
6. I see very little of him	— я редко вижу его
7. both of us	— мы оба
8. to go on with	— продолжать

II. Прочитайте предложения, обращая внимание на различные значения местоимений и наречий и их употребление в предложениях

a) утвердительных:

some [

 one (body)
 thing
 where

1. I have got some time. 2. Some re-
 search laboratory will be built here. 3. We
 shall study some new subjects. 4. He has
 something to discuss with you. 5. Somebo-
 dy must speak at this conference. 6. I saw
 this publication somewhere yesterday.
 7. Someone gave an example. 8. Some 10
 students attended the seminar.

б) *вопросительных*:
any
anyone (anybody)
anything
anywhere

1. Is there any time for it? 2. Have they any new ideas? 3. Do you study any foreign language? 4. Did anybody attend the lecture last week? 5. Will you go anywhere tomorrow? 6. Does anyone of you speak English? 7. Did he find anything as a result of this operation?

в) *отрицательных*:
nobody (no one)
nothing
nowhere

1. They have nothing to tell you. 2. Nobody is going to do research in this field now. 3. No one is familiar with this system. 4. Nothing certain was known about his appointment. 5. She could find his abstract nowhere. 6. He has no research adviser. 7. No computer can think.

not { any
anyone (anybody)
anything
anywhere

1. I do not know anything about this method. 2. He does not study any problems of topology. 3. She did not have any publications. 4. There is not anybody here who knows this subject. 5. He did not write anybody about it. 6. She does not go anywhere this week-end.

every { one(body)
thing
where

1. Everyone (everybody) attended his lecture. 2. Does he know everything? 3. You can find this book everywhere.

III. Прочитайте слова и предложения, обращая внимание на функцию причастия I (Participle I). В каждом случае определите подлежащее и сказуемое.

to read —
reading

— Reading a book he made notes.— The boy reading the book is my brother.

to speak —
speaking

— Speaking at the conference she said some interesting things.— The woman speaking at the conference is our teacher.

to develop —
developing

— Developing the new system they will obtain interesting results.— The man developing these ideas is a famous scientist.

Лабораторное занятие I

IV. а) Вспомните правила чтения буквы *o*. Повторяйте за диктором следующие слова.

[ɔ] — office, hot, job, bottle, possible, copper;

[ou] — stone, over, local, show, cold, road, load, total, slow, moment, open, own;

[ɔ:] — form, more, ought, your, door, shore, four, thought, course, normal, order;

[au] — found, out, about, mount, down, allow, now;

- [auə] — power, our, shower, flower;
 [ʌ] — above, some, other, among, become, young, country, mother, enough;
 [u] — took, hook, could, book;
 [u:] — moon, hoof, choose, prove, group;
 [ə:] — work, worse, world, worm.

б) Читайте за диктором упр. I и затем слова урока.

V. Слушайте и повторяйте упр. II, III.

VI. Ответьте на вопросы.

Sp.: Have you got *any* English books? (Yes, no)

St.: Yes, I have got *some*.

No, I have not (haven't) got *any*.

- a) 1. Could you obtain any articles on hydrodynamics? (Yes).
 2. Were there any students in the room? (No). 3. Does she read any scientific articles? (No). 4. Did you attend any lectures by that scientist? (Yes). 5. Are there any foreign scientists at the conference? (Yes). 6. Did you see any good films last month? (No).

Sp.: Have you *any* journals at home? (books)

St.: No, I have not *any* journals. I have *some* books.

- b) 1. Will you have *any* exams in December? (credit-tests).
 2. Will you obtain *any* information on Monday? (on Tuesday). 3. Did she look through *any* foreign books at the library? (Russian). 4. Were there *any* ancient buildings in the town? (modern). 5. Did they have *any* days off last week? (last month). 6. Does she get *any* letters from her sister? (parents). 7. Were there *any* new words in the exercise? (in the text). 8. Did they show you *any* laboratories? (classrooms).

VII. Измените предложения по образцу.

Sp.: I have got *some* foreign books at home. (periodicals)

St.: Have you got *any* foreign periodicals?

1. They will go *somewhere* in the summer. (winter). 2. I can do *something* about it on Saturday. (Friday). 3. I see *somebody* in the corridor. (lecture hall). 4. *Someone* told me about the credit-test. (examination). 5. *Somebody* must help him with his English. (mathematics). 6. She can say *something* during the seminar. (discussion).

VIII. Слушайте диктора. Выразите ту же мысль иначе.

Sp.: She *must not* do anything now.

St.: She *must* do nothing now.

1. He *must not* tell anybody about it. 2. You *cannot* give such information to anyone. 3. He *must not* show his abstract to anybody. 4. They *cannot* go anywhere tonight. 5. She *will not* use anything for her article. 6. He *did not* tell them anything about his plans for the future.

IX. Измените по образцу.

Sp.: *The man speaking in the hall could...*

St.: *Speaking in the hall the man could...*

1. *The girl standing at the bookstall could not...* 2. *The woman showing you the post-office was...* 3. *The lecturer speaking about the computer will...* 4. *The scientists discussing the result of the experiment were...* 5. *The students learning English at the University must...* 6. *The postgraduate defending his thesis was...*

Домашнее занятие I

X. Замените русские слова, данные в скобках, английскими.

1. They knew (ничего) about our translating machine. 2. Was the (что-нибудь) interesting in the article? 3. Opening the book he found (что-то) and showed it to his teacher. 4. Remembering (кое-что), the little girl laughed happily. 5. My sister wanted to ask (кого-нибудь) to help her with the work. 6. Did you find the same result (где-нибудь)? 7. You must do (все) in due time. 8. Coming into the lab he saw that (ничего) was ready for the experiment. 9. (Все) can take part in the discussion. 10. I am glad I shall obtain (некоторую) information on the subject. 11. Did (кто-нибудь) see the running child? 12. Are there (какие-нибудь) interesting exhibitions in Moscow now? 13. You can get this journal (повсюду). 14. (Никто) of them could say (что-нибудь) about the new method of research. 15. They will have (какие-то) journals at their disposal. 16. There were (несколько) bookstalls in the park.

XI. Измените по образцу.

(While) working in the lab the student could...

The student working in the lab could...

a) 1. (While) translating the article the girl found... 2. (While) living in the hostel the postgraduates managed to... 3. Speaking at the international congress the scientists tried... 4. (When) experimenting in the lab the students obtained... 5. Discussing the results of their research the group of scientists discovered...

The boy taking notes of the lecture asked...

While (when) taking notes of the lecture the boy asked...

b) 1. The research workers developing this system may... 2. The boy writing a letter to his parents remembered that... 3. The girl taking a walk near the University building saw... 4. She teacher standing among his students told them... 5. My brother doing his morning exercises could not...

XII. Задайте вопросы, используя вопросительные слова.

1. Mike could not recognize his old friend. (why). 2. The children were glad to see their parents. (when). 3. It was five years since we met last. (how many). 4. I am sure you were lucky to enter the Mechanics and Mathematics faculty. (why). 5. I remember that geomet-

ry was your favourite subject at school. (what). 6. He will certainly defend his thesis in due time. (when). 7. I congratulated them on their successful experiment. (when). 8. The student's paper disappointed his teacher. (why). 9. I am going to leave for Kiev in a few days. (when). 10. My sister got married last month and her husband took her to his home town (when, where). 11. Both of us love classic music. (what kind of). 12. On Sunday I never get up before eight o'clock in the morning. (why). 13. Last Saturday we went to my friend's place and had a very good time there. (when). 14. They agreed to spend the week-end in the country. (where). 15. There are a lot of beautiful lakes and lovely forests in that part of the country. (what kind of).

XIII. Ответьте на вопросы.

Are there any interesting books in your library?

Yes, there are some. (No, there aren't any).

1. Was there anybody in the classroom? (Yes). 2. Could anybody come and help them? (No). 3. Will anyone go to the stadium today? (No). 4. Did anybody agree to take part in this work? (No). 5. Did you enjoy any of the pictures at the exhibition. (Yes). 6. Will they go anywhere for their holiday? (Yes). 7. Did you see any familiar faces there? (Yes). 8. Are there any cottages in the forest? (Yes).

Аудиторное занятие II

XIV. Прочитайте контрольное упражнение.

round, joke, brown, rose, worth, low, logic, come, course, fought, sock, soak, for, showed, shot, odd, ode, cook, wrong, some, knot, goat, got, gale, soon, wrote, rod, hobby, noble, code, ought, wood, took, form, work, more, slow, your, you, young, ground, down, amount, power, account, shower, our, month, joint, over, toy, point, foil, rough, enough, hold.

XV. а) Переспросите. Воспользуйтесь упр. II а. Работайте в паре.

1st st.: I have got some time.

2nd st.: Have you got any time?

б) Ответьте утвердительно, а затем отрицательно. Воспользуйтесь упр. II б.

1st st.: Is there any information?

2nd st.: Yes, there is some.

No, there is not any.

в) Возразите. Воспользуйтесь упр. II в.

1st st.: They have nothing (not anything) to tell you.

2nd st.: I am sure they have something to tell me.

XVI. Задайте возможно большее количество вопросов к каждому предложению упр. XII.

XVII. *Выслушайте внимательно преподавателя. Уточните информацию, воспользовавшись вопросительным словом, предложенным преподавателем.*

T.: She could not recognize him. (why)

St.: Why could not she recognize him?

XVIII. *Ответьте отрицательно на вопросы преподавателя.*

T.: Is algebra your favourite subject?

St.: No, it isn't. Algebra isn't my favourite subject.

XIX. *Прежде чем приступить к чтению текста, прочитайте вслед за преподавателем слова урока.*

XX. *Внимательно слушайте чтение текста преподавателем, следя за интонацией, ритмом, ударением. Постарайтесь понять содержание текста.*

Two Friends Meet

3

— Hello, Olga! Don't you recognize me?

— Oh, Mike, hello! Of course I do. I'm so glad to see you. It's some four years since we met last.

— Four and a half, to be exact¹. How are you? As far as I can see² you work at the University?

— Yes, that's right. You know that after my graduation I was lucky enough to take a postgraduate course at the department of differential equations.

— Yes, I remember it was your favourite subject as well as³ your hobby. And who was your science adviser?

— You must know him. It was professor Nickolsky.

— I certainly know him. I am also familiar with his latest work. And what about your thesis?

— As a matter of fact, I managed to defend my thesis quite successfully and in due time⁴.

— Congratulations. And what do you do now?

— Well, I go on with my research studies and also do some teaching. It's differential equations that I teach.

— Do you enjoy your work?

— I'm fond of it though sometimes I find it difficult. The thing is that some of my students don't work hard enough. And it's rather disappointing. And what about you? As far as I know after your graduation from the University you got an appointment and went to Sverdlovsk, didn't you?

— No, it was not Sverdlovsk that I went to. It was Tomsk. I work at one of the research centres and I find my work there very interesting. How about your family? Are your father and mother all right?

— Yes, thank you, they are fine. When did you come to Moscow and why?

— A couple of days ago. I must take part in an international conference on computers. I'll stay here for a week or so. I must leave for Tomsk on the 20th of September.

— Oh, then you will be in Moscow on Saturday and on Sunday. Do come to our place. Mother and Father will be glad to see you. And you will meet my husband.

— You got married⁵ then. I didn't know that. Tell me everything about your husband.

— He is a very nice man. His name is Ivan. He is 29. He is a surgeon and a very gifted one. Unfortunately I see very little of him⁶. He leaves for the hospital early in the morning and never comes home before seven or eight o'clock in the evening. He is fond of his work. Coming home he has a short rest and then turns to his medical books and journals.

— Oh, then you don't go anywhere and don't see your friends.

— Yes, we do. Though both of us⁷ are very busy we try to find time to go to the theatre, to some interesting exhibitions and to concerts. We love music, both modern and classic. And certainly we sometimes go to see our friends or ask them to come to our place. We always have a good time together, talking, arguing, laughing and listening to music.

— Keeping up old students' traditions, aren't you?

— That's right. Say, Mike. I have an idea. You see, we have a very nice little cottage not far from Moscow. It's a lovely place. There is a big lake and a nice forest there. You could come and stay with us for the week-end. I'm sure you will enjoy it there.

— Thanks. I'll be glad to come.

— Excellent. Then come to our place on Saturday morning and we'll go to the country together. Let's say about 9 o'clock.

— Agreed.

XXI. Найдите в тексте ответы на следующие вопросы.

1. How many years passed since the two friends met last? 2. Why was Olga lucky? 3. What is Olga's favourite subject? 4. Does she like her work as a teacher? 5. Where did Mike go after graduation? 6. Where does he work in Tomsk? 7. When and why did Mike come to Moscow? 8. What did Olga tell Mike about her husband? 9. What kind of music do both of them like? 10. Where did Olga ask her friend to come?

Лабораторное занятие II

XXII. Прочитайте данные слова и группы слов, сравнивая ваше чтение с последующим чтением их диктором. Повторите правильный вариант.

sole—sob—some, home—hob—come, tone—top—ton, code—cot—become, dome—dot—done, lone—lost—love; old—odd, cold—cot, sold—sod, hold—hot, bold—bond; slow, brown, know, powder, blow, how; pour, four, fore, for, more, moral, core; took, pool, moon, hook,

book, loop, shoot, shook; out, South, pound, house, about; soap, coat, load, soak, boat, road.

XXIII. *Слушайте слова и повторяйте. Постарайтесь догадаться о значении данных слов. Проверьте их значение по словарю.*

'organize, 'mobilize, 'summarize, 'neutralize; in'tensify, 'specify, 'unify; 'concentrate, ma'nipulate, as'sociate, 'indicate.

XXIV. *Ответьте на вопросы диктора. Воспользуйтесь словами, данными в скобках.*

Sp.: Will you go *anywhere* in June? (July)

St.: No, I won't. I'll go *somewhere* in July.

a) 1. Did you see *anybody* in the corridor? (lecture-room). 2. Will your room-mate go anywhere for the week-end? (on Monday and Tuesday). 3. Can I do *anything* to help him? (the child). 4. Did your friend tell you *anything* about the concert? (exhibition). 5. Did she speak to *anyone* about her graduation paper? (appointment).

Sp.: Who came into the room? (никто)

St.: Nobody did.

b) 1. Who opened the door for you? (кто-то). 2. Who will speak at the seminar? (все). 3. Who helped the student with his homework yesterday? (никто). 4. Who was ready for the lesson? (все). 5. What will they discuss? (что-то интересное). 6. Where do they live now? (где-то на востоке). 7. Who was lucky to get tickets for the theatre last night? (никто). 8. Who is familiar with the latest article of professor N? (некоторые студенты нашей группы).

XXV. *Ответьте на вопросы по образцу.*

Sp.: I usually rise at half past six, and you? (at eight)

St.: I usually rise *at eight*.

1. I remember her husband, and you? (only her mother). 2. They are familiar with the latest work of this scientist, and what about you? (his other excellent works). 3. You handed in your thesis in due time, and what about your friend? (only last month). 4. I went to this exhibition a couple of days ago, and you? (last Saturday). 5. She is going to leave for the country tomorrow morning, and you? (at the week-end). 6. Your hobby is history, and what about your girl-friend's hobby? (mathematics). 7. Your brother got married last year, and what about your sister? (a couple of years ago). 8. Both of you are fond of classic music, and what about your children? (modern music). 9. They got excellent for their last examination, and she? (only four). 10. I enjoyed the first part of the concert, and you? (the interval). 11. She agreed to come at seven o'clock in the evening, and he? (only at nine). 12. I can stay here a couple of weeks, and you? (only about a week).

XXVI. а) *Прослушайте текст урока (диалог), следя за диктором по книге; б) Слушайте текст, повторяя в паузах отрезки текста; в) Послушайте текст еще раз, не глядя в книгу, стараясь понять его со слуха.*

XXVII. Ответьте на вопросы по содержанию прослушанного диалога. Запишите ваши ответы с помощью символов + или —.

1. Did Mike recognize his friend Olga? 2. Is it ten years since they met last? 3. Does Olga work at a research centre? 4. Is history her favourite subject? 5. Is Mike familiar with professor Nickolsky's work? 6. Did Olga defend her thesis in due time? 7. Is she fond of her work? 8. Do all her students work hard enough? 9. Does Mike live in Sverdlovsk? 10. Does he teach students at the University? 11. Did he come to Moscow for a holiday? 12. Will he take part in an international conference on computers? 13. Did Olga ask Mike to come to her place? 14. Is her husband a physicist? 15. Does her husband work a lot? 16. Do both of them like modern and classic music? 17. Do their friends come to see them sometimes? 18. Did Olga ask Mike to spend the week-end with her family in the country? 19. Did they make up their minds to go to the country on Friday morning? 20. Did they agree to meet at 9 o'clock on Saturday?

XXVIII. Прослушайте данные диалоги. Попытайтесь понять и запомнить их содержание.

Dialogue I

— Good morning, Denis! How are you this morning?	— Fine, thanks. How are you, Mark?
— I'm all right. Say, Denis, do you remember Ann Golubeva?	— I certainly do. Why? What's the matter with her?
— Oh, nothing. It's just (про-cro) that we are going to get married.	— Congratulations. You are lucky. She is a lovely girl. I'm sure you will be happy together.
— I hope so. She is really very nice and I'm fond of her.	— Where are you going to live after you get married?
— At the students' hostel. And when we graduate from the University we shall go to my home town.	— Will that be in the spring?
— In June.	— Well, I hope to see both of you before you leave Moscow. Why not come to my place one of these days?
— Thank you. I'll be glad to.	— I hope Ann will come too.
— I'm sure she will.	

Dialogue II

— Hello, Max!	— Oh, hello, Michael!
— Is there any news about the coming meeting?	— I am not sure I know anything about it. What's the meeting about?

— It's about the students' construction teams.

— I, certainly, will.

— I think I know why you want to go to Smolensk. Your parents live there, don't they?

— Oh, yes, of course. I think I know what you mean. As far as I remember the meeting will be on Monday at three o'clock in the afternoon. Will you come?

— I'll be there too, I hope one of the teams will work somewhere near Smolensk. I should like to join ['dʒɔɪn] (присоединиться) it.

— Yes, that's right. I'm missing my parents and my little sister. I hope I'll stay with them for a couple of days. I'll be glad to see them.

Домашнее занятие II

XXIX. Напишите русские эквиваленты данных английских глаголов. Затем уточните их значение по словарю.

'advocate, 'cultivate, 'compensate, 'fabricate, 'navigate, 'operate, 'infiltrate; 'improvise, 'centralize, 'modernize, 'synchronise, 'symbolize, 'summarize, 'analyse; in'tensify, 'simplify, 'mystify, 'fortify, 'falsify, 'modify.

XXX. Прочитайте текст и озаглавьте его. Уточните информацию. Запишите ваш вопрос. Просмотрите значение незнакомых вам слов в словаре учебника.

1. Every summer thousands of school graduates try to enter various colleges and Universities. (in what month). 2. It takes them about a month to go through their entrance exams. (how many days). 3. They must take three exams. (what exams). 4. If they are going to pass their exams successfully they must work a lot. (when). 5. Sometimes the examinations are very competitive. (why). 6. In July of this year a lot of applicants ['æplɪkənt] (абитуриент) wanted to enter the Mechanics and Mathematics faculty of Moscow University. (how many). 7. Unfortunately some of the applicants did not work hard enough when they were at school. (why). 8. For them the results of the exams were disappointing. (why). 9. Of course, they can try again next year. (how). 10. Those who managed to enter the University were awfully glad. (why). 11. They are students now. (what year). 12. Some of them live in the students' hostel. (why). 13. Some of the students live with their families. (where). 14. Attending lectures and seminars, doing their homework students must always remember about their coming exams. (why). 15. Hard-working students take their exams in due time and usually have good results. (what kind of students). 16. Those who are lazy will find January a very

difficult time. (why). 17. At the end of January some of the students will go away from Moscow for a short vacation. (when). 18. Some students will stay in Moscow and go to theatres, museums and exhibitions. (where else).

XXXI. *Подготовьтесь к устному изложению текста упр. XXX.*

XXXII. *Возразите и уточните. Запишите ваш ответ.*

Your hobby is music, isn't it? (football).

No, it isn't. My hobby is football.

1. You remember all your school-mates, don't you? (some of them).
2. He is familiar with this German scientist, isn't he? (only with some of his works).
3. You last saw him at the international conference in May, didn't you? (in July).
4. The exhibition is rather disappointing, isn't it? (very interesting).
5. She will leave for Leningrad in October, won't she? (next week).
6. She loves modern music, doesn't she? (her husband).
7. You could recognize the girl and her brother, couldn't you? (only the girl).
8. You see very little of him, don't you? (rather often).

XXXIII. *Повторите тексты диалогов (упр. XXVIII). Будьте готовы к работе в аудитории по теме диалогов.*

Аудиторное занятие III

XXXIV. *Прочитайте и назовите русские эквиваленты выделенных слов.*

popu'lation—to 'populate, demons'tration—to 'demonstrate, to 'recognize—recog'nition, fa'miliar—famili'arity, 'modern—'modernize; to 'argue—'argument, to de'velop—de'velopment, gradu'ation—to 'graduate, 'certainly—'certainty, form—'formula—to 'formulate, 'special—to 'specialize, to 'manage—'management, to 'publish—'publisher, con'venient—con'venience, 'final—fi'nality, 'puritan—to 'purify, 'union—to 'unify, to a'gree—a'greement.

XXXV. *Прочитайте вслух текст урока (см. упр. XX).*

XXXVI. *Ответьте на вопросы преподавателя по тексту урока.*

XXXVII. *Просмотрите тексты диалогов упр. XXVIII еще раз. Попробуйте побеседовать на тему диалогов. Поменяйтесь ролями.*

XXXVIII. *Изложите устно содержание текста упр. XXX.*

XXXIX. *Прочитайте текст и передайте его содержание по-английски.*

Несколько дней назад я встретил одного из моих друзей. Его зовут Олег. Когда мы были студентами, он был моим соседом по комнате в общежитии. Мы обычно вместе ходили на занятия в университет, часто вместе работали в библиотеке. Иногда мы ходили в кино, в театр и на выставки. У него была масса различных увле-

чений. Он любил музыку, книги, шахматы (chess). Иногда мы приглашали своих друзей в нашу комнату в общежитии. Мы смеялись, болтали, спорили и прекрасно проводили время.

Я был ужасно рад увидеть его снова. Последний раз я видел его в день окончания университета три с половиной года назад. Сейчас он приехал в Москву из Ростова, чтобы учиться в аспирантуре. В октябре он успешно сдал вступительные экзамены, и теперь он аспирант на кафедре геометрии.

УРОК 10

Аудиторное занятие I

Грамматика:

Словообразование

Понятие о причастии II. Времена группы Indefinite (Passive Voice)

Словообразование с помощью

а) отрицательных префиксов *in-*, *im-*, *un-*, *dis-*, *ir-*:

in- — active — *inactive* — пассивный

im- — mobile — *immobile* — неподвижный

ir- — regular — *irregular* — неправильный

un- — like — *unlike* — не похожий на

dis- — to like — to *dislike* — не любить

б) префиксов: *re-*, *en-*, *mis-*, *inter-*, *over-*:

re- — to write — to *rewrite* — переписывать

en- — large — to *enlarge* — увеличивать

mis- — to use — to '*misuse* — неправильно использовать

inter- — action — '*interaction* — взаимодействие

over- — to act — to '*overact* — переигрывать (чрезмерно)

1. Прочитайте вслед за преподавателем.

in'formal, *in*cor'rect, *in*'delicate; *im*'practical, *im*ma'terial, *im*'mortal; *ir*'rational, *ir*regu'larity; *un*'natural, *un*suc'cessful, *un*'popular; to *dis*'place, to *dis*'play, to *dis*'organize; to *e*'nable, to *en*'close, to *en*'sure; to *re*'build, to *re*pro'duce, to '*recons*'truct, '*mis*'use(*n*), to '*misin*'terpret, to '*misunder*'stand, '*inter*'change(*n*), to '*intercom*'municate, '*inter*'national; to '*over*'balance, to '*over*'come, to '*over*'do, an '*over*dose(*n*).

Слова урока

Прочитайте вслед за преподавателем данные интернациональные слова и попытайтесь назвать их русские эквиваленты.

'progress *n*, pro'gress *v*, technological [ˌteknə'lɒdʒɪkəl] *a*, revolution [ˌrevə'lʊ:ʃən] *n*, percent [pə'sent] *n*, 'practically *adv*, double

['dʌbl] *a*, fundamental [ˌfʌndə'mentl] *a*, structure ['strʌktʃə] *n*,
 'distant *a*, quasar ['kweɪsə] *n*, pulsar ['pʌlsə] *n*, 'astro'physical *a*,
 quantum ['kwɒntəm] *n*, *a*, mo'lecular *a*, 'process *n*, repro'duce [ˌriː
 prə'djuːs] *v*, 'planet *n*, biology [baɪ'ɒlədʒi] *n*, contri'bution *n*, ther-
 monuclear ['θəːmə'njuːkliə] *a*, design [dɪ'zain] *n*, *v*, intensive [ɪn'ten-
 sɪv] *a*, nature ['neɪtʃə] *n*, control [kən'trɒl] *n*, *v*, re'ac'tion *n*, 'sta-
 tion *n*, basis ['beɪsɪs] *n*, to'pology *n*, theory ['θiəri] *n*, pro'gramming
n, occupy ['ɒkjupaɪ] *v*, 'human *a*, *n*, sphere [sfɪə] *n*, transport ['træn-
 spɔːt] *n*, trans'port *v*, communication [kə'mjuːni'keɪʃən] *n*, economy
 [i'kɒnəmi] *n*, medicine ['medsɪn] *n*, logic *n*, co-operation [kou,ɒpə-
 'reɪʃən] *n*, con'dition *n*, extremely [ɪks'triːmlɪ] *adv*.

Прочитайте вслед за преподавателем следующие слова.

'present *a* настоящий, данный
 pre'sent *v* предъявлять, предо-
 ставлять

be'lieve [bi'li:v] верить

be'lie[f] [bi'li:f] вера

world [wɜːld] мир (земля)

century ['sentʃəri] столетие

law [lɔː] закон

discover [dɪs'klʌvə] открывать,
 обнаруживать

among [ə'mʌŋ] среди

heredity [hi'redɪtɪ] наследствен-
 ность

investigate [ɪn'vestɪgeɪt] иссле-
 довать

chamber ['tʃæmbə] камера

star звезда

'recent недавний, новый

overestimate ['ouvər'estimeɪt]
 переоценивать

example [ɪg'zɑːmpl] пример

possible ['pɒsɪbl] возможный

provide [prə'vaɪd] обеспечи-
 вать, снабжать, давать

power ['paʊə] 1. сила; 2. энер-
 гия

creator [kri'eɪtə] создатель

over ['ouvə] через, сверх, над

society [sə'saɪəti] общество

life жизнь

apply [ə'plai] применять, при-
 лагать

between [bi'twiːn] между

fruitful ['fruːtful] плодотворный

people ['piːpl] 1. люди; 2. народ

peace [piːs] мир

preserve [pri'zə:v] сохранять

security [si'kjʊərɪti] безопас-
 ность

Notes

1. to say nothing of

2. the so called

3. take place

4. for example

5. makes possible

6. power station

7. all over the world

— не говоря о

— так называемый

— имеют место, происходят

— например

— делает возможным

— электростанция

— во всем мире

*11. Прочитайте следующие группы слов. Обратите внимание: на место а) определения, выраженного причастием прошедшего вре-
 мени, относительно определяемого слова.*

The *obtained* results were... The results *obtained* by him were...
 The *corrected* plan can... The plan *corrected* by them can... The *con-
 trolled* operation may... The operation *controlled* by them may..

5) причастия в функции обстоятельства

When informed about it the teacher said... *When given* the instruction the boy began... *If asked* to give this lecture the professor can...

в) на функцию выделенных слов.

1. I *stopped* the man. The man *stopped* by me was old. 2. She *translated* the sentence. The sentence *translated* by her was easy. 3. They *created* a new system. The system *created* by them is good.

1. The ideas *developed* showed that... 2. The combination *used* looked... 3. The result *obtained* changed... 4. The question *asked* helped to...

to find — I *found* the length. — The length *found* by me was... — The length *was (was not) found* by me.

to tell — She *told* me a story. — The story *told* by her was... — The story *was (was not) told* by her.

to occupy — They *occupy* two rooms. — The two rooms *occupied* by them looked... — Two rooms *are (are not) occupied* by their lab.

to write — The students *will write* the new words. — The new words *written* in the exercise-book will... — The new words *will be (will not be) written* in the exercise-book.

г) на структуру вопросительного предложения.

What	The students Who Are are	are is the students the students	given given given given?	a test. a test? a test?
When	Their work What Was was	was was their work their work	done done done done?	in time. in time? in time?
When	The article What Will will	will will the article the article	be be be be	translated translated translated translated?

Лабораторное занятие I

III. Вспомните правила чтения букв *и*, *х* и сочетания *ph*. Повторяйте за диктором следующие слова.

- [ʌ] — cut, utter, plus, subject, result, under;
 [ju:] — use, tutor, music, unit, huge, produce, cube, due, human, humid, nude;
 [u:] — true, rule, blue;
 [u] — put, pull, push;
 [ə:] — turn, curl, murder, burn, surface, burst, further;

- [juə] — during, curious, impure, cure, fuel;
 [ks] — next, text, expect, except, complex, mix, explain, axis;
 [gz] — exam, examine, example, exact, exist;
 [ph] — philosophy, physics, telephone, sphere, phase, atmosphere, phenomenon, photography.

IV. Читайте за диктором упр. I, а затем слова урока.

V. Слушайте и повторяйте упр. II.

VI. Измените предложения по образцу.

Sp.: The man tells... (told, will tell)

St.: The man is told... (was told, will be told)

a) 1. The students meet... 2. He knows... 3. I give... 4. The work begins... 5. You take... 6. She tells...

b) 1. You showed... 2. The children found... 3. They met... 4. They regarded... 5. She saw... 6. It developed...

c) 1. They will discuss... 2. She will see... 3. The boy will show... 4. He will find... 5. I shall ask... 6. She will give...

VII. Выразите согласие с диктором. Скажите то же самое, не называя при этом субъекта действия.

Sp.: They use this information. (used, will use)

St.: Yes, this information is used. (was used, will be used)

1. He *does* this kind of research. 2. They *developed* quite a new system. 3. He *will* certainly *learn* the news today. 4. She *gave* another example. 5. The students *wrote* a few short sentences. 6. I usually *read* such books. 7. The teacher *studied* his paper. 8. We shall *discuss* a lot of things at our meeting. 9. Everybody *attended* the lecture. 10. He speaks English at the lessons.

VIII. Ответьте на вопросы по образцу.

Sp.: Will the new method be used now? (Yes, no)

St.: Yes, *I am sure* the new method will be used now.

No, *I am sure* the method will not be used now.

1. Was the article finished? (No). 2. Was the result doubled? (Yes). 3. Will the seminar be attended? (Yes). 4. Was his thesis handed in in due time? (No). 5. Were the students shown their hostel yesterday? (Yes). 6. Will all the questions be answered (отвечать)? (Yes). 7. Was the child stopped? (No). 8. Will the test work be written on Monday? (No). 9. Are all the students of your faculty taught English? (No). 10. Were all the students given good and excellent marks for their exams? (No).

IX. Возразите. Замените выделенное существительное соответствующим местоимением.

Sp.: I suppose *the work* was finished.

St.: No, *I am afraid it* was not finished.

1. I suppose *the letters* will be sent in due time. 2. I suppose *the exercise* is written correctly. 3. I suppose *the matter* will be studied in detail. 4. I hope *the fact* is known to everybody. 5. I am sure *the truth* was discovered. 6. I suppose *their theory* will be developed. 7. I hope *foreign languages* are studied well at this technical college. 8. I suppose *the exams* were passed successfully. 9. I hope *your graduation paper* is written. 10. I am sure *all these books* will be published again.

Х. *Задайте вопросы. Воспользуйтесь страдательным залогом. Помните о времени сказуемого.*

Sp.: He will defend *his dissertation*.

St.: Are you sure *his dissertation* will be defended?

1. He obtained *very interesting results*. 2. They will build a *new laboratory* next year. 3. I looked through *all these journals* a couple of days ago. 4. They will discuss *every detail* at their conference. 5. Everybody likes *modern music*. 6. His parents asked *his friends* to come to their place. 7. They will solve *such problems* very soon. 8. The children did *all the exercises* at home. 9. The students left *the experiment* unfinished. 10. He knows *all the books* by *this writer*.

Домашнее занятие I

XI. *Измените предложения по образцу. Не забудьте там, где это необходимо, заменить местоимения.*

I was given a room in the hostel. (we)

We were also given a room in the hostel.

1. The boy was asked about his family. (you). 2. I am told to present my graduation paper. (he). 3. They were given very interesting examples during the lecture. (you). 4. He was shown the information obtained by them. (we). 5. Their results were used in his work. (your method). 6. English is taught at the University. (French and German). 7. All the books will be left on the table. (the exercise-book). 8. Room five is occupied by the library. (these rooms). 9. This fundamental law was discovered in the 20th century. (quasars and pulsars). 10. The results of this experiment were overestimated. (the whole work). 11. The seminar will be attended by a lot of people. (the lectures). 12. This system was applied in our lab. (their methods of investigation).

XII. *Прочитайте предложения, выразите согласие с утверждением и запишите ответ согласно образцу.*

Her recent work *was discussed* by them on Thursday.

Yes, they *discussed* her recent work on Thursday.

The work *was not done* by you on Monday.

No, I *did not do* the work on Monday.

1. The final examination *will not be taken* by them on Saturday.
2. The discovery *was overestimated* by everybody. 3. This room is

occupied by these students. 4. The production of electric power was practically doubled by them. 5. A lot of examples were given by the professor during the lecture. 6. The creator of this beautiful structure is not known to us. 7. These fundamental discoveries are known to scientists all over the world. 8. Heredity laws are not investigated by this group of researchers.

XIII. *Задайте вопросы, используя вопросительные слова, данные в скобках.*

1. It is believed that a lot of important information will be obtained from the so called astrophysical laboratories. (what). 2. This fundamental law was discovered by Newton. (by whom). 3. The production of electric power will be doubled here next year. (when). 4. The successes of quantum mechanics were discussed at the recent conference on mechanics. (what). 5. The Seminar class on programming was attended by a number of specialists in this field. (by whom). 6. The contribution of academician L. Artsimovich to the problem of controlled thermonuclear reactions is world known. (whose). 7. The solution of this problem could provide a basis for the creation of the first thermonuclear power station. (what). 8. Close co-operation between Soviet and foreign scientists in certain fields of technology is very helpful and important. (what). 9. The lecturer gave many examples of the contribution of the 20th century science to the life of the human society. (who). 10. Close co-operation among scientists of various countries will help to preserve peace all over the world. (what).

Аудиторное занятие II

XIV. *Прочитайте контрольное упражнение.*

judge, cut, surface, 'current, 'useful, 'usual, pure, 'during, up, nut, burn, put, blue, unit, true, us, fur, push, 'curious, 'circus, cute, rule, mule, user, fuss, bulb, clue, club, 'urgent, 'further, 'number, 'numeral, cure, full, such, 'furnish, tube.

XV. *Подтвердите услышанное.*

T. He *showed them* the town.

St.: Yes, that's right. *They were shown* the town.

1. He *asked her* that question. 2. They *sent him* their article. 3. I *showed you* how to make the experiment. 4. She *told him* about their recent investigations in the field of molecular biology. 5. I *showed my students* a number of publications on the subject. 6. The lecturer *gave them* some interesting examples. 7. His students usually *ask him* a lot of questions. 8. She *sent her parents* a letter a few days ago. 9. The student showed *me* his graduation paper a couple of days ago. 10. They *told the foreign scientists* about their studies in the theory of information and programming.

XVI. *Выслушайте утверждение и возразите.*

T.: *I believe the translation was done in due time.*

St.: *I'm afraid the translation was not done in due time.*

1. I believe he *was given* some work at this lab. 2. I'm sure a power station *will be constructed* in this distant town. 3. I believe some result *was obtained* during the discussion. 4. I suppose everybody *was informed* about the coming meeting. 5. I hope this experiment *will be reproduced* in our lab. 6. I believe this publication *is based* on facts.

XVII. *Задайте общий вопрос к каждому предложению упр. XIII.*

XVIII. *Выслушайте внимательно преподавателя и уточните информацию, воспользовавшись вопросительным словом, предложенным преподавателем.*

T.: They will apply the results of their investigation. (where)

St.: Where will they apply the results of their investigation?

XIX. *Выслушайте преподавателя и либо согласитесь, либо возразите.*

T.: We *can see* those distant stars. (Yes, no)

St.: *Yes, I suppose* those distant stars *can be seen*.

No, I am afraid those distant stars *cannot (can't)* be seen.

1. We can apply this law in our experement. (Yes). 2. Students must study these fundamental laws. (Yes). 3. He must use the new method. (No). 4. They could double the production last year. (No). 5. You can leave your graduation paper with the teacher. (Yes). 6. They must control the conditions of work. (Yes). 7. Their laboratory may occupy those two rooms. (No). 8. They can practically double the number of publications. (Yes).

XX. *Прежде чем приступить к чтению текста, прочитайте вслед за преподавателем слова урока.*

XXI. *Внимательно слушайте чтение текста преподавателем, следя за интонацией, ритмом, ударением. Постарайтесь понять содержание текста.*

Progress of Science

We all know that our present age is the age of scientific and technological revolution. It is believed that ninety percent of the knowledge which the world has at its disposal today was obtained in the 20th century, in its last fifty years actually.

The number of scientific publications and science journals practically doubles every ten years.

Some fundamental laws of nature were discovered by the scientists of the twentieth century. Among them are the laws of heredity, the structure of the atom.

The successes of quantum mechanics, molecular biology, to say nothing of¹ cybernetics, are also great.

Scientists investigate distant stars, quasars and pulsars, the so called² astrophysical laboratories. They can be called laboratories because the processes that take place³ in them cannot be reproduced on our planet. The information that scientists obtain while studying quasars and pulsars is extremely important.

The contribution of Soviet science to the development of world science and technology cannot be overestimated. For example⁴ the famous «Tokamak». This thermonuclear chamber is the result of scientific and design research work of a large group of scientists. «Tokamak» makes possible⁵ an intensive study of the problem of controlled thermonuclear reactions. It is hoped that it may provide the basis for the first thermonuclear power station⁶ by the end of the century.

The successes of Soviet mathematicians in the theory of numbers, topology, mathematical logic, the theory of information and programming are world known. Such scientists as N. Lusin, P. Alexandrov, A. Kolmogorov, M. Keldysh as well as I. Vinogradov, M. Lavrentiev, N. Bogolyubov and others are the creators of the Soviet schools of mathematics and mechanics.

Today science occupies an extremely important place in the life of the human society. It is because the results of scientific research are applied in such spheres of life as medicine, economy, communication, construction, transport and many others.

In various fields of science there is close co-operation between Soviet and foreign researchers. They hope to solve many of the difficult problems facing the world today. And of course this co-operation may be fruitful only if people manage to preserve peace all over the world⁷. Peace is the main condition of life and development on our planet. Scientists together with other people in all countries of the world must do their best to preserve peace and security for humanity.

XXII. Найдите в тексте ответы на следующие вопросы.

1. What can we say about our present age? 2. How often does the number of scientific publications double? 3. What fundamental laws were discovered in the 20th century? 4. What does this text say about «Tokamak»? 5. What are the names of the creators of the Soviet schools of mathematics and mechanics? 6. Why is the progress of science important for the life of society? 7. Why do scientists from different countries co-operate? 8. What is the main condition of life and development on our planet?

Лабораторное занятие II

XXIII. Прочитайте данные слова и группы слов, сопоставляя ваше чтение с последующим чтением их диктором.

use—us; muse—must; fuse—fuss; cute—cut; huge—hug; 'music—musk; 'mutiny—mutter; 'unity—uncle; true—trust; blue—blust; rude—'ruddy; truce—truck; clue—club; plume—plum; urge, 'urban, curl, turn, 'turkey, ab'surd, burn, re'turn, 'murder; 'turret—'turner; 'hurry—hurtle; 'current—'curtain; 'furrow—'further; 'picture, 'natu-

re, 'feature, 'structure; ox, flux, ex'cite, 'mixture, ex'cuse, ex'ceed; ex'cept, ex'pect; e'xam, ex'amine, e'xactly, e'xhibit, e'xert; phone, phase, 'physicist, 'phantom, 'spherical, phrase.

XXIV. *Слушайте слова и повторяйте. Постарайтесь догадаться о значении выделенных слов.*

possible—impossible; to use—to misuse; human—*inhuman*; to inform—to *misinform*; rational—*irrational*; to place—to *displace*; large—to *enlarge*; to write—to rewrite; usual—*unusual*; to use—to *overuse*; proportion—*disproportion*; to change—to *interchange*; to place—to *misplace*.

XXV. *Скажите то же самое иначе.*

Sp.: I *can do it* (could, must...)

St.: *It can be done.*

1. He *could provide the paper* in time. 2. I *must write an article on the subject*. 3. You *may ask him that question* tonight. 4. I *could show them the computer*. 5. She *might change the subject of her dissertation*. 6. You *must look through these journals*. 7. They *must agree upon the time of the meeting*. 8. They *can speak about the power station* at the conference.

XXVI. *Задайте вопрос, уточняя интересующую вас подробность.*

1. The students were provided with books. (what kind of). 2. This fundamental law was discovered by D. Mendeleev. (when). 3. The creator of this system was asked to speak about it. (when). 4. The examination will be taken only tomorrow. (why). 5. Control must be doubled. (why). 6. Our classroom was occupied by another group. (when). 7. The conditions of life at the students' hostel were discussed by the administration. (when). 8. The process was applied quite successfully. (where). 9. They had some information at their disposal. (what kind of). 10. We discussed their possible contribution to our work. (with whom). 11. They work on the problems of heredity. (where). 12. There is one power station in our town. (what kind of). 13. I do not believe him. (why). 14. She gave only a few examples. (what kind of). 15. There must be close co-operation among scientists. (why).

XXVII. а) *Прослушайте текст урока, следя за диктором по книге;* б) *Слушайте текст, повторяя в паузах отрезки текста;* в) *Послушайте текст еще раз, не глядя в книгу, стараясь понять его со слуха.*

XXVIII. *Ответьте на вопросы по содержанию текста и запишите ответы с помощью символов + или —.*

1. Can we say that we live in the age of technological and scientific revolution? 2. Was ninety percent of scientific knowledge obtained in the 19th century? 3. Does the number of scientific publications all over the world double every three years? 4. Can quasars and pul-

sars be called «astrophysical laboratories»? 5. Can processes that take place in pulsars and quasars be reproduced on our planet? 6. Are the results of scientific research applied in various spheres of life? 7. Is there a close co-operation between Soviet and foreign scientists in certain fields of science? 8. Do Soviet scientists work on the problem of controlled thermonuclear reactions? 9. Are the names of outstanding Soviet mathematicians known to scientists all over the world? 10. Does science occupy an important place in the life of the human society?

XXIX. *Послушайте диалог и попытайтесь понять его содержание.*

Dialogue

— Say, Nick, what is your idea of a really outstanding scientist?	— Well, I suppose there are actually two main types (типы).
— What is the first type of scientists?	— They are scientists whose intellectual potential is extremely high. They are mainly theoreticians.
— I believe, I know what you mean. A classic example of a scientist of this type is Albert Einstein, isn't it?	— Yes, that's right.
— And what's the other type?	— I think this other type is actually the creator of some scientific school.
— 'Plato, for example.	— Yes, that's right. Another outstanding example of such a scientist was and will always be the founder of the famous school of Soviet physicists, Abram Ioffe.
— Oh, yes, certainly. For many of the world-known Soviet physicists his institute in Leningrad was their Alma Mater. For example P. L. Kapitza, N. N. Semionov and others.	— Yes, he loved them all and believed in them and they were all fond of him. He was a great man.

Домашнее занятие II

XXX. *Напишите русские эквиваленты выделенных английских слов. Затем уточните их значение по словарю.*

different—in'different; moral—immo'rality; 'rational—ir'ational; to use—un'used; planet—inter'planetary; to re'gard—to 'disre'gard; to build—to re'build; con'venient—incon'venient; to manage—to

'mis'manage; large—to en'large. to spend—to 'over'spend: real—
'un'real; work—'over'work

XXXI. Прочитайте данные тексты озаглавьте их и напишите
вопросы к ним.

Text I

1. When we speak about Dubna we usually have in mind international co-operation among scientists. (why). 2. This co-operation helps researchers from different countries to solve scientific and technological problems. (in what way). 3. Dubna is a very big modern scientific complex. (what kind of). 4. It has all facilities for fruitful and intensive work. (what kind of). 5. Many scientists working in Dubna's laboratories successfully present their theses for Candidate's and Doctor's degrees. (who). 6. There are many outstanding physicists doing research in Dubna now. (from what countries).

Text II

1. The Cavendish Laboratory at Cambridge was founded in 1874. (when). 2. The contribution of the Cavendish Laboratory to the development of research in physics cannot be overestimated. (what). 3. A number of great discoveries were made here. (by whom). 4. Among the researchers who worked at the laboratory at various times were such world-known physicists as Rutherford, Chadwick and Thomson. (what other outstanding physicists). 5. In 1919 the laboratory was headed by E. Rutherford. (what laboratory). 6. Rutherford was known for his great capacity [kə'pæsiti] (способность) for work, his volcanic [vɒl'kænik] energy ['enədʒi], interest for work and optimism. (who). 7. He was also known as an outstanding organizer ['ɔ:gənaɪzə] of research work. (what). 8. He gathered around (собира́л вокруг) him young gifted scientists. (where). 9. He directed [di'rektɪd] (направля́л) and co-ordinated [kou'ɔ:dineɪt] their research. (in what way). 10. This world famous school of research was always a model of international co-operation. (which school). 11. Soviet academician Peotr Kapitza worked in the laboratory for 10 years. (when). 12. P. Kapitza and E. Rutherford co-operated very successfully. (where).

XXXII. Выразите несогласие и уточните. Запишите ваши ответы.

He presented his thesis in May. (in April)

No, he didn't. He presented his thesis in April.

1. This room is occupied by students. (postgraduates). 2. The number of lectures was practically doubled. (the number of seminars). 4. He works in the field of quantum mechanics. (theory of programming). 5. The conditions of work here will be discussed tomorrow. (next week). 6. This scientist lived in the eighteenth century. (nineteenth). 7. She provided them with some books on biology. (journals). 8. It took them one year to create a basis for their future work. (only half a year). 9. This law was discovered by a French scien-

tist. (German). 10. This researcher works at Dubna now. (at the Institute of Theoretical Physics).

XXXIII. Прочитайте тексты упр. XXXI еще раз. Подготовьте устное изложение текстов.

Аудиторное занятие III

XXXIV. Прочитайте и назовите русские эквиваленты выделенных слов.

democratic—undemocratic, to know—known—unknown, to interpret—to misinterpret; important—unimportant, convenient—inconvenient, close—to enclose—to disclose, to read—to reread, to change—to interchange, to play—to overplay; material—immaterial, proportion—disproportion, rational—irrational.

XXXV. Прочитайте вслух текст 'Progress of Science'.

XXXVI. а) Ответьте на вопросы преподавателя по тексту 'Progress of Science'; б) Работая в парах, кратко изложите содержание текста.

XXXVII. Вам было дано задание постараться запомнить содержание диалога (упр. XXIX). Просмотрите его еще раз. Попробуйте побеседовать на тему диалога (работайте в паре).

XXXVIII. Работая в паре, кратко изложите содержание текстов упр. XXXI.

XXXIX. Прочитайте данный текст и передайте его содержание по-английски.

Наука сегодня занимает очень большое место в жизни человеческого общества. Это происходит потому, что результаты научных исследований находят применение практически во всех сферах человеческой жизни. Советские ученые вносят большой вклад в развитие мировой науки. Имена многих выдающихся советских ученых известны во всем мире.

В некоторых областях науки, таких, как астрономия, астрофизика, медицина, советские ученые успешно сотрудничают с учеными из других стран.

Особое место среди других наук имеет математика. По-существу сегодня развитие естественных наук, таких, как физика, химия, биология, геология, невозможно без математических исследований. Математика применяется также в медицине, экономике, промышленности, транспорте. Большие успехи в развитии математической логики, теории информации и программировании сделали возможной современную революцию в компьютерной технологии.

PART II

LESSON II

Classwork I

Grammar:
Word-building
Present, Past, Future Continuous (Active Voice)

I. a) *Read the following sentences. Compare the words in italics and see how they function.*

They *study* the structure of matter.

He usually *answers* well.

They *research* the problem of heredity.

They *faced* a lot of difficulties.

Their *study* of the structure of matter is important.

His *answers* were correct.

Their *research* in the problem of heredity was discussed at the conference.

His *face* showed great interest.

b) *Translate these word combinations. Try to guess the meaning of the words whose elements you already know.*

a sportsman, lifelong, a handbag, a handbook, a week-end, a textbook, a schoolboy, a cinema-goer, a dining-room, well-known, to overwork, a well-informed man, a post-office, a letter-box, a hard-working student, a class-mate, home-made, to overbalance, a long-distance call, a holiday-maker.

II. a) *Read the following. Mind the function of the Participle I.*

working—Working in the lab the students can...—The students working in the lab can (could)...—The students are working in the lab now.

looking—Looking at the picture he said...—The man looking at the picture said that...—The man was looking at the picture when I saw him.

translate—While translating the article they will find...—The students translating the article will find...—He will be translating the article at that time.

b) *Read these sentences and compare the tense forms.*

I usually read books in the evening.

He speaks English well.

She went home after work.

I am reading a book now.

He is speaking German at the moment.

She was going home when I saw her. It was 3 o'clock.

I had a seminar yesterday.

They will discuss various aspects of the problem tomorrow.

We were having a seminar from 3 till 5 o'clock. (at that time). This time tomorrow (at 2 o'clock) they will be discussing various aspects of the problem.

c) Read the sentences given below. Mind the structure of the interrogative and the negative sentences.

Are you working now?

Were they taking their exam at 10 o'clock?

{ Yes, I am.
No, I am not.
Yes, they were.
No, they were not.

She is not taking a walk now. They were not playing football when we saw them. They will not be having dinner at 7 o'clock in the evening.

Words to be Learned

Follow your teacher. Read these international words and try to guess their meaning.

numeration [ˌnju:mə'reɪʃən] *n*, system ['sɪstɪm] *n*, represent [ˌreprɪ'zent] *v*, combination [ˌkɒmbɪ'neɪʃən] *n*, base [beɪs] *n, v*, sentence [ˈsentəns] *n*, equal ['i:kwəl] *a*, plus [plʌs] *n*, minus ['maɪnəs] *n*, sum [sʌm] *n*, basic ['beɪsɪk] *a*, arithmetic [ə'riθmə'tɪk] *n*, multiplication [ˌmʌltɪplɪ'keɪʃən] *n*, multiply ['mʌltɪplaɪ] *v*, multiplier ['mʌltɪplaɪə] *n*, result [rɪ'zʌlt] *n, v*, product ['prɒdəkt] *n*, expression [ɪks'preʃən] *n*, check [tʃek] *n, v*, contain [kən'teɪn] *v*.

Repeat after the teacher.

without [wɪ'ðaʊt] без
number ['nʌmbə] *n* число, количество; *v* перечислять
numeral ['nju:mərəl] цифра, символ, число
use [ju:z] *v* пользоваться, использовать
use [ju:s] *n* применение, использование
digit ['dɪdʒɪt] цифра
vary ['veəri] меняться, изменяться
as [æz] 1. как, в качестве; 2. когда
value ['vælju:] *n* величина, значение; *v* ценить
thus [ðʌs] таким образом
sign [saɪn] *n* знак; *v* подписывать

add [æd] складывать
addend [ə'dend] слагаемое
summand ['sʌmənd] слагаемое
inverse [ɪn'vɜ:s] обратный
subtract [səb'trækt] вычитать
minuend ['mɪnjuənd] уменьшаемое
subtrahend ['sʌbtrəhend] вычитаемое
difference ['dɪfərəns] разность
symbol ['sɪmbəl] символ, знак
multiplicand [ˌmʌltɪplɪ'kænd] множимое
division [dɪ'vɪʒən] деление
divide [dɪ'vaɪd] делить
dividend ['dɪvɪdənd] делимое
divisor [dɪ'vaɪzə] делитель
above [ə'boʊv] над, выше, сверх
same [seɪm] тот же самый
which [wɪtʃ] который

quotient ['kwɒʃənt] частное
 whole [həʊl] целый
 zero ['ziərou] ноль
 remainder [ri'meində] остаток
 whenever [wen'evə] когда бы
 ни, всегда

except [ik'sept] кроме, за иск-
 лучением
 meaningless ['mi:nɪŋlis] бес-
 смысленный
 factor ['fæktə] *п* сомножитель;
и разложить на множители

Notes

1. and so on — и так далее
2. numeration system — система счисления
3. in a special way — особым образом
4. Hindu-Arabic system — арабская система
5. over and over again — многократно, часто
6. place-value system — позиционная система разрядов
7. one and the same — одно и то же
8. a way of thinking of — способ представить себе
9. from the above — из вышесказанного
10. a whole number of times — целое число раз
11. a part left over — остаток, оставшаяся часть
12. check division by using multiplication — проверить деление, пользуясь умножением

Laboratory Assignment I

III. *Follow the speaker as he is reading the words.*

a) *Mind the pronunciation of the letter s.*

- [s] — side, size, looks, clocks, hopes, rots;
 [z] — sides, clubs, days, studies, finishes, watches, logs, toys;
 [ʃ] — sure, ensure, pressure, mission, expression, Russian;
 [ʒ] — usual, provision, measure, closure, division, exposure, televi-
 sion, treasure.

b) *Mind the sounds [a:] and [ɔ:] and the letters and combina-
 tions of letters these sounds are expressed by.*

- [a:] — arm, fast, father, rather, article, partial, mark, answer, last,
 ask, half, example, farmer, pass, card, mask, path, after, army;
 [ɔ:] — form, or, cause, law, fall, brought, order, inform, more, saw,
 water, ball, ought, your, quarter, hall, draw, thought, course,
 door, four, author, always, also, automation, borne, orbit.

IV. a) *Listen and repeat the new words of the lesson. See 'Words
 to be Learned';* b) *Listen and repeat ex. II a, b, c.*

V. *Listen to the speaker and answer his questions. Follow the
 model.*

Sp.: Are you reading or writing?

St.: I am writing.

a) 1. Are you teaching English or *learning it*? 2. Are you having
 a lecture or *a seminar* now? 3. Is he speaking English or *German*

to that foreign scientist? 4. Were they having a discussion on philosophy or *cybernetics*? 5. Will you be *asking questions* or answering them? 6. Is she writing a test or *an exercise*?

Sp.: Are you translating his paper? (from 5 till 8 tomorrow)

St.: No, I'm not. I *shall (I'll) be translating* his paper from 5 till 8 tomorrow.

b) 1. Is he having dinner now? (at seven o'clock in the evening). 2. Was he playing chess when you saw him? (from 7 till 9 tonight). 3. Were they taking a walk when you met them in the morning? (at 3 o'clock in the afternoon). 4. Are you making your experiment now? (all day long tomorrow). 5. Were you writing your test-work when I opened the door? (tomorrow from 9 till 10.30).

Sp.: What are you doing? (solve a problem)

St.: I am solving a problem.

c) 1. What is he writing? (a scientific paper). 2. Where were you going when I saw you in the morning? (to the post-office). 3. Where was he giving his lecture at 6 o'clock? (at the main conference hall). 4. What are they arguing about? (the time of the meeting). 5. Where is he attending the conference? (at the Institute of Mechanics). 6. What will you be doing this time tomorrow? (showing them the town).

Sp.: Do you read English books? (an interesting book)

St.: Yes, I do. I am reading an interesting book now.

d) 1. Do they apply various methods of research? (a new method). 2. Do students study laws of physics? (the law of 'magnetism'). 3. Do you investigate such problems at your lab? (one of such problems). 4. Does he usually have his vacation in winter? (at present). 5. Does she often write letters to her parents? (her mother). 6. Do they do their morning exercises before breakfast? (at the moment).

VI. *Listen to the speaker. Disagree with him.*

Sp.: They are talking. (argue)

St.: They are not talking. They are arguing.

1. He is taking his exam in biology. (history). 2. They are leaving for Kiev. (Leningrad). 3. She is trying to publish his article. (his book on heredity). 4. They will be investigating various aspects of this matter. (only one). 5. She was trying to enter the faculty of Cybernetics. (Physics). He is sharing a room with his friend. (his brother).

Homework I

VII. *Follow the model. Write down your statements.*

You *must add* these numerals.

I *am adding* these numerals.

1. He *must find* the difference. 2. They *must change* the whole system. 3. You *can change* the sign in the first part of the equation. 4. She *must first* multiply and then subtract. 5. You *can check* divi-

sion by multiplication. 6. They *must write* this mathematical expression in their exercise-books.

VIII. *Follow the model. Answer the questions below. Write down your answers.*

Are you adding 15 and 7? (subtract 7 from 15)

I am subtracting 7 from 15.

1. Was the boy checking division by multiplication? (subtraction). 2. Are you trying to find the product? (quotient). 3. Are the children learning the operation of addition? (division). 4. Will you be speaking about the numeration system at the lesson? (the four basic operations of arithmetic). 5. Were they discussing mathematical symbols? (various types of mathematical sentences).

IX. *Ask questions to which the sentences below could be answers.*

1. Our teacher spoke about inverse operations during the lesson. 2. Division by zero is meaningless. 3. He reads books whenever he has time. 4. The sentence contained three new words. 5. The results of their experiments varied. 6. In this mathematical expression one of the factors is not known. 7. This primitive computer can add, subtract, multiply and divide. 8. He changed the signs in both parts of the equation. 9. They used a base five numeration system. 10. Today people cannot live without numerals. 11. There are some basic laws of arithmetic that everybody must know. 12. There is a great difference in the conditions of life in these developing countries. 13. Everybody except one of my group-mates came to the meeting in time. 14. Those symbols are used in arithmetic operations. 15. The result of division is called a quotient. 16. The result of multiplication is called a product.

Classwork II

X. *Practise reading the words given below.*

digits, numbers, sums, re'sults, 'special, con'tains, 'values, ad'dends, 'leasure, ap'plies, laws, pre'sents, studies, 'usually, 'assure, stays, keeps, 'finishes, cottages, measure, 'subjects, de'velops, expression, leaves, turns, 'recognizes, pro'vision; harm, last, 'answer, pass, 'cardinal, afternoon, rather; course, law, call, 'formal, awfully, warm, 'author, 'August, talk, thought, brought, more, floor, quart.

XI. *Translate these words. Your teacher will help you in case you are not sure of the meaning of the words.*

a week-day *n*, life-story *n*, a time-table *n*, a new-comer *n*, present-day *a*, world-famous *a*, man-made *a*, hard-working *a*, well-informed *a*, to overact, to underestimate, to overestimate, highly-developed *a*, underdeveloped *a*, three-year-old *a*, first-class *a*, a letter-box *n*, newly-discovered *a*.

XII. Translate into Russian.

1. The power station *functions* well. He does not know his *functions* well. 2. The students *work* hard at their English. Their *work* was very helpful. 3. He usually *places* all the journals on his writing table. The table occupies a lot of *place*. 4. The girl had a lovely *face*. He could not *face* the truth. 5. How many *questions* did the teacher ask you? He was *questioning* me for a long time.

XIII. a) State the function of the word in italics.

1. *Having* no time I could not talk to him. 2. While *speaking* to my science adviser I learned something quite new. 3. The boy *sharing* the room with me is one of my friends. 4. *Taking* his paper from him I thanked him. 5. They are *building* a modern computer at this research centre. 6. The child is *trying* to find the remainder while *dividing* 341 by 8. 7. The *playing* children did not see their mother *entering* the room. 8. I was *thinking* about him when he came.

b) *Listen to your teacher as she (he) is reading the sentences and ask a logical question about every sentence. (Don't look into your text-book).*

XIV. Ask a 'general question about every sentence of ex. IX.

XV. *Disagree with each one of the statements below and give correct variants.*

T.: We can get this book everywhere. (in the library).

St.: We cannot get this book everywhere. We can get it in the library.

1. In the Hindu-Arabic numeration system we use five digits. (ten). 2. The result of multiplication is called the difference. (product). 3. We get the sum as a result of subtraction. (addition). 4. Addition and multiplication are inverse operations. (addition and subtraction). 5. Division and subtraction are inverse operations. (division and multiplication). 6. As a result of this operation he found the sum. (the product). 7. She usually solves a lot of equations while doing her homework. (very few). 8. You are placing the plus sign between these numerals. (minus). 9. They were speaking about the new system. (the old method). 10. The remainder equals 5. (nine). 11. This expression is meaningless. (meaningful). 12. In the expression $2+3=5$ two and three are factors. (summands). 13. In the equation $12-11=1$ one is the minuend. (the difference). 14. In the mathematical sentence $12:6=2$ two is the divisor. (quotient). 15. If you divide 15 by 4 you will get a whole number as a result. (a remainder). 16. If we multiply 12 by 4 we shall get 50 as a product. (48).

XVI. *Follow your teacher as she (he) is reading the words of the lesson.*

XVII. *Read the text below. You are expected to say a few words about its contents after you have read the text. You may do it either in English or in Russian.*

Four Basic Operations of Arithmetic

We cannot live a day without numerals. Numbers and numerals are everywhere. On this page you will see number names and numerals. The number names are: zero, one, two, three, four and so on¹. And here are the corresponding numerals: 0, 1, 2, 3, 4, and so on. In a numeration system² numerals are used to represent numbers, and the numerals are grouped in a special way³. The numbers used in our numeration system are called digits.

In our Hindu-Arabic system⁴ we use only ten digits: 0, 1, 2, 3, 4, 5, 6, 7, 8, 9 to represent any number. We use the same ten digits over and over again⁵ in a place-value system⁶ whose base is ten.

These digits may be used in various combinations. Thus, for example, 1, 2, and 3 are used to write 123, 213, 132 and so on.

One and the same⁷ number could be represented in various ways. For example, take 3. It can be represented as the sum of the numbers 2 and 1 or the difference between the numbers 8 and 5 and so on.

A very simple way to say that each of the numerals names the same number is to write an equation—a mathematical sentence that has an equal sign (=) between these numerals. For example, the sum of the numbers 3 and 4 equals the sum of the numbers 5 and 2. In this case we say: three plus four ($3+4$) is equal to five plus two ($5+2$). One more example of an equation is as follows: the difference between numbers 3 and 1 equals the difference between numbers 6 and 4. That is three minus one ($3-1$) equals six minus four ($6-4$). Another example of an equation is $3+5=8$. In this case you have three numbers. Here you add 3 and 5 and get 8 as a result. 3 and 5 are addends (or summands) and 8 is the sum. There is also a plus (+) sign and a sign of equality (=). They are mathematical symbols.

Now let us turn to the basic operations of arithmetic. There are four basic operations that you all know of. They are addition, subtraction, multiplication and division. In arithmetic an operation is a way of thinking⁸ of two numbers and getting one number. We were just considering an operation of addition. An equation like $7-2=5$ represents an operation of subtraction. Here seven is the minuend and two is the subtrahend. As a result of the operation you get five. It is the difference, as you remember from the above⁹. We may say that subtraction is the inverse operation of addition since $5+2=7$ and $7-2=5$.

The same might be said about division and multiplication, which are also inverse operations.

In multiplication there is a number that must be multiplied. It is the multiplicand. There is also a multiplier. It is the number by which we multiply. When we are multiplying the multiplicand by the multiplier we get the product as a result. When two or more numbers are multiplied, each of them is called a factor. In the expression five multiplied by two (5×2), the 5 and the 2 will be factors. The multiplicand and the multiplier are names for factors.

In the operation of division there is a number that is divided and it is called the dividend; the number by which we divide is called the divisor. When we are dividing the dividend by the divisor we get the quotient. But suppose you are dividing 10 by 3. In this case the divisor will not be contained a whole number of times¹⁰ in the dividend. You will get a part of the dividend left over¹¹. This part is called the remainder. In our case the remainder will be 1. Since multiplication and division are inverse operations you may check division by using multiplication¹².

There are two very important facts that must be remembered about division.

a) The quotient is 0 (zero) whenever the dividend is 0 and the divisor is not 0. That is, $0:n$ is equal to 0 for all values of n except $n=0$.

b) Division by 0 is meaningless. If you say that you cannot divide by 0 it really means that division by 0 is meaningless. That is, $n:0$ is meaningless for all values of n .

XVIII. Now that you have read the text above, speak about it. Say which operations of arithmetic it deals with.

Laboratory Assignment II

XIX. Listen and repeat. Guess the meaning of the words in italics.

to repre'sent—*represen'tation*—*repre'sentative*; combi'nation—to *com'bine*; base—'baseless; 'equal—to 'equalize; 'basic—'basically; 'product—*pro'ductive*—*produc'tivity*—to *pro'duce*; ex'pression—to ex'press; to con'tain—*con'tainer*; use—'useful—'useless—'uselessness—'usefulness; 'digit—'digital; 'value—'valuable; 'symbol—sym'bo'lic—to symbolize; ex'cept—ex'ception—ex'ceptionally; 'various—to 'vary; ex'ample—to ex'amplify; be'tween—bet'weenness; in'verse—in'verse'ly; 'difference—*different*—*in'different*—*indifferently*; to think—*thinker*; whole—*wholly*; part—*partly*.

XX. Answer the following questions. Follow the model below.

Sp.: What are you doing? (divide 10 by 2)

St.: I am dividing ten by two.

1. What is he doing? (find the value). 2. What are the students writing? (another equation). 3. What were they talking about? (base two numeration system). 4. What symbols are you using? (mathematical symbols). 5. Were you adding these numerals? (multiplying). 6. Were you subtracting 5 from 15? (divide). 7. Are you writing down the addends? (the sum). 8. Will he be dividing 20 by 4? (add). 9. Is it a combination of three digits? (four). 10. Do they use a base five numeration system in computers? (a base two). 11. Are you trying to find the quotient? (remainder). 12. Can you find the minuend in this way? (the subtrahend).

XXI. *Open your book. Listen to the speaker as he is reading the words of the lesson and repeat them.*

XXII. a) *Follow the speaker as he is reading the text;* b) *Hear the text again without looking into the book.*

XXIII. *Listen to the questions below and write down your answers with the help of a + sign (if you agree), or a — sign (if you disagree), or some numeral.*

1. Can people live without numerals? 2. How many digits do we use in our Hindu-Arabic system of numeration? 3. Is a base five system used in modern computers? 4. Is subtraction an inverse operation of division? 5. Is addition an inverse operation of multiplication? 6. Are subtraction and addition inverse operations? 7. Are division and multiplication inverse operations? 8. Is the product the result of subtraction? 9. Is the difference the result of division? 10. Will there be a remainder if you divide 36 by 6? 11. Will there be a remainder if you divide 31 by 7? 12. How many basic operations of arithmetic do you know?

Homework II

XXIV. *Arrange the words given below according to the parts of speech they belong to.*

investigate, peaceful, security, application, overestimate, ageless, possibly, agreement, difference, different, creator, powerless, readiness, optimist, thankful, divisor, lifeless, fruitfully, spherical, occupation, theoretical, naturally, popularize, reproduction, simplify, luckily, recognize, traditional, development, valuable, partly, thinker, signify, usable, gladly, certainly.

XXV. *Ask a general question about every sentence of ex. XV.*

XXVI. *Disagree with the following statements and write correct variants.*

In our Hindu-Arabic numeration system we use 5 digits.

No, we don't. We use 10 digits.

1. The base of the binary system is ten. 2. Addition is the inverse operation of multiplication. 3. The decimal system of numeration uses only five digits. 4. The use of parentheses is not important in the following expression $20 \times 30 + 10 : 2 - 5 + 16$. 5. When no parentheses are used in a mathematical sentence it means that first you must add and subtract and then multiply and divide. 6. If you are going to add 5, 7, and 10 the order of the operations is very important. 7. Any operation is called a binary operation when it is applied to only three numbers at a time. 8. In the operation of multiplication the order in which three factors are multiplied is important.

XXVII. a) *Read the following text. It contains a number of international words whose meaning you can guess. Consult the vocabulary of this text-book if you are not sure;* b) *Entitle this text.*

The teacher asked his students to add the numbers 5, 8 and 6 at the same time. Some of the students first added 5 and 8 and got 13. Next they added 13 and 6 and obtained 19. Other students first added 8 and 6 and got 14 and then added 14 and 5 also getting 19 as a result.

The examples given above illustrate ['iləstreɪt] two important characteristics [ˌkærɪktə'rɪstɪks] of addition. One of the two characteristics is that addition is an operation applied to only two numbers at a time (одновременно). For this reason ['rɪ:zn] we say that addition is a binary ['baɪnəri] operation. Any operation is called a binary operation when it is applied to only two numbers at a time and gives a single ['sɪŋɡl] (единственный, один) result. [rɪ'zʌlt]. The other characteristic shown by the above examples is that the sum is the same re'gardless of (независимо от) the 'order (порядок) of the addition.

The use of parentheses (круглые скобки) will indicate ['ɪndikeɪt] how the answer, that is the result, was obtained. The first example can be written as follows: $5+8+6=(5+8)+6=13+6=19$. The second example can be written as follows $5+8+6=5+(8+6)=5+14=19$. Since the final answers are the same we are making the following statement: $(5+8)+6=5+(8+6)$.

XXVIII. After you have read the text above, write a question about each one of its sentences.

XXIX. a) Read the text 'Four Basic Operations of Arithmetic'; b) Shorten the text leaving out the unimportant details. Do it in writing; c) You must be prepared to speak on the contents of the text in class.

Classwork III

XX. Read the words and guess the meaning of the words in italics.

to 'illustrate—*il'lustrative*; to 'reason—'*reason n—'reasonable—un'reasonable*; to apply—*application*; character—*characteristic a*; to indicate—*indicative*; to add—*additive*; e'xample—to e'*xamplify*; basic—*basically*; ope'ration—to '*operate*; to repre'sent—*represen'tation*; same—'*sameness*; 'various—to '*vary*, 'difference—to '*differ*; 'product—*pro'ductive—produc'tivity*; to sup'pose—*suppo'sition*; 'value—'*valuable—'valueless—to value*.

XXXI. Read the text 'Four Basic Operations of Arithmetic'.

XXXII. Answer your teacher's questions about the text.

XXXIII. Speak on the text 'Four Basic Operations of Arithmetic'. You may work in pairs.

XXXIV. Read the sentences below and give an adequate translation of each sentence.

1. Умножение подобно сложению представляет собой двоичную операцию, так как в любом действии умножения из множества чисел одновременно используются только два числа. 2. В любой системе счисления должны быть символы для чисел 0 и 1. 3. Если мы хотим показать порядок арифметических действий, мы должны воспользоваться скобками. 4. Все четыре основных действия арифметики являются двоичными действиями. 5. Прежде чем мы решим данное уравнение, мы должны проделать следующие действия. 6. Решая такие уравнения, студенты должны помнить о порядке арифметических действий. 7. Во время лекции преподаватель привел ряд примеров, показывающих, что деление на 0 не имеет смысла. 8. Каковы действия, обратные вычитанию и делению?— Это сложение и умножение. 9. Представьте себе, что вас просят проиллюстрировать этот закон каким-нибудь примером. 10. Вы перемножаете эти два числа?— Нет. Я делю одно число на другое. 11. Возможно ли разделить 231 на 6 без остатка?— Нет, невозможно.— А каков будет остаток?— Разделите и вы увидите. 12. Сколько чисел содержится в этом уравнении? 13. Как называется результат деления (умножения, сложения, вычитания)? 14. Которую из задач вы пытаетесь решить? 15. Почему он сначала умножает, а затем вычитает? 16. Почему они спорят?— Они пытаются найти истину.

LESSON 12

Classwork I

Grammar:

Present, Past Continuous (Passive Voice)

I. *Read these sentences and compare them.*

a) She is multiplying these numerals.	— These numerals are being multiplied.
You are checking the result.	— The result is being checked.
They were developing his ideas at the meeting.	— His ideas were being developed at the meeting by others.
We are building computers.	— Computers are being built everywhere.
b) Was your paper being discussed when you came?	— My paper was not being discussed at that time.
Were the texts being translated during the lesson?	— The texts were not being translated during the lesson.
Is the theorem being proved by him?	— The theorem is not being proved.
Are your plans being changed?	— My plans are not being changed.
c) What are they constructing here?	— What is being constructed here?

How were they operating the machine?

Who is asking the student?

d) We were given English lessons last year.

The article is translated into Russian.

— How was the machine being operated?

— Who is being asked by the teacher?

— They were being given that information when I came.

— The article is being translated into Russian.

II. Read the following questions and 'yes' and 'no' answers.

Are such symbols being used now? { Yes, they are.
No, they are not.

Is the operation of division being checked? { Yes, it is.
No, it isn't.

Were you being told about the students' construction team when I came? { Yes, we were.
No, we were not.

Was he being shown their method of research at that time? { Yes, he was.
No, he was not.

Words to be Learned

Follow the teacher. Read these international words. Try to guess their meaning.

calculate ['kælkjuleit] *v*, electronic [ilek'trɒnik] *a*, indicate ['indi-keit] *v*, extensive [iks'tensiv] *a*, speed *n*, position [pə'zɪʃən] *n*, binary ['bainəri] *a*.

Repeat after your teacher.

latter ['lætə] 1. недавний, последний (из перечисленных); 2. последний

build [bild] (built) *v* строить

complicated ['kɒmpleikeitɪd] сложный

correspond [,kɒrɪs'pɒnd] *v* 1. соответствовать; 2. переписываться

corres'pondence *n* соответствие

off [ɒf] *зд.* выключение

on *зд.* включение

circuit ['sə:kɪt] цепь, контур

high [haɪ] высокий

power ['paʊə] 1. энергия, сила; 2. показатель степени (мат.)

below [bi'lou] ниже, под

squared [skweəd] в квадрате (мат.)

recently ['ri:səntli] недавно

switch [swɪtʃ] *n* переключатель; *v* переключать, включать

account [ə'kaʊnt] *n* счет, расчет, подсчет

account for *v* объяснять

notation [nou'teɪʃən] обозначение

therefore [ðə'fɔ:] поэтому

advantage [əd'vɑ:ntɪdʒ] преимущество

disadvantage [ˌdisəd'vɑ:ntɪdʒ] недостаток

appear [ə'piə] *v* 1. появляться; 2. казаться

compare [kəm'preə] сравнивать, сопоставлять

Notes

1. some centuries before — за несколько столетий до
2. in some of the most complicated — в некоторых наиболее сложных
3. as shown below — как показано ниже
4. 2^3 — two cubed or two to the third power
 2^2 — two squared
 1×2^3 — one multiplied by two to the third power
5. is the simplest — самый простой
6. well familiar with — хорошо знакомы с
7. the system has the advantage (disadvantage) of having — система обладает тем преимуществом, что она имеет

Laboratory Assignment I

III. Follow the speaker as he is reading the words below. Mind the combinations of letters producing the sounds [ʌ], [ə:], [ou], [au].

- [ʌ] — month, young, trouble, result, discover, other, some, rough, done, enough, mother, sum, above, just, country, among, sun, love, become, double, subject, jump, grudge, ton, come;
- [ə:] — work, serve, dirty, early, world, search, burn, vertical, hurt, word, circuit, worse, firm, earn, term, were, firm, burst, journal;
- [ou] — know, hold, open, so, process, told, own, note, road, approach, boat, motion, cold, slow, low, bold, grow;
- [au] — about, stout, allow, house, count, amount, power, brown, countable, down, without, how.

IV. Listen to the speaker as he is reading the new words of the lesson and repeat them after the speaker.

V. Follow the speaker as he is reading ex. I.

VI. a) Agree with the statements. Follow the model.

Sp.: I suppose the method is being changed. (they)

St.: Yes, they are changing the method.

1. I suppose these students are being given a lecture. (this scientist). 2. I suppose the experiment was being made when you came. (the students). 3. I suppose these books are being read. (everybody). 4. I suppose they were being shown the new computer at that moment. (he). 5. I suppose the dissertation was being defended at 11 o'clock. (she).

b) Answer these questions.

Sp.: Is the machine being built? (we)

St.: Yes, we are building the machine.

1. Is such an experiment being made in your lab? (one of our young scientists). 2. Were the children being helped? (their teacher).

3. Is the newly developed system being widely used? (everybody).
4. Was the information being discussed when you came? (some of our students).
5. Are these numbers being multiplied? (the children).

VII. *Disagree with the speaker.*

Sp.: The problem is being solved successfully.

St.: The problem is not being solved successfully.

1. The answer is being easily obtained. 2. Such articles are being translated. 3. Base five numeration system is being used in such electronic computers. 4. These numerals are being added. 5. Research is being done in this field. 6. The test-work was being written by the students at that time.

VIII. *Listen to the speaker and answer his questions. Mind the irregular verbs.*

1. Where did you find this article? (in your journal). 2. When did you hold the conference? (two days ago). 3. When did he take his exam in physics? (last week). 4. What did you see at their laboratory? (very interesting tests). 5. What did his research adviser tell him? (to present his thesis). 6. What kind of research did he do? (important). 7. To whom did he speak about the advantages of their plan? (some foreign scientist). 8. When did professor read the abstract of your dissertation? (yesterday). 9. Where did they build the new computer? (at our Institute). 10. What did she teach you? (German). 11. When did he write his abstract? (last month). 12. When did you begin the lesson? (at 9 o'clock). 13. What did they deal with? (philosophy). 14. Whom did you meet at the conference? (a friend).

Homework I

IX. *Write questions.*

1. The students were being informed about the meeting. (by whom). 2. The conference is being held now. (where). 3. Such methods are being developed. (why). 4. The results were being checked at 6 o'clock. (how). 5. The computer was being placed there when they entered. (by whom).

X. *Answer these questions.*

1. How many high-speed computers are being operated at their faculty? (three). 2. When were the advantages and the disadvantages of the new type of machines being discussed? (during the conference yesterday). 3. How do you account for the fact that the work is not being done? (there is not enough information). 4. Where is this big power station being built? (in the East of our country). 5. Where are electronic computers being extensively used? (in science and technology).

XI. *Ask questions the answers for which are provided by the sentences below.*

1. There are two reasons that account for this situation. 2. This system of notation is widely used now. 3. This scientist worked in this laboratory in the latter part of the nineteenth century. 4. The binary system is another name for the base two system. 5. These ideas are extensively developed everywhere. 6. The instrument uses mechanical power. 7. The recently published article was spoken about at our seminar. 8. The minus sign indicates that the work cannot be started. 9. The plus sign indicates that the machine is operating well. 10. He could not account for the fact that they began their work so late. 11. His brother failed his exam in the spring and therefore he must take it again in September. 12. They used a mechanical calculator for their work. 3. There is no correspondence between the results obtained by the two groups of researchers. 14. Everybody is familiar with books by this writer.

Classwork II

XII. *Practise reading these words.*

become, burn, out, bus, slow, another, sold, world, early, own, cover, powerless, under, load, research, curve, circle, fuss, country, double, trouble, word, boat, about, journal, young, counter, allow, among, without, grow, now, road, know, how, slowly.

XIII. *Ask questions to find out the details.*

1. The recent book by this philosopher and mathematician is being made ready for publication. (where). 2. Such buildings are being reconstructed. (why). 3. These laws are being studied by children. (why). 4. This statement was being made by one of the administrators. (where and when). 5. Such information is not being produced now. (why). 6. The result of their work was being discussed during the recent meeting. (by whom). 7. Numbers are being multiplied, divided, added, and subtracted with the help of a calculator. (in what way). 8. They were being asked about their recent research when we came. (by whom).

XIV. *Ask a general question about every sentence of ex. XI.*

XV. a) *Name the predicate in every sentence below;* b) *Translate these sentences.*

1. He is trying to find the value of «a». 2. This unimportant question need not be discussed during their meeting. 3. His first article was soon followed by another article in our journal. 4. All the data are being sent to them. 5. It is impossible to indicate the position of this planet at the moment. 6. He wants to pass his exam successfully, as usual, and therefore he works a lot. 7. Since the machine is not complicated they could easily operate it. 8. In a few months' time they are going to put into operation another computer. 9. The result obtained showed something quite unexpected. 10. While working on these two facts he found that there was a certain correspondence between them. 11. He does not want to speak about the disadvantages

of his method of research now. 12. The position of every digit is being changed. 13. The child always tries to follow his father's example. 4. They will be making some very interesting experiments at the lab. 15. He did not rise early in the morning today. 16. The system introduced appeared new.

XVI. *Disagree with each one of the statements below.*

1. You can leave the speed unchanged. 2. He switched off the circuit in due time. 3. I am familiar with his recent paper. 4. The book was written in the traditional classical manner. 5. He believes you can account for the application of this method of construction. 6. The binary system of notation is used in such cases. 7. The information obtained showed the real situation. 8. You can easily see the difference between these machines. 9. We are trying to find some additional facts. 10. There is something unusual about the article published by them. 11. The information is being checked. 12. They are applying new methods of research.

XVII. *Follow your teacher as she (he) is reading the words of the lesson.*

XVIII. *Read the text below. You are expected to give a short outline of the text after you have read it. (You may do it in Russian).*

Base Two Numerals

During the latter part of the seventeenth century a great German philosopher and mathematician Gottfried Wilhelm von Leibnitz (1646—1716), was doing research on the simplest numeration system. He developed a numeration system using only the symbols 1 and 0. This system is called a base two or binary numeration system.

Leibnitz actually built a mechanical calculating machine which until recently was standing useless in a museum in Germany. Actually he made his calculating machine some 3 centuries before¹ they were made by modern machine makers.

The binary numeration system introduced by Leibnitz is used only in some of the most complicated² electronic computers. The numeral 0 corresponds to *off* and the numeral 1 corresponds to *on* for the electrical circuit of the computer.

Base two numerals indicate groups of ones, twos, fours, eights, and so on. The place value of each digit in 1101_{two} is shown by the above words (*on* or *off*) and also by powers of 2 in base ten notation as shown below³.

$\dots 2^3$ Eights	2^2 Fours	2^1 Twos	1 Ones
1	1	0	1

The numeral 1101_{two} means
 $(1 \times 2^3) + (1 \times 2^2) + (0 \times 2) + (1 \times 1) = (1 \times 8) + (1 \times 4) + 0 + 1 = 8 + 4 + 0 + 1 = 13$. Therefore $1101_{\text{two}} = 13$.

A base ten numeral can be changed to a base two numeral by dividing by powers of two.

From the above you know that the binary system of numeration is used extensively in high-speed electronic computers. The correspondence between the two digits used in the binary system and the two positions (on and off) of a mechanical switch used in an electric circuit accounts for this extensive use.

The binary system is the simplest⁵ place-value, power-position system of numeration. In every such numeration system there must be symbols for the numbers zero and one. We are using 0 and 1 because we are well familiar with⁶ them.

The binary numeration system has the advantage of having⁷ only two digit symbols but it also has a disadvantage of using many more digits to name the same numeral in base two than in base ten. See for example:

$$476 = 111011100_{\text{two.}}$$

It is interesting to note that any base two numeral looks like a numeral in any other base. The sum of 10110 and 1001 appears the same in any numeration system, but the meaning is quite different. Compare these numerals:

$$\begin{array}{r} 10110_{\text{two}} \\ + 1001_{\text{two}} \\ \hline \end{array} \quad \begin{array}{r} 10110_{\text{ten}} \\ + 1001_{\text{ten}} \\ \hline \end{array} \quad \begin{array}{r} 10110_{\text{seven}} \\ + 1001_{\text{seven}} \\ \hline \end{array}$$

XIX. Now that you have read the text 'Base Two Numerals' give a short outline of it either in English or in Russian.

Laboratory Assignment II

XX. Listen and repeat. Guess the meaning of the italicized words.

part—*partly*; philosopher—*philosophical*; use—usable—*useless*—*useful*—*usefulness*—*uselessness*; symbol—*to symbolize*; actually—*to act*; mechanical—*mechanically*; to make—*maker*; to introduce—*introduction*; to correspond—*correspondent* a; value—*valuable*; digit—*digital*; power—*powerful*—*powerless*; to change—*changeable*—*unchangeable*; used—*misused*; familiar—*familiarity*; base—*baseless*; to appear—*to disappear*; advantage—*advantageous*.

XXI. Answer the speaker's questions. See the model.

Sp.: Is the problem being solved? (in some time)

St.: No, it is not. It will be solved *in some time*.

1. Are both these facts being discussed? (in the next article).
2. Are students being taught differential geometry now? (next term).
3. Were both methods being considered? (during the next seminar).
4. Is the machine being built now? (next year).
5. Were the problems facing human society being discussed then? (at the international conference next month).

XXII. *Listen to the speaker and give short 'yes' or 'no' answers.*

a) 1. Were there any outstanding scientists at that congress? (Yes). 2. Are there various service facilities in the main University building? (Yes). 3. Are there students of different nationalities at this college? (Yes). 4. Is there anybody who knows German in your class? (No). 5. Will there be any exhibition at this museum in January? (No).

b) 1. Could you recognize these two people? (Yes). 2. Can you see any familiar faces among those who are present here? (No). 3. Must you stay in town over the week-end? (No). 4. May I leave early today? (No). 5. Must the children study these laws? (Yes).

c) 1. Did you believe all he said? (No). 2. Do they investigate the problems of heredity at their institute? (Yes). 3. Did he meet his parents at the station? (Yes). 4. Does your brother always have a shower before breakfast? (Yes). 5. Does your sister speak three foreign languages? (No).

d) 1. Was the information obtained considered in due time? (Yes). 2. Is her science adviser's recent book much spoken about? (Yes). 3. Were all of you asked to take part in this experiment? (No). 4. Were the advantages of the new method of control discussed by them yesterday? (Yes). 5. Was everybody told about the time of the examination? (Yes).

e) 1. Are they reconstructing this ancient building? (No). 2. Is he doing his morning exercises now? (No). 3. Were they having dinner when you came to the dining-room? (Yes). 4. Will the children be taking a walk in the park between eleven and twelve o'clock? (No). 5. Was he working at his article all day long on Sunday? (Yes).

XXIII. a) *Open your book. Listen to the speaker as he is reading the words of the lesson and repeat them;* b) *Follow the speaker as he is reading the text;* c) *Listen to the text again without looking into the book.*

XXIV. *Listen to the questions about the text and write down your answers with the help of a + or a - sign.*

1. Was Leibnitz doing his research in the twentieth century? 2. Did he develop a base-five system? 3. Did he use the binary system in his machine? 4. How many symbols did he use? 5. Does the numeral 1 correspond to the word «off»? 6. Does the numeral 0 correspond to the word «off»? 7. Are many high-speed electronic computers being used everywhere now? 8. Does the expression $0 \times 1 = 0$ hold for all numeration systems? 9. Must every numeration system have symbols that represent zero and one? 10. Has the binary numeration system advantages as well as (так же как) disadvantages?

Homework II

XXV. *Arrange the words given below according to the parts of speech they belong to.*

builder, calculate, calculation, indicator, indication, equality, use-
less, symbolic, notation, advantageous, powerful, classical, sameness,
actually, correspondence, familiarity, activate, inversely, production,
container, wholeness, baseless, physical, specially, successful, presen-
ce, appointment.

XXVI. *Ask a logical question about every sentence of ex. XV. Write your questions down.*

XXVII. *Disagree with the following statements and write down the correct variant.*

Leibnitz developed a numeration system using three symbols. No, he did not. He developed a numeration system using two symbols.

1. Leibnitz was doing his research on the simplest numeration system during the latter part of the 19th century. 2. The machine constructed by Leibnitz was used extensively in the 18th century. 3. The mechanical calculating machine was first built in England. 4. The binary numeration system was introduced in France. 5. The binary numeration system is used in some of the most primitive computers. 6. The numeral 0 corresponds to «on». 7. The place value of each digit in 1101_{two} is unimportant. 8. A base ten numeral cannot be changed to a base two numeral. 9. High-speed electronic computers use base five numeration system. 10. In any numeration system there must be symbols for 1, 0, and 3. 11. The binary numeration system has no advantages over the base ten system. 2. The base ten system has no disadvantages.

XXVIII. a) *Read the following text. It contains some international words whose meaning you may try to guess; b) After you have read it, write a plan of the text in the form of questions.*

Albert Einstein

Albert Einstein [ˈaɪnstain] was born [bɔ:n] in Germany 1879. His un-usual 'talent for mathematics and physics began to show when he was a student at a technical school in Zurich [zju:rik]. At the age of 21, after four years of study at the university, he began to work as a clerk [kla:k] at an office. And in 1905 he made some revolutionary discoveries in science. He published three papers. In his first paper he explained ([iks'pleɪn] объяснять) the photoelectric effect with the help of M. Planck's quantum theory. His second paper was a mathematical development of the theory of Brownian motion [ˈmou-ʃən]. His third paper was about the «Special Theory of Relativity» [relə'tiviti]. It must be mentioned ([ˈmenʃən] упоминать) that a great contribution to the theory of relativity had been made earlier by the great mathematicians Lorentz and Poincare. Einstein's work was published in a physical journal. It stated that energy equals mass multiplied by the square of the speed of light (свет). This theory is expressed by the equation: $E=mc^2$ [si:'skweəd].

Scientists all over the world met this Einstein's work with interest and surprise [sə'praiz]. But only very few physicists realized (['riəlaiz] осознавать) the importance of his theory at that time.

Another of Einstein's great discoveries was his unified ['ju:nifaid] field theory. It was the result of 35 years of intensive research work. He expressed it in four equations where he combined the physical laws that control forces (силы) of light and energy with the mysterious [mis'tiəriəs] force of gravitation [grævi'teɪʃən].

Albert Einstein gave all his life to science. He was an extremely talented man and a great thinker. He was always looking at the world around him with his eyes ([aiz] глаза) wide open and he was always asking: «Why? Why is that so?»

His ideas made a revolution in natural ['nætʃərəl] sciences of the 20th century.

XXIX. *Now that you have read the text and written your plan, get ready to give a short outline of the text in class.*

XXX. *Go back to the text 'Base Two Numerals': a) Read the text again; b) Shorten the text leaving out the unimportant details. Do it in writing; c) Get ready to discuss the text in class.*

Classwork III

XXXI. *Read these words and guess the meaning of the italicized words.*

'talent—'talented; mass—'massive; speed—to speed—'speedily—'speediness—spee'dometer; to con'trol—con'trollable—uncon'trollable; 'magnetism—mag'netic; to re'peat—repe'tition; to 'indicate—indication; gravi'tation—gravi'tational; to 'illustrate—illus'tration; to sur'prise—a sur'prise—sur'prising; mys'terious—a 'mystery; to con'sult—consul'tation; 'final—fi'nality; to ob'tain—ob'tainable.

XXXII. *Read the text 'Base Two Numerals'.*

XXXIII. a) *Answer your teacher's questions in connection with the text; b) Speak on the text 'Base Two Numerals'. You may work in pairs.*

XXXIV. *Speak about Albert Einstein. Work in pairs.*

XXXV. *Read the sentences below and give an adequate translation of each sentence.*

1. Когда Лейбниц изучал простейшую систему счисления?
2. Сколькими символами он пользовался для своей системы счисления?
3. Эта система называется двоичной, так как она использует только две цифры.
4. По существу он создал вычислительную машину три века назад.
5. Какого рода вычислительные машины строят современные ученые?
6. Чему соответствует число 0 в этой системе?
7. Число 1 означает включение.
8. Современные электрон-

ные счетные машины очень сложны. 9. Число 1101 в двоичной системе соответствует числу 13 в десятичной системе. 10. В любой системе счисления должны быть цифры 1 и 0. 11. Двоичная система имеет некоторое преимущество. 12. Каковы недостатки этой системы?

Home-reading

Read and translate the following text. You may guess the meaning of some of the international words which you have not yet learned. Consult the dictionary whenever you find necessary.

Entitle the text. Write questions to ask your class-mates. Be prepared to give a short outline of the text in class.

The twentieth century is famous for two great developments (события). One of these was the capture (овладение) of atomic energy. The second of these developments was making machines handle (обрабатывать) information in reasonable ways. We might well call (мы можем с успехом называть) this development the Second Industrial Revolution. Like the First Industrial Revolution of the eighteenth century in England it has many various aspects: automatic control, automatic handling of materials, robots, automatic processing (обработка) of data, automatic computers.

What is a computer? A computer is a machine (or a man) that can take in information (problems and data), perform reasonable operations and put out answers.

What is a reasonable operation? Reasonable operations are logical and mathematical operations.

What is information? Information is a set of marks that have meaning.

There are modern machines that can take in, record (записывать), and store (хранить) information. A machine that can perform these operations by itself is an automatic computer. Such a machine must have an automatic program.

Some scientists say that without the computer life in the 21st century will be impossible.

Computers today are running factories, planning our cities and towns, teaching children and 'forecasting (предсказывают) our future. The computer solves in seconds of time the problems that generations (поколения) of mathematicians may need months and years to solve without its help.

The de'gree (степень) to which computers will take over (взять на себя) human functions some time in future may seem as'tonishing (поразительный). The computer, like the 'telephone or elec'tricity, is be'coming (становится) an 'ordinary thing of every day. It will be used by almost everybody and everywhere. Computers can even (даже) enter our home life. They may help people with house work, re'mind (напоминать) of important ap'ointments and answer the 'telephone.

We often hear that the growing amount (количество) of information will be one of the problems of the 21st century. The computer may help to solve it too. In a computerized library of the future any information will be obtained instantly (немедленно) and as fully (исчерпывающе) as the user wants.

It's difficult to imagine (вообразить) all the possible aspects of the use of the computer in future.

LESSON 13

Classwork I

Grammar: Equivalents of Modal Verbs

1. Read these sentences and notice the shades of meaning, expressed by the equivalents of the modal verbs 'can', 'must', 'may'.

a) *To be able to*: 1. They are able to compare the results. 2. He was able to solve that complicated problem by himself. 3. We shall be able to indicate the disadvantages of their method. 4. I am not able to account for such an extensive use of the old system. 5. They will be able to build another high-speed machine in future. 6. He will not be able to give a logical explanation. 7. Will he be able to finish the work in time? 8. Was he able to telephone you?

b) *To have to*: 1. She has to present her paper next month. 2. They will have to use the binary system of notation in this case. 3. They had to discuss the political and economic situation of the period. 4. You don't have to come so early. 5. He doesn't have to change his plans for tomorrow. 6. They did not have to control the operation. 7. Will you have to take your exam in theoretical mechanics in January? 8. Do you have to follow this tradition?

c) *To be to*: 1. I am to write an abstract of my dissertation by June. 2. He was to speak at the conference. 3. You are to come at 8 o'clock. 4. Am I to join the construction team on Monday? 5. Were they to show him the result of their recent investigation yesterday? 6. You are not to agree to this plan without a discussion. 7. Are they to be here at 8 o'clock tonight?

d) *Should*: 1. Scientists should develop this important branch of mathematics. 2. You should think about what you are saying. 3. He should not change the speed of the operation. 4. You should do your morning exercises and not be lazy. 5. Should the students look through all the articles in this journal? 6. Should they have all the facts at their disposal?

e) *Ought to*: 1. You ought to find time to write a letter to your parents today. 2. She ought to agree with all he says. 3. You ought not to go there again. 4. Children ought not to argue with their parents and teachers. 5. Ought you to leave tomorrow? 6. Ought he to discuss it with his science adviser?

f) *To be allowed to*: 1. He was allowed to attend the seminar. 2. She will be allowed to take her exam next week. 3. Were they allowed to change the order of operations in the experiment? 4. They will not be allowed to work in the lab each Sunday. 5. Will you be allowed to leave on Monday?

Words to be Learned

Follow your teacher. Read these international words and try to guess their meaning.

natural ['nætʃərəl], unique [ju:'ni:k] *a*, uniqueness [ju:'niknis], general ['dʒenərəl], 'element *a*, axiom ['æksiəm] *n*, summarize ['sʌməraɪz], definition [,defi'niʃən], 'practically, pro'duce *v*.

Repeat after the teacher.

concern [kən'sə:n] *v* касаться, иметь отношение к

be concerned with заниматься, быть заинтересованным

property ['prɒpəti] свойство

closure ['kləʊzə] замкнутость

follow ['fɒləʊ] следовать за, сопровождать

statement ['steɪtmənt] утверждение, заявление

state утверждать

notice ['nəʊtɪs] замечать, обращать внимание

exist [ɪg'zɪst] существовать

existence [ɪg'zɪstəns] существование

both [bəʊθ] оба

imply [ɪm'plaɪ] 1. заключать в себе; 2. иметь в виду, означать, предполагать

define [di'faɪn] определять, давать определение

instead(of) [ɪn'sted] вместо

asterisk ['æstərɪsk] звездочка (в обозначениях)

pair [peə] *n* пара; *v* удваивать

consider [kən'sɪdə] 1. считать, полагать; 2. рассматривать

necessarily ['nesɪsərɪli] обязательно

necessary ['nesəsəri] обязательный

true [tru:] истинный, правдивый, справедливый (для)

appear [ə'piə] 1. появляться; 2. казаться

several ['sevrəl] несколько

denote [di'nəʊt] обозначать

impossible [ɪm'pɒsɪbl] невозможный

happen ['hæpən] иметь место, произойти

point out отмечать

hence следовательно

thus таким образом

accept [ək'sept] принимать, признавать

proof [pru:f] *n* доказательство

prove [pru:v] *v* доказывать

capital ['kæpɪtəl] заглавный, важный

allow [ə'laʊ] разрешать, позволять

should [ʃʊd] следует, должен

ought [ɔ:t] следует

(be) able [eɪbl] быть способным, мочь

Notes

1. following are other examples — далее следуют другие примеры
2. both... and — и... и, как... так и

3. in general — вообще
4. as follows — следующим образом
5. A capital — заглавное А
6. it should be pointed out — следует отметить

Laboratory Assignment I

II. *Listen and repeat. Remember what letters and combination of letters the sounds [i], [ai], [ei], [ɔi] are expressed by.*

- [i] — duty, till, ready, did, language, determine, examine, knowledge, damage, daily, symbol, cynic, film;
 [ai] — right, try, mile, light, fly, by, mild, hide, flight, bind, dry, analyse, why, wine;
 [ei] — main, game, eight, day, straight, agent, against, grey, stay, way, fame, rain, away, play;
 [ɔi] — boy, oil, spoil, loyal, employ, point, foil, avoid.

III. *Listen to the speaker as he is reading the new words of the lesson and repeat them.*

IV. *Follow the speaker as he is reading ex. 1.*

V. *Comment on the speaker's statements. Follow the model.*

Sp.: She *cannot* give you the journal now. (next week)

St.: I *hope*, she *will be able to* do it next week.

1. They could not operate the machine well. (in some time). 2. She cannot translate scientific articles. (next year). 3. I cannot obtain enough information. (in a few days). 4. They cannot produce such complicated computers now. (in future). 5. He could not solve this complicated problem. (with your help).

VI. a) *Ask a question following the model below.*

Sp.: I cannot use these data now. (in your paper).

St.: *Will you be able to* use these data in your paper?

1. He cannot leave Moscow now. (after his exams). 2. She could not visit her home town in September. (during her winter holidays). 3. They could not get tickets for the theatre on Monday. (on Saturday). 4. He can not attend lectures now because he is ill. (next month).

b) *Comment on the speaker's statements.*

Sp.: I am not able to do research now. (last year).

St.: I *suppose* you were able to do research last year.

1. She is not able to speak English well now. (a few years ago). 2. He is not able to work at home today. (last Sunday). 3. I am not able to discuss it with my science adviser at present. (last Tuesday). 4. We are not able to help her at the moment. (some time ago). 5. They are not able to play chess tonight. (last night).

VII. Answer the speaker's questions.

Sp.: Did you (do you, will you) have to change the whole system? (the method)

St.: No, I did not (do not, will not). I had (have, will have) to change the method.

1. Do you have to study the closure property? (uniqueness). 2. Do they have to speak to your teacher? (science adviser). 3. Does he have to work in the lab? (in the library). 4. Does she have to translate only one text? (both texts). 5. Did you have to tell them about it? (my father). 6. Did they have to control the operation? (to check the result). 7. Did he have to leave so early? (at 11 o'clock). 8. Did she have to answer one question? (a few). 9. Will you have to help the boy? (the girl). 10. Shall we have to go now? (tomorrow). 11. Will he have to perform many operations? (only one). 12. Will she have to see him? (his mother).

VIII. a) Listen to the speaker and agree with him.

Sp.: You ought to study a foreign language.

St.: Yes, I suppose I should.

1. He ought to help his mother. 2. She ought to get up early this morning. 3. You ought to work much at your English. 4. She ought to see a doctor. 5. They ought to attend their classes regularly.

b) Comment on the speaker's words.

Sp.: He works too much.

St.: He ought not to work too much.

1. He rises late every day. 2. She takes very long walks in the evening. 3. They discussed such things in the children's presence. 4. They are constructing this modern building near the ancient monastery. 5. He is going to Leningrad before his exams.

IX. Answer these questions.

Sp.: Were you allowed to change the program? (Yes, no)

St.: Yes, I was allowed to change the program.

No, I was not allowed to change the program.

a) 1. Were you allowed to leave early? (No). 2. Were they allowed to check the work of the power-station? (Yes). 3. Was he allowed to occupy the lab for today? (Yes). 4. Were the students allowed to join the construction team in August? (No). 4. Are you allowed to take part in this investigation? (Yes). 5. Will the student be allowed to run this machine by himself? (No).

Sp.: When are you to meet? (after classes)

St.: We are to meet after classes.

b) 1. When is he to see his doctor? (tomorrow). 2. What is she to do with her paper? (give it to me). 3. When are you to speak to your science adviser? (after his lecture). 4. When was she to present her abstract (as soon as possible). 5. What were you to show that foreign scientist? (our recent data).

Homework I

X. Answer these questions.

Do you have to change the place of the meeting? (the time).
We have to change the time of the meeting.

1. Are the students to study the uniqueness property at the lesson? (the closure). 2. Was he able to give the proof? (the general definition). 3. Were the scientists to consider the plan of their future work at the conference? (the results of the recent experiment). 4. Did you have to discuss one of the articles? (both). 5. Were they able to obtain any data? (all the necessary data). 6. Does he have to summarize the results of the research work of the whole department? (of our laboratory). 7. Are you to begin your work now? (in a few days). 8. Ought you to tell everybody why you changed your mind? (my mother). 9. Should everything be done tomorrow? (today). 10. Were you able to notice the difference between these two methods? (the similarity).

XI. Ask questions making use of the given question words.

1. She had to agree with both of them. (why). 2. They were to learn the third law of mechanics. (when). 3. He is to come at four instead of five o'clock. (when). 4. Properties of existence and closure should be studied at the next lesson. (what). 5. You will not be able to obtain all the necessary books. (why). 6. This fact should be pointed out to them. (by whom). 7. There are various definitions of this property. (how many). 8. This new method has to be accepted as soon as possible. (why). 9. The property of existence is implied in the following definition. (which). 10. Their experiment was considered in an article in the physical journal. (when). 11. The proof of this problem is not very complicated. (what). 12. He took my book instead of the journal. (why). 13. The existence of these machines is a fact. (what). 14. He ought not to read his paper at the seminar. (why). 15. Everybody without exception came again on Saturday. (when). 16. They were not allowed to begin research. (why).

XII. Write the following sentences in the negative form.

1. He will be able to notice the difference. 2. They should be concerned with the application of the new system. 3. We have to consider some of their statements at present. 4. He has to give us all the details of the future experiment. 5. We have to accept his words without proof. 6. It had to happen again. 7. These pairs of natural numbers are to be multiplied. 8. You ought to discuss both of these properties now. 9. They were able to discover another fundamental law of nature. 10. You have to learn two foreign languages while you are taking a postgraduate course. 11. He was allowed to take part in their work. 12. You are allowed to operate the machine.

Classwork II

XIII. Practise reading these words.

empty, hid, determine, night, blind, sight, play, steady, ink, toy, examine, plain, plane, mist, mild, coil, hit, boil, average, win, wind, aim, nice, again, faint, stay, my, soil, grey, coin, why, language, hide, damage, mail, male, milt, might, eighty.

XIV. Ask a general question about every sentence of ex. XII.

XV. Disagree with each one of the statements of ex. XI.

XVI. a) Name the predicate in the sentences below; b) Translate these sentences.

1. It is necessary to summarize all the known facts. 2. The asterisk denotes a certain operation. 3. They were allowed to introduce their method. 4. We shall be able to consider the existing situation in detail. 5. You have to see both of these students and ask them about their plans. 6. While considering the advantages of this paper we ought to remember the following thing. 7. This definition cannot be accepted. 8. His graduation paper is to be presented in January. 9. The problems considered appeared very important. 10. Closure, uniqueness and existence properties were being discussed by the students during the lesson. 11. He is concerned with the problems of heredity. 12. Everything happened quite unexpectedly. 13. What are you trying to imply? 14. Since you know practically everything, I can add just a few things.

XVII. Follow your teacher as she (he) is reading the words of the lesson.

XVIII. Read the text below. You are expected to give a short outline of the text after you have read it. (You may do it in Russian).

Closure Property

In this lesson we shall be concerned with the closure property.

If we add two natural numbers, the sum will also be a natural number. For example, 5 is a natural number and 3 is a natural number. The sum of these two numbers, 8, is also a natural number. Following are other examples¹ in which two natural numbers are being added and the sum is another natural number. $19+4=23$ and only 23; $6+6=12$ and only 12; $1429+357=1786$ and only 1786. In fact, if you add any two natural numbers, the sum is again a natural number. Because this is true, we say that the set of natural numbers is closed under addition.

Notice that in each of the above equations we were able to name the sum. That is, the sum of 5 and 3 exists, or there is a number which is the sum of 19 and 4. In fact, the sum of any two numbers exists. This is called the existence property.

Notice also that if you are to add 5 and 3, you will get 8 and only 8 and not some other number. Since there is one and only one sum for $19+4$, we say that the sum is unique. This is called the uniqueness property.

Both uniqueness and² existence are implied in the definition of closure.

Now, let us state the closure property of addition.

If a and b are numbers of a given set, then $a+b$ is also a number of that same set. For example, if a and b are any two natural numbers, then $a+b$ exists, it is unique, and it is again a natural number.

If we use the operation of subtraction instead of the operation of addition, we shall not be able to make the statement we made above. If we are to subtract natural numbers, the result is sometimes a natural number, and sometimes not. $11-6=5$ and 5 is a natural number, while $9-9=0$ and 0 is not a natural number.

Consider the equation $4-7=n$. We shall not be able to solve it if we must have a natural number as an answer. Therefore, the set of natural numbers is not closed under subtraction.

What about the operation of multiplication? Find the product of several pairs of natural numbers. Given two natural numbers, is there always a natural number which is the product of the two numbers?

Every pair of natural numbers has a unique product which is again a natural number. Thus the set of natural numbers is closed under multiplication.

In general³, the closure property may be defined as follows⁴: if x and y are any elements, not necessarily the same, of set A (A capital)⁵ and $*$ (asterisk) denotes an operation $*$, then set A is closed under the operation asterisk if $(x*y)$ is an element of set A .

To summarize, we shall say that there are two operations, addition and multiplication, for which the set of natural numbers is closed. Given any two natural numbers x and y , $x+y$ and $x \times y$ are again natural numbers. This implies that the sum and the product of two natural numbers exists. It so happens that with the set of natural numbers (but not with every mathematical system) the results of the operations of addition and multiplication are unique.

It should be pointed out⁶ that it is practically impossible to find the sum or the product of *every* possible pair of natural numbers. Hence, we have to accept the closure property without proof, that is, as an axiom.

XIX. Now that you have read the text 'Closure Property', say which properties are discussed in it.

Laboratory Assignment II

XX. Listen and repeat. Guess the meaning of the italicized words. nature—natural—naturally; actually—an act—to act; true—truth—truthful; special—specially—specialize; to notice—noticeable;

to imply—*implication*; to consider—*consideration*; to solve—*solution*; general—*generally*—*generalize*; necessary—*unnecessary*; impossible—*possible*—*possibility*; axiom—*axiomatic*.

XXI. *Answer the following questions. Make use of the model below.*

Sp.: Was he able to give a lot of examples? (just a few)

St.: No, he was not. He was able to give just a few examples.

1. Did you have to rise early on Sunday? (at eight o'clock).
2. Were you to meet in the morning? (in the afternoon). 3. Was he able to provide them with all the necessary data? (very little). 4. Will they have to make a lot of changes? (just a few). 5. Are students able to work in the lab on Sunday? (only on week-days). 6. Did you have to write a lot of exercises for your homework? (only two).
7. Will they be able to visit all the places of interest in this town? (only the ancient part of the town). 8. Ought he to see a doctor? (stay in bed* for a couple of days). 9. Are you to discuss the details? (the general situation). 10. Do they have to speak French at this international conference? (English).

XXII. *Listen to the speaker and ask a general question about each one of his statements.*

1. This statement is not true. 2. They are going to discuss the properties of uniqueness and existence during the lesson. 3. I easily noticed the difference. 4. Both of the brothers came in due time. 5. This definition is rather long. 6. He is to come today instead of tomorrow. 7. This information is being considered by the head of our department. 8. We were able to find several books by this ancient author in his library. 9. These two pairs of numbers are the elements of this equation. 10. It is necessary to denote this element with a capital letter. 11. This operation is denoted by an asterisk. 12. Nobody knows what happened in the camp yesterday. 13. He again pointed out that this discovery had a practical application. 14. He has to accept this appointment at the moment. 15. Both of them were allowed to join the construction team in the summer. 16. He ought to take his father's advice about his future work.

XXIII. *Open your book. Listen to the speaker as he is reading the words of the lesson and repeat them.*

XXIV. a) *Follow the speaker as he is reading the text 'Closure Property';* b) *Listen to the text again without looking into the book.*

XXV. *Listen to the questions about the text and write down your answers with the help of a + or a — sign.*

1. Will the sum of two natural numbers be again a natural number? 2. If any two natural numbers are being added, is the sum again

* stay in bed — *полежать в постели*

a natural number? 3. Is the set of natural numbers closed under addition? 4. Is the statement of closure one of the special properties of division? 5. Are we able to name the sum in the equations $19+4=23$ and $6+6=12$? 6. Does the sum of the above equations exist? 7. Is this called the existence property? 8. Is this sum unique? Are uniqueness and existence implied in the definition of closure? 9. If one natural number is being subtracted from another natural number, is the difference always a natural number? 10. Can the equation $4-7=-n$ be solved if we are to have a natural number as an answer? 11. Is the set of natural numbers closed under subtraction? 12. Has every pair of natural numbers a unique product? 13. Is the set of natural numbers closed under division? 14. Are we able to find practically the sum or the product of *every* possible pair of natural numbers? 15. Do we accept the closure property as an axiom?

Homework II

XXVI. a) *See ex. XX. Write down the Russian equivalents of the italicized words contained in the exercise;* b) *Arrange the words given below according to the parts of speech they belong to.*

length, usage, knowledge, specify, minimize, actively, productive, productivity, primitive, effectiveness, symbolic, measure, producer, generalize, generalization, activity, appearance, acceptable, impossibility, follower, useful, helpless.

XXVII. *Ask a logical question about every sentence of ex. XVI. Write down your questions.*

XXVIII. *Disagree with the following statements.*

His words *had* to be accepted without proof.

No, his words did not have to be accepted without proof.

1. They should discuss the property of closure at the next lesson. 2. There are some general definitions in this paper. 3. She follows her sister's example. 4. This important news is being considered. 5. I noticed the difference between the two brothers. 6. It is necessary to remember all these laws. 7. Other facts must necessarily be pointed out. 8. There exist some new machines of this type. 9. The given element may be denoted by the same symbol. 10. They will be able to use some symbols instead of words. 11. You ought to accept everything he says as an axiom. 12. The information produced showed interesting results. 13. You are to change the time and the place of the meeting. 14. The definition developed appeared complicated.

XXIX. a) *Read the text below and translate it. The text contains some international words whose meaning you can guess. In some cases the context will help you;* b) *Entitle the text.*

From the above you ought to remember that the result of multiplication is called a product, and that the numbers to be multiplied are called factors. When you write $6 \times 3 = 18$ it means that you write

number 18 as a product of two whole number factors. Another pair of whole-number factors will be 9 and 2. Since $9 \times 2 = 18$ will you be able to name other factors of 18?

In some cases when we have to name a whole number in factored form, more than (более, чем) two factors can be used. We can, for example, name 60 as the product of 3 factors.

Since multiplication is associative [ə'souʃiətiv], we know that $(3 \times 4) \times 5 = 3 \times 4 \times 5 = 3 \times (4 \times 5)$. We may also write that $60 = 3 \times 4 \times 5$; $60 = 3 \times 5 \times 4$ and so on.

In each of the above equations the same set of factors is used, namely, 3, 4 and 5. Regardless of the order in which they are written, 3, 4 and 5 should be considered just one set of three factors of 60. Also 60 can be written as the product of four factors as shown in the equation $60 = 3 \times 2 \times 2 \times 5$. In some of your exercises you 'probably' (вероятно) noticed that some factors you used could be factored 'further' (далее) and others could not.

In the equation $18 = 6 \times 3$, the factor 6 can in turn be written as 3×2 . If you do this, you will get $18 = 2 \times 3 \times 3$. None of these three factors can be written in factored form if you do not use 1 as a factor. Hence $2 \times 3 \times 3$ is the form containing the smallest (наименьший) factors of 18.

You already (уже) know that every whole number has 1 and it'self (себя) as factors. Some such numbers have only itself and 1 as factors. Since its only factors are 1 and 5, we say that 5 is such a number.

The same may be said about 7 or 11. Numbers like 5, 7, or 11 are called prime numbers.

A whole number is called a prime number or just a prime if it meets the following conditions (удовлетворяет следующим требованиям): a) It is greater than 1; b) Its only factors are itself and 1.

Any whole number, with the exception of ([ik'sepʃən] (за исключением) 0 or 1 which is not a prime number, is called a 'composite number, or just a composite.

XXX. Now that you have read, translated and entitled the text above, get ready to discuss it in class. You must write some question to ask your class-mates and be prepared to answer their questions.

XXXI. Go back to the text 'Closure Property'. a) Read the text again; b) Shorten it leaving out the inessential details; c) Get ready to render your shortened text in class.

Classwork III

XXXII. Read these words and give the Russian equivalents of the words in italics.

whole—'wholly; name—to name—nameless—namely; mean—meaning—meaningful—meaningless; a factor—to factor—'factorable; to as'sociate—as'sociative—associ'ation; 'order *n*—dis'order; 'previous—

'previously; 'probably—'probable—proba'bility—im'probable; ex'ception—ex'ceptional; 'composite—compo'sition—to com'pose; 'practical—im'practical; 'necessary—un'necessary; to prove—to dis'prove; true—un'true; closed—'closure—to dis'close; to 'notice—un'noticed.

XXXIII. Read the text 'Closure Property'.

XXXIV. Answer your teacher's questions in connection with the text.

XXXV. Discuss the text 'Closure Property'. Work in pairs.

XXXVI. Read the sentences below and give an adequate translation of each sentence.

1. Нам предстоит рассмотреть множество чисел. 2. Вам следует помнить, что результат умножения называется произведением. 3. Числа, которым предстоит быть помноженными, называются сомножителями. 4. Давайте согласимся называть 6 и 3 одной парой сомножителей числа 18. 5. Вам следует помнить, что умножение ассоциативно. 6. В каждом из вышеприведенных уравнений нам дан один и тот же ряд сомножителей. 7. Порядок, в котором они должны быть записаны, не существен. 8. Вы сможете разложить данное число дальше. 9. Сумма двух натуральных чисел есть тоже натуральное число. 10. Поскольку это справедливо, мы говорим, что это замкнутое множество. 11. Свойство замкнутости есть одно из свойств сложения. 12. По существу сумма любых двух чисел существует. 13. Рассмотрим уравнение $4 - 7 = n$. 14. Следовательно, множество натуральных чисел не является замкнутым при вычитании. 15. Вообще свойство замкнутости может быть определено следующим образом. 16. Следовательно, мы принимаем свойство замкнутости как аксиому без какого-либо доказательства.

XXXVII. Discuss the text of ex. XXIX. Work in pairs.

LESSON 14

Classwork I

Grammar:

Degrees of Comparison. More about Pronouns

1. Follow your teacher. a) Read these words and groups of words.

long—longer—longer than—the longest

big—bigger—bigger than—the biggest

easy—easier—easier than—the easiest

late—later—later than—the latest

few—fewer—fewer than—the fewest

important—more important—the most important

interesting—more interesting—the most interesting

general—more general—the most general

b) *Mind the form of the possessive pronouns.*

I—my (it's my book)—mine (the book is mine).

You—your (it's your pen)—yours (the pen is yours).

He—his (it's his pencil)—his (the pencil is his).

She—her (it's her table)—hers (the table is hers).

We—our (it's our room)—ours (the room is ours).

They—their (it's their plan)—theirs (the plan is theirs).

II. *Read these sentences. Compare and translate them.*

a) 1. He is *young*. His sister is *younger*. She is *the youngest* in the family. 2. Their department is *large*. Our department is *larger than that one*. It is one of *the largest* in the University. 3. This machine is *complicated*. The new one is *more complicated*. It is *the most complicated* machine that I know of. 4. This definition is too *general*. There is a *less general* definition. 5. This example is not quite *good*. You ought to find a *better* one. I do not think it is the *best* example that you can give. 6. The result of their exam is *bad*. It is much *worse than* we expected. In fact, it is *the worst* in many years.

b) 1. This method of research is *more interesting than the one* we followed. 2. I am interested in history *less than* in philosophy. 3. The equation given to me was *easier than the one* he was given. 4. The remainder in this operation of division is *greater than* 1. 5. He speaks German *better than* I do.

c) 1. The texts you gave me are *as short as those* I was given last week. 2. The name of Leibnitz is *as familiar to us as that* of Newton. 3. This system is *as interesting as the one* you are studying. 4. I have *as much work as you do*. 5. He speaks English *as nicely as she does*.

d) 1. Their computer is *not so modern as the one* we have in our lab. 2. The lecture we were given yesterday was *not as interesting as the one* he gave us last week. 3. The definition given by you is *not so specific as his*. 4. I am *not so much concerned with this problem as he is*.

e) 1. *The sooner* we decide on this question *the better*. 2. *The later* he begins his research *the less time* he will have for writing his thesis. 3. *The more specific* definition you give *the better*.

Words to be Learned

Follow your teacher. Read these international words and guess their meaning.

equality [i:'kwɒliti] *n*, reflexive [ri'fleksiv] *a*, symmetric [si'metrik] *a*, transitive ['trænzitiv] *a*, opposite ['ɒpəsit] *a*, correct [kə'rekt] *a*, incorrect [inkə'rekt] *a*, essential [i'sensjəl] *a*, inequality [ini:'kwɒliti] *n*, false [fɔ:ls] *a*, express [iks'pres] *v*.

Follow your teacher and read these words.

decide [di'said] решать
part [pa:t] *n* часть; *v* делить

member ['membə] член
whether ['weðə] ли (союз)

relation [ri'leiʃən] отношение
 relate [ri'leit] относить (к)
 satisfy ['sætɪsfai] удовлетво-
 рять
 while [waɪl] в то время как,
 между тем
 feature ['fi:tʃə] черта, свойство
 involve [ɪn'vɒlv] включать в
 себя; влечь за собой, во-
 влекать
 either ['aɪðə] 1. любой (из);
 2. либо
 determine [dɪ'tə:mɪn] опреде-
 лять
 direct [dɪ'rekt] а прямой; в на-
 правлять
 concise [kən'saɪs] сжатый
 understanding [ʌndə'stændɪŋ]
 понимание
 understand (understood) пони-
 мать

across [ə'krɒs] через, сквозь
 conventional [kən'venʃənəl]
 привычный, общепринятый
 replace [ri'pleɪs] замещать, за-
 менять
 merely ['miəli] просто, только
 include [ɪn'klu:d] включать
 even ['i:vən] даже
 choose [tʃu:z] (chose [tʃouz],
 chosen ['tʃoʊzən]) выби-
 рать
 wrong [rɒŋ] а ошибочный
 be wrong ошибаться
 constantly ['kɒnstəntli] посто-
 янно
 respect [rɪs'pekt] и 1. отноше-
 ние; 2. уважение
 draw {drɔ:} (drew [dru:],
 drawn [drɔ:n]) 1. чертить,
 рисовать; 2. тянуть, выво-
 дить
 namely именно

Notes

1. you will remember — вы, по-видимому, помните
2. either true or false — либо истинное, либо ложное
 both true and false — как истинное, так и ложное
3. to decide whether a closed sentence is — чтобы решить, явля-
 ется ли замкнутое выражение
4. we check to see — мы проверяем, чтобы убедиться
5. there is nothing incorrect about writing — вовсе не ошибочно
 написать
6. in other words — иными словами

Laboratory Assignment I

III. *Listen and repeat after the speaker. Mind that one and the same sound can be expressed in writing by various letters and combinations of letters.*

- [i:] — feed, see, seems, meet, need, beta, theme, he, mete, Pete, the-
 se, scene, even, secret, complete, meat, mean, heat, speak, field,
 piece;
 [a:] — arm, far, article, card, father, rather, yard, artist, margin,
 mask, fast, last, pass, ask, answer, half;
 [ɔ:] — form, glory, more, oral, short, tall, wall, small, walk, salt, cau-
 se, because, author, autumn, door, floor, saw, law, draw, war,
 warm, quarter, your, four, course, thought, brought, taught;
 [ə:] — first, firm, circle, thirty, third, curve, hurt, urgent, turn, germ,
 serve, herd, nerve, person, earn, early, work, word, worth.

IV. a) *Listen and repeat.*

as short as	not as good as	not so important as
as long as	not as bad as	not so bad as
as easy as	not as nice as	not so easy as
as interesting as	not as sure as	not so high as

b) *Listen and write down your translation of the following.*

the more... the better; the easier... the better; the longer... the more difficult; the bigger... the worse; the higher... the more interesting; the larger... the better; the sooner... the easier.

V. *Listen and repeat ex. II.*

VI. *Answer the speaker's questions.*

Sp.: Who's younger: the boy or *the girl*?

St.: *The girl* is younger than the boy.

a) 1. Which is longer in winter: the day or the night? 2. Which is easier: to read or to translate? 3. Who is older: your friend or his brother? 4. Which city is larger: Moscow or Leningrad? 5. Which is more interesting for you: history or philosophy? 6. Which month is shorter: January or February? 7. Who is more beautiful: the girl or her mother? 8. Which is worse: to be late or to be early? 9. Which is better: to love or to be loved? 10. Which is less: 19 or 90?

Sp.: Is *football* as popular as hockey?

St.: *Football* is more popular than hockey.

b) 1. Is *his second* article as interesting as the first one? 2. Are these results as important as *their previous results*? 3. Is the new machine as complicated as *the old machine*. 4. Was *today's statement* as essential as his recent statement? 5. Is *that red planet* as distant as the Sun?

Sp.: Who is the best student in your English class? (Nina)

St.: Nina is the best student.

c) 1. Which is the easiest exercise in this lesson? (the second and the third). 2. Which is the highest building in this town? (the students' hostel). 3. Who is the youngest in your family? (my brother). 4. Which is the biggest lake in the Soviet Union? (the Baikal). 5. Which is the newest college in their republic? (the technological).

VII. *Comment on the speaker's words.*

Sp.: Leningrad is not so old as *Moscow*.

St.: *Moscow* is older than Leningrad.

a) 1. The red pencil is not so long as *the black pencil*. 2. In summer the days are not so short as *in autumn*. 3. He is not so gifted as *his father*. 4. This examination is not so difficult as *the examination in physics*. 5. This scientist is not so famous as *Einstein*. 6. The girl is not so independent as her sister.

Sp.: I shall come soon (*good*).

St.: *The sooner* you come *the better*.

b) 1. We shall have dinner late today. (*bad*). 2. The computer is very small. (*good*). 3. The problem is quite simple. (*good*). 4. The meeting will begin early. (*good*). 5. This system is very old. (*bad*).

VIII. *Listen to the speaker as he is reading the new words of the lesson and repeat them.*

Homework I

IX. *Comment on each one of the following statements and give some additional information (write it down).*

Europe is a *large* continent (Asia ['eɪʃə]).

Yes, but Asia is *much larger*.

1. The Volga is a *long* river. (The Lena). 2. Autumn in our country is rather a *cold* season. (winter). 3. The first text is quite *easy*. (the third). 4. His room in the hostel is *big*. (my room). 5. Leningrad is an *old* town. (Kiev).

X. *Write down your answers. Follow the model.*

Is this machine *as complicated* as that one?

No, it is *more complicated* than that one.

1. Is this apartment *as comfortable* as that one? 2. Is his new film *as interesting* as the previous one? 3. Was their recent experiment *as successful* as the last one? 4. Is this language *as difficult* as that one? 5. Is the new definition *as general* as the previous one.

XI. *Agree with the statements below and add some more information.*

The Volga is a *long* river (in Europe).

Yes, it is *the longest* river in Europe.

1. Moscow is a *large* city. (in the USSR). 2. The Mississippi is a *very long* river. (in the world). 3. The Soviet Union is a *large* country in territory. (in the world). 4. The building of Moscow University is *very high*. (in Moscow). 5. His room is *very comfortable*. (in this apartment). 6. This computer *is complicated*. (in our lab).

XII. *Answer in the negative. Write down your answers.*

Is the film *interesting*? (I expected)

No, it is *not so interesting* as I expected.

1. Was the examination *difficult*? (he expected). 2. Are these methods of research *simple* enough? (they must be). 3. Was his graduation paper *good*? (we expected). 4. Was the translation *easy*? (we hoped). 5. Were the results of their work *disappointing*? (could be).

XIII. *Write questions making use of the question words.*

1. I was not satisfied with my students' answer during the examination. (why). 2. Either of these two examples could show the real situation. (in what way). 3. You will have to replace one member

of the equality with another. (why). 4. She gave a detailed explanation of their method of research. (when). 5. I expect a concise definition instead of this general talk. (from whom). 6. These conventional symbols are accepted by scientists. (where). 7. He did not want to be involved in this long and uninteresting discussion. (why). 8. The most essential part of the program is being considered now. (by whom). 9. They use both direct and indirect methods of investigation. (in what case). 10. This is the most correct and concise definition given. (by whom). 11. This statement is false and I can prove it. (how). 12. All the members of the family gathered in the dining-room. (when). 13. A better understanding of this fundamental law is necessary. (why).

Classwork II

XIV. *Read these words.*

due, good, union, knew, early, ought, worth, secret, draw, circle, fast, army, field, seem, beta, warm, urgent, ruler, tall, yard, mean, bought, salt, third, fourth, work, article, true, wall, earn, tune, group, curve, law, soon, watch, person, autumn, war, yours, drawing, author.

XV. *Ask a general question about each sentence below.*

1. They included all the necessary data in their recent article. 2. Those are false statements of arithmetic. 3. The first element of the relation contains the letter *y*. 4. These are widely used conventional symbols. 5. Certain characteristic features of the process are being considered at the moment. 6. The student placed the equality sign between the two parts of the equation. 7. The plus sign has to be replaced by the opposite sign. 8. The manager was asked direct questions in the course of the discussion. 9. They were satisfied with the results of the international conference. 10. She expected better understanding from him. 11. There exist false statements in mathematics. 12. You will be able to apply either the first method or the second one. 13. Those two expressions must be related in a certain way. 14. More than fifteen people were involved in the experiment. 15. They decided to give a detailed account of their work. 16. He is constantly arguing with his sister.

XVI. *Disagree with the statements.*

T.: He finds his position false.

St.: He does not find his position false.

1. The members of their scientific group took part in the seminar. 2. He decided to agree to that appointment. 3. The given relation satisfies the symmetric axiom. 4. This article is concerned with the most essential political problems of today. 5. It was meaningless to use direct methods in such experiments. 6. You will be able to replace the old parts of the machine with the new ones. 7. He understands children better than she does. 8. This seminar is as popular with our

students as Alexandrov's seminar. 9. He chose one of the two possibilities. 10. He can draw very well.

XVII. *Listen to your teacher as he is reading the words of the lesson and repeat the words.*

XVIII. *Read the text below and find in it answers to the following questions.*

1. What is an equation? 2. Is it always incorrect to write a false mathematical sentence? 3. Which basic axiom does the relation $a=a$ satisfy? 4. Does the sign of non-equality ($\neq$) tell you which numeral names the greater or the lesser of the two numbers?

Something about Mathematical Sentences

In all branches of mathematics you need to write many sentences about numbers. For example, you may be asked to write an arithmetic sentence that includes two numerals which may name the same number or even different numbers. Suppose that for your sentence you choose the numerals 8 and 11—3 which name the same number. You can denote this by writing the following arithmetic sentence, which is true: $8=11-3$.

Suppose that you choose the numerals $9+6$ and 13 for your sentence. If you use the equal sign ($=$) between the numerals you will get the following sentence $9+6=13$. But do $9+6$ and 13 both name the same number? Is $9+6=13$ a true sentence? Why or why not?

You will remember¹ that the symbol of equality ($=$) in an arithmetic sentence is used to mean *is equal to*. Another symbol that is the symbol of non-equality ($\neq$) is used to mean *is not equal to*. When an equal sign ($=$) is replaced by a non-equal sign ($\neq$), the opposite meaning is implied. Thus the following sentence ($9+6\neq13$) is read: nine plus six is not equal to thirteen. Is it a true sentence? Why or why not?

An important feature about a sentence involving numerals is that it is either true or false², but not both.

A mathematical sentence that is either true or false, but not both is called a closed sentence. To decide whether a closed sentence³ containing an equal sign ($=$) is true or false, we check to see⁴ that both elements, or expressions, of the sentence name the same number. To decide whether a closed sentence containing a non-equal sign ($\neq$) is true or false, we check to see that both elements do not name the same number.

As a matter of fact, there is nothing incorrect or wrong, about writing⁵ a false sentence; in fact, in some mathematical proofs it is essential that you write false sentences. The important thing is that you must be able to determine whether arithmetic sentences are true or false.

The following properties of equality will help you to do so.

Reflexive: $a=a$

Symmetric: If $a=b$, then $b=a$.

Transitive: If $a=b$ and $b=c$, then $a=c$.

The relation of equality between two numbers satisfies these basic axioms for the numbers a , b , and c .

Using mathematical symbols, we are constantly building a new language. In many respects it is more concise and direct than our everyday language. But if we are going to use this mathematical language correctly we must have a very good understanding of the meaning of each symbol used.

You already know that drawing a short line across the = sign (equality sign) we change it to $\neq$ sign (non-equality sign). The non-equality symbol ($\neq$) implies either of the two things, namely: is greater then or is less than. In other words⁶, the sign of non-equality ($\neq$) in $3+4\neq 6$ merely tells us that the numerals $3+4$ and 6 name different numbers; it does not tell us which numeral names the greater or the lesser of the two numbers.

If we are interested to know which of the two numerals is greater we use the conventional symbols meaning less than ($<$) or greater than ($>$). These are inequality symbols or ordering symbols because they indicate order of numbers. If you want to say that six is less than seven, you will write it in the following way: $6<7$. If you want to show that twenty is greater than five, you will write $20>5$.

The signs which express equality or inequality ($=$, $\neq$, $>$, $<$) are called relation symbols because they indicate how two expressions are related.

Laboratory Assignment II

XIX. *Listen and repeat. You can guess the meaning of the words in italics.*

part *n*, *v*—*partly*; relation—*interrelation*; satisfy—*satisfaction*; to involve—*involvement*; to direct—*directly*—*directness*—*indirect*—*indirectly*—*direct a*; false *a*—*falsify*—*falsification*; symmetric—*symmetry n*; concise *a*—*concisely*; to include—*inclusion*; constantly—*constant a*; to replace—*replacement*; to decide—*decision*; to determine—*determination*; opposite—*opposition*—*to oppose*; correct *a*—*correctly*—*to correct*—*correctness*—*incorrectly*; to express—*expressive*.

XX. *Answer the speaker's questions.*

Sp.: Is it *a good* book? (I have)

It is *the best* book I have.

a) 1. Is it an *easy* text? (the teacher gave us). 2. Was it a long story? (she told us). 3. Was it an *interesting* discussion? (during the conference). 4. Is it a *complicated* computer? (I know of). 5. Will it be a *difficult* examination? (you will have).

Sp.: Is Leningrad *as old* as Moscow?

St.: No, it isn't. Leningrad is *not so old* as Moscow.

b) 1. Is this work *as essential* as theirs? 2. Are these problems *as important* as the those facing your lab? 3. Did he give *as many lectures as* he did last term? 4. Is this building *as high as* the main building? 5. Is this river *as long as* the Mississippi? 6. Is this country *as large as* India?

Sp.: Is it a good translation? (*bad*)

St.: It's *worse than that one*.

c) 1. Is it a long river? (*short*). 2. Is it a large lake? (*small*). 3. Is it a new machine? (*old*). 4. Is it a wrong answer (*correct*). 5. Is it a bad example? (*good*).

Sp.: Is it a big apartment? (*I*)

Sp.: It's bigger than *mine*.

d) 1. Is it a new book? (*you*). 2. Was it a long discussion? (*we*). 3. Will it be a difficult problem? (*he*). 4. Is this a complicated machine? (*you*). 5. Was it an easy translation? (*she*). 6. Is it a good laboratory? (*we*).

XXI. *Listen to the speaker and agree with him.*

Sp.: Lermontov *and* Pushkin *are* famous Russian poets.

St.: Yes, that's right. Lermontov *as well as* Pushkin *is* a famous Russian poet.

1. Mathematics *and* mechanics *are* important fields of science. 2. The new system *and* the old one *are* quite conventional. 3. The first equation *and* the second one *are* complicated. 4. His thesis *and* the abstract *will* be ready next month. 5. The library *and* the dining-room *were in* this building.

XXII. *Supply a general question to each one of the sentences below.*

Sp.: We decided to begin the work now.

St.: Did you decide to begin the work now?

1. We are going to discuss the relation between these two facts. 2. He was satisfied with their co-operation. 3. They are planning to perform direct control of the operation. 4. He was involved in their useless argument. 5. Either of these solutions will be wrong. 6. The information has to be presented in a concise form. 7. They were going to replace these symbols with conventional ones. 8. They are determined to do intensive research in future. 9. He will be able to choose a room in the hostel. 10. Students understand those fundamental laws.

XXIII. *Open your text-book. Listen to the speaker as he is reading the new words of the lesson and repeat them after him.*

XXIV. a) *Follow the speaker as he is reading the text 'Something about Mathematical Sentences';* b) *Listen to the text again without looking into the book.*

XXV. *Listen to the questions and write down your answers (+, -).*

1. Do you need to write sentences about numbers in all branches of mathematics? 2. Do the numerals 8 and 11—3 name the same number? 3. Do $9+6$ and 13 both name the same number? 4. Is the sentence $9+6 \neq 13$ a true sentence? 5. Can a sentence involving numerals be both true and false? 6. Is a mathematical sentence that is either true or false, but not both, called a closed sentence? 7. Is it always incorrect to write a false sentence? 8. Do mathematical symbols help us to build a new language? 9. Is everyday language more direct and concise than symbolic language? 10. Must we have a good understanding of the meaning of each symbol? 11. Does the symbol of non-equality ($\neq$) imply that one member of the mathematical sentence is greater than the other? 12. Are relation or ordering symbols important?

Homework II

XXVI. *Arrange the words of ex. XIX according to the parts of speech they belong to.*

XXVII. *Ask questions to which the following could be answers.*

1. There is a certain difference between an equation and an equality. 2. There exist true and false mathematical sentences. 3. Both members of the equation name the same number. 4. We are to decide whether this sentence is true. 5. It is necessary to know whether this sentence is correct. 6. This relation of equality satisfies the following axioms. 7. We need to use symbols in all branches of physics. 8. The given symbol $\neq$ means is not equal to. 9. The following symbol $>$ means greater than. 10. This mathematical sign implies the opposite meaning. 11. These features are considered essential. 12. In mathematics it is possible to write a false sentence. 13. Everyone who is concerned with mathematics must have a good understanding of the meaning of each symbol. 14. The symbol of non-equality $\neq$ implies either greater than or less than. 15. These are ordering symbols because they indicate the order of numbers.

XXVIII. *Write in the negative.*

1. I decided to take part in this work. 2. He is an active member of their group. 3. I am satisfied with their reaction to our publication. 4. This feature is characteristic of him. 5. He is determined to provide us with all the information possible. 6. This work has to include direct methods of control. 7. The child can draw much better. 8. This process can be constantly reproduced in the lab. 9. These symbols are as conventional as the ones used in this book. 10. They have to study the relation between these two discoveries at present. 11. I agreed with him in just one respect. 12. I believe you will choose the right solution.

XXIX. a) Read the text below and entitle it; b) Write a few questions about the text in the form of a plan; c) Be prepared to discuss the text in class. The text contains a number of international words whose meaning you can guess.

In this lesson the students learn to recognize, understand, and use the distributive [dis'tribjutiv] property of multiplication over addition. Further the students discover that the properties of operations are fundamental to understanding the structure of mathematics. They make the usual arithmetic manipulations secure.

Multiplication is distributive over addition in the set of natural numbers. That is, for any three natural numbers a , b , and c , $a(b+c) = ab+ac$. This property can be extended (можно расширить) to include more than two addends. Since the set of natural numbers is closed under addition, $a+b$ names a natural number (when a and b name natural numbers). Therefore, the distributive property is extended as follows.

$$a(b+c+d) = a[b+(c+d)] = ab+a(c+d) = ab+(ac+ad) = ab+ac+ad.$$

It is important that the students also recognize, by the property of equality, that the above statements are reversible ([ri'və:səbl] обратимы). For example $ab+ac=a(b+c)$ and $ab+ac+ad=a(b+c+d)$.

Without the concept of symmetry of equality, the students sometimes find it difficult to understand the properties of operations. They find it easy to work from left (левый) to right (правый) but they meet difficulties while using the distributive property in a factoring situation, as given below.

$$5n+5r=5(n+r)$$

The use of the associative, commutative [kə'mju:tətiv], and distributive properties in working on equivalent expressions is extremely important in the development of mathematical thought ([lə:t] эд. мышление) and in the understanding of the structure of mathematics.

XXX. a) Go back to the text 'Something about Mathematical Sentences'; b) Shorten the text retaining the most essential information; c) Be prepared to render the text in class.

Classwork III

XXXI. Read these words and give Russian equivalents of the words in italics.

to under'stand—*under'stable*; dis'tributive—to dis'tribute—*distribution*; structure—*structural*; to in'clude—in'clusion; to close—*closed*—closure—close a ; to re'verse—*re'versible*, 'difficult—*'difficulty*; as'sociative—*association*—to associ'ate [ə'souʃieit]; ex'tremely—*extreme* [iks'tri:m] a —*ex'tremist*; thought—*thoughtful*—*thoughtless*; de'termine—*determi'nation*; 'constant—*'constancy* n ; di'rectly—*indi'rectly*.

XXXII. Read the text 'Something about Mathematical Sentences' aloud.

XXXIII. Listen to your teacher's statement and either agree or disagree. If you agree with the statement begin your answer with the words: 'Yes, that's right'. If you don't agree begin with: 'I am afraid it's not right'.

XXXIV. Answer your teacher's questions in connection with the text.

XXXV. Render the text. (You may work in pairs).

XXXVI. Say the following in English.

1. Уравнение содержит знак равенства? 2. Эти две части называют членами уравнения. 3. Математические выражения могут быть либо истинными, либо ложными. 4. Вам следует поставить знак неравенства между членами этого отношения. 5. Знак $\neq$ заменяется знаком $=$ в этом выражении. 6. Эти символы предполагают (заключают в себе) различные значения. 7. Они не смогли понять значения этого выражения. 8. Вы знаете общепринятые математические символы? 9. Это доказательство более правильно? 10. Язык математики есть самый прямой и сжатый язык.

XXXVII. Discuss the text of ex. XXIX. Work in pairs. You may either render the text or ask and answer questions. You may make use of the plan which you wrote at home.

Home-reading

Text I

Read the following text and translate it. You can guess the meaning of some of the international words contained in the text. If you are not sure, you may consult the dictionary. Write down your translation.

M. V. Lomonosov

We think of M. V. Lomonosov as the father of Russian science. Some of his scientific works were a great contribution [ˌkɒntriˈbjʊːʃən] to the world [wɜːld] (мировую) science. A. S. Pushkin wrote: «Lomonosov was a great man. It was he who founded the first Russian University and he himself (сам) was our first University». He worked a lot in the field of natural [ˈnætʃərəl] science, especially in physics and chemistry [ˈkemistri]. It was Lomonosov who originated [əˈrɪdʒɪneɪtɪd] the study of geology [dʒiˈɒlədʒi], geochemistry [dʒiəˈkemistri] and physical chemistry in Russia. He also took great interest in history, mathematics and philosophy.

We know Lomonosov as the author of the first Russian book on grammar [ˈgræmə]. He was the first to use Russian language when writing scientific books.

Working in various fields of science he also gave much of his time to practical application of natural sciences. He opened the first chemical laboratory and originated the production of glass (стекло) in Russia.

Text II

This is a text about Leonardo da Vinci ['vintʃi]. Read it and write a few questions about it to ask your class-mates.

Leonardo da Vinci

Le'onardo da Vinci is a man of legend ['ledʒənd]. He was an artist ['ɑ:tɪst], who was interested in technology. He was an engineer [ˌendʒɪ'niə] and a scientist who was a great artist. In his time, in the fifteenth century he was recognized as an artist and as an engineer. He studied geometry, mechanics, hydraulics [haɪ'drɔ:liks], botany ['bɒtəni], anatomy [ə'nætəmi], geology, architecture ['ɑ:kɪtektʃə] and astronomy [əs'trɒnəmi]. He had a number of original [ə'ri:dʒɪnəl] ideas about the telescope ['telɪskəʊp], hydraulic turbines ['tæ:bain], tanks and aeroplanes ['ɛərəpleɪn] and ... computers. It was Leonardo who introduced [ˌɪntrə'dʒu:s] an important and useful coefficient [ˌkəʊɪ'fɪʃənt] of 'friction. It can be said that Leonardo was actually the first engineer with modern understanding (понимание) of elementary [ˌeli'mentəri] principles ['prɪnsəpəl] of machine [mə'ʃi:n] functioning ['fʌŋkʃənɪŋ]. In all his studies he was interested not only in theory but in the practical application of his theoretical concepts ['kɒnsɛpt].

Text III

Here is another text. Read and entitle it. Get ready to render the text in class. You might add some information on the subject, if you have any.

In ancient times people lived in small family groups. People lived in this way because there was little food (пища) around. When a family became so large that there was not enough food for all the members of the family, the group divided. Some of its members went away looking for (в поисках) new hunting grounds (охотничьи угодья). Families divided over and over again until people lived in every part of the world.

When the separated groups of people lived away from each other for some time they began to talk differently. And so little by little hundreds and thousands of languages came into the world. And now, speech, which at one time was a bridge (мост) between people, often became a wall (стена) separating people.

But it is not only the language barrier that keeps people apart (разделяет). There are also social, political, and economic reasons for it and these reasons are very important.

In 1887 Dr. (doctor) Zemenhof of Poland invented (изобрел) an artificial (искусственный) language called Espe'ranto. The word Esperanto comes from the Latin word «spero» meaning hope. But this language did not become popular though (хотя) there are people who believe in artificial language. There are even about thirty radio stations in the world that have programs in Esperanto.

LESSON 15

Classwork I

Grammar:

Present, Past, Future Perfect (Active Voice)

1. Read these pairs of sentences. a) Compare them and explain the use of the tense forms (Indefinite, Continuous, Perfect).

I am checking the result.	He has checked the result.
We are studying this feature.	They have studied this feature.
She is changing the order.	I have changed the order.
He is answering my question.	You have answered my question.
Have they solved the equation?	— No, they have not. They are solving it now.
Has he defined those properties?	— No, he has not. He is defining them now.
Have you built a new computer?	— No, we have not. We are building it.
Has she considered those questions?	— No, she has not. She is considering them at this moment.
Have you seen him?	— Yes, I have. I saw him yesterday.
Has she used your system?	— Yes, she has. She used it in her last work.
Has he given you the lecture?	— Yes, he has. He gave us the lecture two days ago.
Have they held a conference?	— Yes, they have. They held it last month.

b) Mind the situation calling for the use of the Present, Past or Future Perfect.

Has he spoken to his research adviser?	— Yes, he has (just) spoken to him.
Have you ever been there?	— Yes, I have (often) been there.
Has she presented her thesis yet?	— Yes, she has (already) presented it.
Have they passed their exams yet?	— Yes, they have passed them (today, this week, this month).

Has he shown you his plan?

Have you been to Kiev?

Have I come late?

Have they ever used this method?

Has he done any calculations?

Has she seen her research adviser?

Have you found that paper?

Have they discussed his thesis?

Have you done the exercise?

Has she finished her work?

— No, he has not shown it (yet).

— No, I have never been to Kiev.

— No, you have not come late (today).

— No, they have never used it.

— He said that he had done some.

— She said she had seen him.

— I told you I had found it.

— I thought they had discussed it.

— I shall have done it by tomorrow.

— She will have finished it before you come.

What have you done? Where have you been? What kind of problem has he solved? Why have you told him about it? Whom have they seen there?

Words to be Learned

Follow your teacher. Read these international words and guess their meaning.

fraction [ˈfrækʃən], fractional, equivalent [iˈkwɪvələnt] *a*, relatively [ˈrelatɪvli], rational [ˈræʃənəl], process [ˈprouses] *n*, to reduce [rɪˈdju:s], divisible [dɪˈvɪzɪbl], concept [ˈkɒnsept] *n*, principle [ˈprɪnsɪpl] *n*, valid [ˈvælɪd] *a*.

Follow the teacher and read these words.

chapter [ˈtʃæptə] глава
numerator [ˈnju:məreɪtə] чис-
литель

denominator [dɪˈnɒmɪneɪtə] зна-
менатель

into [ˈɪntə] в (внутрь)

quantity [ˈkwɒntəti] количество

proper [ˈprɒpə] 1. правильный;
2. присущий, собственный

improper [ɪmˈprɒpə] неправиль-
ный

mixed [mɪkst] смешанный

integer [ˈɪntɪdʒə] целое число

never [ˈnevə] никогда

prime [praɪm] 1. простой; 2. пер-
вичный

attempt [əˈtemt] *n* попытка;
v пытаться

dwell (on) [dweɪ] (dwelt) оста-
навливаться (на)

twice [twɑɪs] дважды; twice as
вдвое

term [tɜ:m] член, термин

low [ləʊ] низкий

accordingly [əˈkɔ:dnɪŋli] соот-
ветственно

conclude [kənˈklu:d] делать за-
ключение, вывод

ever ['evə] когда-либо
yet [jet] 1. тем не менее; 2. еще
(нет)
high [hai] высокий

conclusion [kən'klu:ʒən] заклю-
чение
bring [brɪŋ] (brought [brɔ:t],
brought) приносить

Notes

1. does not meet all of our needs — не удовлетворяет все наши потребности
2. dwell on — остановимся на
3. the same is true of — то же самое справедливо
4. the process of bringing — процесс приведения
5. reducing a fraction — сокращение дроби
6. draw the conclusion — сделать вывод
7. just as valid — столь же справедливо

Laboratory Assignment I

II. Listen and repeat after the speaker.

- [ʌ] — 'subject, 'publish, us, 'utter, cons'truct, a'bove, dis'cover, other, nothing, young, enough, double;
[ɒ] — hop, lot, want, what, water, was;
[i] — system, duty, ready, gym, inch;
[e] — help, tend, head, bread, steady, ready;
[u] — book, took, look, put, pull;
[u:] — true, blue, rule, soon, group, smooth;
[ju:] — due, unity, union, use, news, knew, few, Newton, Europe, stupid.

III. Follow the speaker as he is reading ex. I.

IV. Comment on the speaker's requests or statements.

Sp.: Open the box. (he)

St.: But *he has opened* the box.

a) 1. Check the result. (he). 2. Discuss his appointment with them. (we). 3. Solve this task. (he). 4. Tell her about the apartment. (I). 5. Show them the conference hall. (she). 6. Open your book at page two. (I). 7. Take the program from him. (she). 8. Ask the child's parents about his vacation. (she).

Sp.: He is writing his paper.

St.: *As far as I know he has written* his paper.

b) 1. She is learning French. 2. They are taking their final examination. 3. We are considering the details. 4. He is writing a letter to his parents. 5. They are comparing the results. 6. She is discussing the plan with her research adviser. 7. They are developing a new system. 8. They are applying new methods of investigation in this case.

Sp.: I have not seen him. (she).

St.: Has *she* seen him?

c) 1. I have not been there yet. (they). 2. He has not read his paper. (you). 3. They have not discovered the truth yet. (you). 4. He has not provided me with the information obtained. (they). 5. He has not been to this exhibition. (you). 6. They have not given me any help. (she). 7. I have not written my thesis. (she). 8. They have not found any data on the subject. (he).

V. Answer the speaker's questions.

Sp.: What did he bring? (his thesis)

St.: He *said* he *had brought* his thesis.

a) 1. Where did she see that surgeon? (at the hospital). 2. Where did they find the children? (in the forest near the lake). 3. Whom did she meet after the concert? (his wife). 4. What did she show them? (her room in the hostel). 5. Where did she obtain that journal? (the book-stall). 6. When did they begin the investigation? (recently). 7. How did she get tickets for the theatre? (quite easily). 8. Whom did she speak to about her appointment? (science adviser).

Sp.: Have you done your homework? (by 5 o'clock)

St.: I *shall have done* it by 5 o'clock.

b) 1. Have you told him about the changes in our program? (by tomorrow). 2. Has he spoken to them about the coming meeting? (before he leaves). 3. Have you solved this difficult problem? (before I see my science adviser). 4. Have they learned the truth? (by the end of the day). 5. Have they doubled the production of this chemical? (by the end of the year). 6. Has he informed them about the possible differences? (before the conference begins).

Sp.: Has she spoken to him? (one of these days)

St.: No, she has not. She *is going to do* it one of these days.

c) 1. Has he shown you his recent article? (on Monday). 2. Have you defended your dissertation (in a month's time). 3. Have they seen the libraries in the main building? (after dinner). 4. Have they built the electric power-station there? (only next year). 5. Has he taken his exam in differential equations? (in January). 6. Have you begun the translation of your paper into English? (tomorrow morning).

Homework I

VI. a) Read these sentences. Mind the situations calling for the use of the Present Perfect Tense; b) Ask questions about the details.

1. My research adviser has found the second chapter of my dissertation too long. (why). 2. The workers of this factory have decided to produce more machines of this kind. (what). 3. The examiner has found the conclusion quite correct. (what). 4. They have not yet answered my request. (why). 5. Our group has determined to agree to their plan. (why). 6. The scientists have just changed the order of the whole process. (how). 7. He has already reduced the fraction. (in what way). 8. We have come to the conclusion that these features are

not essential. (why). 9. The worst has already happened. (what exactly). 10. Those postgraduates have not taken part in our research. (why). 11. Our English teacher has brought some interesting journals today. (what kind of). 12. I have not yet divided the given quantity into two parts. (why). 13. My sister has never translated texts from Russian into English. (why). 14. They have already agreed to accept these principles as the basis of their work. (what). 15. They have chosen the most conventional method for their experiment. (why). 16. They have already learned something about rational numbers. (who). 18. He has already found a proper solution for this problem. (what kind of).

VII. *Read these sentences and change them according to the model. Write pronouns instead of nouns.*

The doctor is examining *the boy* (expect).

I *expected* the doctor had examined *him*.

1. The students are looking through *the journals*. (think). 2. He was writing a program for *the computer*. (expect). 3. They are considering various aspects of *this experiment*. (to be sure). 4. My brother is writing the first chapter of *his dissertation*. (expect). 5. The scientists are introducing *new methods of control*. (think). 6. They were discussing the advantages of *this symbolic language*. (expect). 7. He was writing a letter to his *girl-friend*. (to be sure). 8. They are having *their vacation*. (think).

VIII. *Read these questions and answer them in writing.*

Have you seen this museum? (last year)

Yes, I have. I *saw* it last year.

1. Have you taken the exercise-book from him? (yesterday). 2. Have they brought you the journal? (in the evening). 3. Have you had dinner? (at 3 o'clock in the afternoon). 4. Has she spoken to her parents about it? (a couple of days ago). 5. Has he come from Kiev? (on Wednesday). 6. Have you given her both articles. (on Friday). 7. Has he seen his doctor about it? (a few days ago). 8. Have you told your wife about it? (on Saturday). 9. Have you met her husband? (at the theatre last night). 10. Has he begun the lecture? (at nine o'clock in the morning).

Classwork II

IX. *Read these words.*

too, under, up, want, wand, heavy, wallow, spread, duty, move, hook, wan, couple, hue, watt, guess, another, ever, wasp, cover, measure, should, dew, foot, true, usually, rude, soon, through. Euclid, newly, disprove, ink, done, monthly, none, myth, unity, impulse, country, group, could, you, whom, truth, full, remove.

X. *Answer your teacher's questions.*

XI. Answer the following questions (you may work in pairs).

T.: Has he taken his exam? (I was told)

St.: I was told he had taken it.

a) 1. Have they developed that complicated system? (I was informed). 2. Has she found a proper answer to the question that interested her? (she said). 3. Has he brought all the necessary data? (I was told). 4. Have they published their recent results? (she told me). 5. Has she begun research? (I was sure). 6. Have you checked the result of the calculation? (I told you).

T.: Have you taken his exercise-book?

St.: I have not taken his exercise-book.

b) 1. Have they applied the new method? 2. Has he changed his plans? 3. Have you read the fourth chapter yet? 4. Have they come to any conclusion? 5. Has he brought the tickets? 6. Has she told them the truth? 7. Have they given you the details? 8. Have you seen those ancient 'manuscripts?

XII. Ask a general question about every sentence of ex. VI.

XIII. Ask questions to which the following sentences could be answers.

1. The numerator and the denominator of this fraction are divisible by two. 2. The given quantity should be properly divided. 3. He found the whole system relatively simple. 4. It was impossible to reduce this fraction further. 5. The given principle is valid for all such cases. 6. The scientists were determined to develop further that idea. 7. The newspaper was brought by my brother. 8. You have to read the following chapter. 9. He was able to find a proper answer. 10. I wanted to know what had happened to that machine. 11. You are to choose the best program. 12. We have just come to this conclusion.

XIV. Listen to the words of the lesson as read by your teacher and repeat them.

XV. Read the text below and give a short outline of the text in English.

Rational Numbers

In this chapter you will deal with rational numbers. Let us begin like this.

John has read twice as many books as Bill. John has read 7 books. How many books has Bill read?

This problem is easily translated into the equation $2n=7$, where n represents the number of books that Bill has read. If we are allowed to use only integers, the equation $2n=7$ has no solution. This is an indication that the set of integers does not meet all of our needs¹.

If we attempt to solve the equation $2n=7$, our work might appear as follows.

$$2n=7, \quad \frac{2n}{2} = \frac{7}{2}, \quad \frac{2}{2} \times n = \frac{7}{2}, \quad 1 \times n = \frac{7}{2}, \quad n = \frac{7}{2}.$$

The symbol, or fraction, $\frac{7}{2}$ means 7 divided by 2. This is not the name of an integer but involves a pair of integers. It is the name for a rational number. A *rational number* is the quotient of two integers (divisor and zero). The rational numbers can be named by fractions. The following fractions name rational numbers:

$$\frac{1}{2}, \quad \frac{8}{3}, \quad \frac{0}{5}, \quad \frac{3}{1}, \quad \frac{9}{4}.$$

We might define a rational number as any number named by $\frac{a}{n}$ where a and n name integers and $n \neq 0$.

Let us dwell on² fractions in some greater detail.

Every fraction has a numerator and a denominator. The denominator tells you the number of parts of equal size into which some quantity is to be divided. The numerator tells you how many of these parts are to be taken.

Fractions representing values less than 1, like $\frac{2}{3}$ (two thirds) for example, are called proper fractions. Fractions which name a number equal to or greater than 1, like $\frac{2}{2}$ or $\frac{3}{2}$, are called improper fractions.

There are numerals like $1\frac{1}{2}$ (one and one second), which name a whole number and a fractional number. Such numerals are called *mixed fractions*.

Fractions which represent the same fractional number like $\frac{1}{2}$, $\frac{2}{4}$, $\frac{3}{6}$, $\frac{4}{8}$, and so on, are called equivalent fractions.

We have already seen that if we multiply a whole number by 1 we shall leave the number unchanged. The same is true of³ fractions since when we multiply both integers named in a fraction by the same number we simply produce another name for the fractional number. For example, $1 \times \frac{1}{2} = \frac{1}{2}$. We can also use the idea that 1

can be expressed as a fraction in various ways: $\frac{2}{2}$, $\frac{3}{3}$, $\frac{4}{4}$ and so on.

Now see what happens when you multiply $\frac{1}{2}$ by $\frac{2}{2}$. You will have $\frac{1}{2} = 1 \times \frac{1}{2} = \frac{2}{2} \times \frac{1}{2} = \frac{2 \times 1}{2 \times 2} = \frac{2}{4}$. As a matter of fact in the above operation you have changed the fraction to its higher terms.

Now look at this: $\frac{6}{8} : 1 = \frac{6}{8} : \frac{2}{2} = \frac{6:2}{8:2} = \frac{3}{4}$. In both of the above operations the number you have chosen for 1 is $\frac{2}{2}$. In the second example you have used division to change $\frac{6}{8}$ to lower terms, that is to $\frac{3}{4}$. The numerator and the denominator in this fraction are relatively prime and accordingly we call such a fraction the simplest fraction for the given rational number.

You may conclude that dividing both of the numbers named by the numerator and the denominator by the same number, not 0 or 1 leaves the fractional number unchanged. The process of bringing⁴ a fractional number to lower terms is called reducing a fraction⁵.

To reduce a fraction to lowest terms, you are to determine the greatest common factor. The greatest common factor is the largest possible integer by which both numbers named in the fraction are divisible.

From the above you can draw the following conclusion⁶: mathematical concepts and principles are just as valid⁷ in the case of rational numbers (fractions) as in the case of integers (whole numbers).

Laboratory Assignment II

XVI. *Listen and repeat. Guess the meaning of the words in italics.*

rational—*ir'ational*—'*rationalize*; 'integer—*integral* ['intigrəl] *n*, *a*—*integrity* [in'tegrɪti]; indicate—*indication*; to appear—to *disappear*; fraction—*fractional*; to define—*definition*—*definite* ['defɪnɪt] *a*—in'definite *a*; quantity—*quantitative* ['kwɒntɪtətɪv]; value *n*, *v*,—*valuable*—*valueless*; proper—*properly*; like *a*—*likeness*; same—*sameness*; to change—*unchanged*—*changeless*; simply—*simplify*; example—*exemplify*; to conclude—*conclusion*; 'valid—*va'lidity*; to reduce—*reduction*.

XVII. *Answer the speaker's questions. Follow the model.*

Sp.: Have you seen him? (yesterday)

St.: Yes, I have. I saw him yesterday.

a) 1. Has he written to you about his decision? (last week). 2. Have they introduced the new system yet? (last year). 3. Has she told you about the international conference? (only last night). 4. Has he seen his science adviser? (on Tuesday). 5. Have you learned the truth? (only yesterday). 6. Have you ever been to this town? (a few years ago).

Sp.: Have you met her husband? (brother)

St.: No, I haven't. I've met her brother.

b) 1. Has he translated a book? (a few articles) 2. Have they

passed their exam in philosophy? (theoretical mechanics). 3. Has she entered the faculty of cybernetics? (physics). 4. Have you been to the Opera House? (a drama theatre). 5. Has she learned French? (German). 6. Have they got two rooms in the hostel? (one room).

Sp.: Where did she see him? (in the library)

St.: She said she had seen him in the library.

c) 1. How did he get that information? (with her help). 2. Where did they build this modern theatre? (far from the centre). 3. Whom did he obtain this information from? (his science adviser). 4. How did they spend the week-end? (very nicely). 5. Where did she make these calculations? (at our lab).

XVIII. *Comment on the speaker's words.*

Sp.: They have not seen the program. (last week).

St.: *As far as I know* they saw the program last week.

a) 1. She has not given her test work to the teacher. (after the lesson). 2. They have never worked independently. (a few years ago). 3. She has never made an attempt to change the situation. (some time ago). 4. He has not made such a statement. (last night). 5. He has not proved this theorem. (two years ago). 6. He has not taken part in this investigation. (when he was in Moscow).

Sp.: He *did* the same exercise. (I was told).

St.: Yes, I was told he *had done* the same exercise.

b) 1. They *studied* various aspects of the problem. (I knew). 2. They *produced* important information. (he said). 3. They *discussed* the advantages of the modern computer. (I was told). 4. He only *gave* a general definition. (I remembered).

XIX. *Combine these pairs of sentences with the help of 'when', 'why' and so on.*

Sp.: I want to know... you *did* it. (how).

St.: I want to know how you *have done* it.

Sp.: I wanted to know... he *came*. (why).

St.: I wanted to know why he *had come*.

1. I want to know... she spoke to him. (how). 2. I asked him... he liked the book (why). 3. He wants to know... I found his note. (where). 4. She wanted to see... they did the exercise. (how). 5. They asked me... I presented my paper. (when). 6. She wants to know... they produced the information. (how).

XX. *Supply a general question to each one of these sentences.*

1. These are rational numbers. 2. I have studied the first chapter. 3. This conclusion is rather unexpected. 4. You have reduced the fraction correctly. 5. She is determined to finish her work in time. 6. I have brought you the book. 7. He has chosen a wrong solution. 8. This integer is divisible by two. 9. It happened on Friday.

XXI. *Open your text-book. Listen to the speaker as he is reading the new words of the lesson.*

XXII. a) *Follow the speaker as he is reading the text 'Rational Numbers';* b) *Listen to the text again without looking into your book.*

XXIII. *Listen to the questions about the text and write down your answers (+, -).*

1. Is this chapter concerned with fractions? 2. Is the fraction $\frac{6}{2}$ an improper fraction? 3. Are there mixed fractions? 4. Is it possible to reduce the fraction $\frac{2}{3}$ to lower terms? 5. Could you change the fraction $\frac{2}{4}$ to higher terms? 6. Is 20 divisible by 5? 7. Shall we change a fraction if we multiply it by 1? 8. Shall we change a fraction if we divide it by 1? 9. Is $\frac{1}{2}$ a rational number? 10. Are principles of arithmetic valid in the case of mathematics? 11. Is a rational number another name for a fraction? 12. Does every fraction have a numerator and a denominator?

Homework II

XXIV. *Arrange the words of ex. XVI according to the parts of speech they belong to.*

XXV. *Ask questions to which the following sentences could be answers.*

1. Fractions like $\frac{2}{3}$ are called proper fractions. 2. In the proper fraction the denominator is greater than the numerator. 3. In the improper fraction the denominator is less than the numerator. 4. A mixed fraction contains an integer and a proper fraction. 5. There also exist equivalent fractions. 6. You are to give an example of a mixed fraction. 7. The little boy was able to multiply and divide fractions. 8. If you write first $\frac{1}{2} = \frac{3}{6}$ and then $\frac{1}{2} = \frac{n}{6}$ that means that you have replaced 3 with n . 9. The words *choose* and *select* mean one and the same thing. 10. If you change a fraction from $\frac{16}{48}$ to $\frac{1}{3}$ you will reduce it to its lowest terms. 11. We are to read another chapter of this book. 12. This chapter deals with various kinds of fractions. 13. Now we are concerned with mixed fractions. 14. You should take two parts of equal size for your experiment. 15. The quantity of material has to be reduced. 16. Everything happened during the recent experiment.

XXVI. *Go back to the text 'Rational Numbers'. a) Shorten the text leaving out the unimportant details; b) Write a few questions*

about the text to ask your class-mates; c) Be prepared to render and discuss the text in class.

XXVII. Read the following text. Entitle it.

Using mathematical concepts and principles, we can show the validity of the usual rule (правило) of arithmetic, that is, multiplying both integers named in a fraction by the same whole number simply produces another name for the fractional number.

From the solution of equations such as $4y=11$, we find a general pattern that results from the division property of equations.

$$4y = 11, \quad \frac{4y}{4} = \frac{11}{4} \quad \text{why?}, \quad \frac{4}{4} \times y = \frac{11}{4} \quad \text{why?}, \quad 1 \times y = \frac{11}{4} \quad \text{why?}, \\ y = \frac{11}{4} \quad \text{why?}$$

Consider the equation $ny=c$, where n and c name integers ($n \neq 0$). Using the division property of equations we obtain the following solution.

$$ny = c, \quad \frac{ny}{n} = \frac{c}{n} \quad \text{why?}, \quad \frac{n}{n} \times y = \frac{c}{n} \quad \text{why?}, \quad 1 \times y = \frac{c}{n} \quad \text{why?}, \quad y = \frac{c}{n} \quad \text{why?}$$

From this we are able to make the following conclusion.

$$\text{If } ny = c, \text{ then } y = \frac{c}{n} \quad (n \neq 0).$$

You have used this idea in arithmetic. It indicates that division and multiplication are inverse operations, that is, dividing by 5 is the inverse of multiplying by 5.

XXVIII. Now that you have read and entitled the text above, write a few questions about it to ask your class-mates.

Classwork III

XXIX. Read these words and give Russian equivalents of the words in italics.

valid—*validity*; simple—*simply*—*simplification*—*simplify*; to solve—*solvable*—*insolvable*; result n —to result v ; to obtain—*obtainable*—*inobtainable*; ideal—*idealist*—*idealistic*; proper—*properly*; mixed—*mixture*—to mix; relatively—*relative*—*relativity*; to determine—*determination*—*undetermined*; equal—*equalize*.

XXX. Read the text 'Rational Numbers'.

XXXI. Listen to your teacher's statements and either agree or disagree with them. Begin with: 'Yes, that's right', 'You are quite right' or 'I'm afraid, it's not right (it's wrong)'.

XXXII. Answer your teacher's questions in connection with the text.

XXXIII. *Render the text (you may work in pairs).*

XXXIV. *Say the following in English.*

1. Мы уже знаем, что каждая дробь имеет числитель и знаменатель. 2. На что указывает знаменатель? 3. На что указывает числитель? 4. Дробь, подобные $\frac{2}{3}$ или $\frac{3}{5}$, называют правильными дробями. 5. Дробь, называющие числа большие, чем единица, — неправильные дроби. 6. Дайте пример смешанной дроби. 7. Мы только что разделили отрезок на равные части. 8. Что вы знаете об эквивалентных дробях? 9. Вы, возможно, помните, что когда целое число умножают на 1, оно остается неизменным. 10. Что вы изменили в этом уравнении? 11. В этом уравнении вы заменили букву *a* цифрой. 12. Дробь $\frac{2}{3}$ меньше единицы. 13. Дробь $\frac{5}{3}$ больше единицы. 14. Возможно ли сократить эту дробь?

XXXV. *Discuss the text of ex. XXVII. Make use of the questions you wrote at home. Work in pairs.*

LESSON 16

Classwork I

Grammar:

Present, Past, Future Perfect. Passive Voice. Perfect Continuous

1. Read these sentences. Compare the predicates in these pairs of sentences.

a) *We have defined the relation.*

They have learned chapter seven.

She has changed the order.

b) *Has she checked the result?*
Have you reduced the fraction?

Has she found the answers to these questions?

c) *I have not yet brought the book.*

They have not found the size yet.

He has not yet replaced the terms in the equation.

You have not multiplied the denominator yet.

d) *He said that they had considered the situation.*

The relation has just been defined.

Chapter seven has been learned.

The order has been changed.

Has the result been checked?

Has the fraction been reduced?

Have answers to these questions been found?

The book has not yet been brought.

The size has not been found yet.

The terms in the equation have not yet been replaced.

The denominator has not yet been multiplied.

He said that the situation had been considered.

I *learned* that they *had corrected* the plan.

I *was told* that they *had not held* the seminar.

I *learned* that the plan *had been corrected*.

I *was told* the seminar *had not been held*.

II. *Mind the situations calling for the use of the Perfect Continuous Tense form.*

a) *I am studying* English.

She *is trying* to solve this problem.

They *are discussing* the definition.

He *is speaking* at the conference.

I *have been studying* it since September.

She *has been trying* to solve it for a long time.

They *have been discussing* it for some time.

He *has been speaking* for half an hour.

b) Have you been working there *since* last year? Has he been developing these ideas *for* a long time? Have they been using this system *since* October? Has she been teaching you *since* December?

c) I have not been doing any research *since* last year. They have not been producing any information *for* a few months. You have not been reading this chapter *long*. She has not been writing anything *since* November.

d) I knew he had been trying to find an answer *for a long time*. He said she had been writing that paper *for* a week. I was told he had been lecturing *since* 1967. They had been considering that question *for some time* when I came.

Words to be Learned

Follow the speaker. Read these international words and guess their meaning.

diagram ['daɪəgræm] *n*, separate ['sepɪt] *a* ['sepəreɪt] *v*, decimal ['desɪmə], indefinitely [ɪn'defɪnɪtli], procedure [prə'si:dʒə] *n*, situation [ˌsɪtʃu'eɪʃən], introduce [ɪntrə'dju:s] *v*, algorithm ['ɒlgərɪðəm], placement ['pleɪsmənt], vertical ['vɜ:tɪkəl], standard ['stændəd] *n, a*, identity [aɪ'dentɪti].

Follow your teacher.

comma ['kɒmə] запятая

point [pɔɪnt] точка

left левый

skip пропускать

repeat [rɪ'pi:t] повторять

pattern ['pætən] схема, образец

observe [əb'zə:v] 1. наблюдать;
соблюдать

lie [laɪ] (lay [leɪ], lain [leɪn])
лежать

keep (kept) держать, хранить
align [ə'laɪn] располагать на
одной линии

far 1. далеко; 2. далекий

appropriate [ə'prɒpriət] соответствующий, подходящий
correspond [kɒrɪ'spɒnd] 1. со-

namely [ˈneɪmli] а именно
 full [fʊl] полный
 care [keə] забота
 careful [ˈkeəfʊl] тщательный,
 внимательный
 step шаг

ответствовать; 2. переписы-
 ваться
 hour [ˈaʊə] час
 affect [əˈfekt] воздействовать
 agreement [əˈɡri:mənt] согла-
 сие

Notes

1. over and over again — многократно
2. may prove helpful — может оказаться полезным
3. to the left (right) of — налево (направо) от
4. at the right of — справа
5. just as well — точно так же
6. take care of — /зδ./ охватить, предусмотреть
7. in full agreement with — в полном соответствии с
8. this keeps each digit — это удерживает каждую цифру
9. as appropriate — как полагается

Laboratory Assignment I

III. Listen and repeat after the speaker.

- [ei] — stable, waste, famous, danger, raise, con'tain, ob'tain, a'gain,
 mainly, stay, day, way, say, they, grey, 'stimulate, 'calculate,
 'formulate, great;
 [ai] — mild, bind, find, design, a'lig'n, sign, i'deal, item, shine, light,
 de'fine, ap'ply, sky, shy, 'typist, im'ply, high;
 [au] — brown, town, down, out, about, found, stout, loud;
 [ou] — note, so, only, though, low, slow, own, cold, hold, most, load,
 boat, road, coat, coast.

IV. Follow the speaker as he is reading ex. I and II.

V. Answer the speaker's questions. Follow the models.

Sp.: Has the result been defined? (I)
 Yes, I have defined the result.

a) 1. Have these fractions been reduced? (the student). 2. Has the given quantity been divided? (they). 3. Has any conclusion been drawn from these facts? (we). 4. Have the diagrams been chosen? (I). 5. Has the situation been already discussed? (they). Has a proper solution been found? (she). 7. Have these integers been added? (he). 8. Has the first chapter of the book been written? (we).

Sp.: How has the work been done? (well)

St.: The work has been done well.

b) 1. By whom has the experiment been made? (by a scientist). 2. How has the process been controlled? (easily). 3. Where has this article been published? (in some journal). 4. By whom has this method been chosen? (the worker).

Sp.: *Has the article been rewritten?*

St.: No, but it *has to be rewritten*.

c) 1. *Has the fraction been reduced?* 2. *Have these concepts been discussed?* 3. *Have the students been examined yet?* 4. *Have these integers been multiplied?*

Sp.: *Have you been told about it? (yesterday)*

Yes, I *was told* about it yesterday.

d) 1. *Has his idea been developed?* (at the previous seminar). 2. *Has she been asked to present her thesis?* (last week). 3. *Has the second chapter of his book been written?* (a long time ago). 4. *Have these definitions been changed?* (during the conference yesterday). 5. *Have various aspects of the procedure been defined?* (during the lecture on Monday). 6. *Has any information on the subject been obtained?* (a few days ago).

VI. *Comment on the speaker's statements.*

Sp.: The library *has not been opened*. (they, last month)

St.: *As far as I know they opened the library last month*.

1. The hostel *has not been built*. (they, half a year ago). 2. His graduation paper *has not been presented*. (he, on Monday). 3. The future of these ancient buildings *has not been considered*. (they, at their last meeting). 4. The solution for this problem *has not been found*. (he, some time ago). 5. The advantages of this program *have not been* spoken of (the scientists, at the conference).

VII. *Answer the speaker's questions.*

1. Where have you been working since last year? (at the University). 2. What has he been speaking about for such a long time? (his thesis). 3. Which one of you has been studying English since May? (nobody). 4. For how long have they been considering the new method? (for many hours).

Homework I

VIII. *Ask questions to find out the details. Write down your questions.*

1. Each step of the process has been carefully studied. (by whom). 2. The general pattern has been observed. (in what way). 3. The comma and the point have been properly placed. (where). 4. The new procedure has already been introduced. (by whom). 5. All the points have been placed on the left and on the right of the straight line. (why). 6. The necessary information has just been obtained. (what kind of). 7. The whole material has already been learned by the students. (how). 8. All the digits have been aligned as appropriate. (what). 9. We have been trying to obtain the diagram since Monday. (why). 10. The scientists have been studying the situation. (for how long). 11. He has been carefully observing the procedure for a long

time. (in what way). 12. They have been testing the new system over and over again for a month. (why).

IX. *Answer the questions below (in writing).*

Have they *introduced new methods*? (I was told)

I was told that *new methods had been introduced*.

a) 1. Have the students *studied all the new words*? (I expected).
2. Has the worker *followed the appropriate procedure*? (They told me). 3. Have your friends *drawn the diagram*? (They said). 4. Has your brother *obtained all the data*? (I thought). 5. Have they *closed the lab*? (He learned).

Do you work on this model? (since May)

Yes, *I have been working* on it since May.

b) 1. *Do you apply* these methods of investigation? (for a long time). 2. *Do you work* here? (since last year). 3. *Is he doing* his morning exercises? (since 7 o'clock). 4. *Does he share* a room with his little brother? (for a whole year). 5. *Are they building* a new Opera House in this town? (for many years).

Was he working when you came? (since the morning)

Yes, *he said he had been working* since the morning.

c) 1. *Was she translating* the text at 3 o'clock? (for half an hour).
2. *Were they learning* the examination material when you entered? (since 10 o'clock). 3. *Was he trying* to obtain the information when you saw him? (since Tuesday). 4. *Were they discussing* the situation at that time? (for many hours).

X. *Translate these sentences. Mind the use of the verb 'to have'.*

a) His diagram has certain advantages. He has already spoken about these advantages. He has to discuss them again with his assistants. He has been asked to speak about the disadvantages of this procedure.

b) The researchers had certain difficulties. They had to overcome these difficulties. They said that the head of their lab had been informed about these difficulties.

c) They have to introduce an appropriate procedure. Every step has been carefully considered. They have to observe carefully the general pattern of their research. They have been trying to come to a certain agreement. They have some differences of opinion.

Classwork II

XI. *Read these words.*

may, vail, sigh, idle, outer, wild, design, old, designate, fight, mind, amount explain, town, cloud, fable, rain, gold coal. try, host, cycle, fly, wait, graduate, blow, round, noble, break, blind, flow, approach, although, stout, mild, load, low, mail, sign, align, plain, night, know, now. how, great.

XII. Answer these questions. Follow the model. Replace the noun with the pronoun.

T.: Has *the new department* been opened? (they, last year)

St.: Yes, they opened *it* last year.

a) 1. Has *an appropriate procedure* been developed? (we, at the conference). 2. Has *the algorithm* been carefully worked out? (they, at their recent seminar). 3. Has *this standard situation* been considered? (we, when he came). 4. Have *all the rules* been observed? (they, when they were solving the problem). 5. Have any of these *articles on mathematics* been translated recently? (he, last month). 6. Has *the production of such computers* been reduced? (they, some years ago).

T.: For how long have they been discussing *the situation*? (for half an hour)

St.: They have been discussing *it* for half an hour.

b) 1. Which one of you has been learning *English* for three or four months? (all of our students). 2. Why have you been aligning *these integers* to the left of the decimal point? (according to the rule). 3. Why have you been repeating *these English words* and sentences over and over again? (because I want to memorize them). 4. For how long has she been showing them the *dining-rooms, the libraries and the hostel*? (for one and a half hours). 5. How have you been learning *these fundamental laws*? (with the help of our teacher).

XIII. Ask questions about the sentences below.

1. I have found this article very helpful. (why). 2. You should skip this chapter because it is not interesting. (why). 3. You are to place a point between these two digits. (what). 4. You ought to repeat these words again. (why). 5. The vertical line separates the two groups of digits. (how). 6. Our discussion dealt only with the general pattern. (why). 7. They are going to introduce the new system. (when). 8. He will have to be very careful if he is going to perform this operation. (why). 9. The student gave an example of an algorithm. (who). 10. Our teacher introduced a new system of equations during the previous seminar. (when). 11. All those numerals were to be properly aligned (in what way). 12. The results of the experiment may affect their further work. (in what way). 13. These integers lie on the left of the vertical line. (where). 14. He was not able to find an appropriate solution. (why).

XIV. Change the following sentences according to the model.

T.: They have studied this period. (he)

St.: He has not studied this period.

1. She has drawn the diagram. (I). 2. I found the whole procedure complicated. (she). 3. She was able to obtain the full program. (they). 4. I have repeated the new text over and over again. (he). 5. He has been introduced to that foreign scientist. (they). 6. He

always keeps his word. (she). 7. She considered each step carefully. (you). 8. He tried to observe the instruction. (they). 9. We followed the appropriate procedure. (they). 10. This boy has been separated from his mother. (his sister).

XV. Ask a general question about each one of the sentences of ex. VIII.

XVI. Listen to the new words of this lesson as read by your teacher and repeat them.

XVII. Read the text below and find in it answers for the following questions.

1. How many numerals are used in our numeration system? 2. What does a comma separate? 3. What kind of numbers do all the digits to the left of the decimal number represent? 4. Can you give an example of a repeating decimal? 5. Can rational numbers be named by decimal numerals? 6. Why is it more difficult to learn division in decimal form? 7. Has each step of addition in fractional form a corresponding step in decimal form? 8. Why is it unnecessary to write .26 as .260?

Decimal Numerals

In our numeration system we use ten numerals called digits. These digits are used over and over again¹ in various combinations. Suppose, you have been given numerals 1, 2, 3 and have been asked to write all possible combinations of these digits. You may write 123, 132, 213 and so on. The position in which each digit is written affects its value. How many digits are in the numeral 7086? How many place value positions does it have? The diagram below may prove helpful². A comma separates each group or period. To read 529, 248, 650, 396, you must say: five hundred twenty-nine billion, two hundred forty-eight million, six hundred fifty thousand, three hundred ninety-six.

Billions period	Millions period	Thousands period	Ones period
Hundred billions Ten-billions One-billion	Hundred millions Ten-millions One-million	Hundred- thousands Ten-thousands One-thousand	Hundreds Tens Ones
5 2 9,	2 4 8,	6 5 0,	3 9 6

But suppose you have been given a numeral 587.9 where 9 has been separated from 587 by a point, but not by a comma. The numeral 587 names a whole number. The sign (.) is called a decimal point.

All digits to the left of³ the decimal point represent whole numbers. All digits to the right of the decimal point represent fractional parts of 1.

The place-value position at the right⁴ of the ones place is called tenths. You obtain a tenth by dividing 1 by 10. Such numerals like 687.9 are called decimals.

You read .2 as two tenths. To read .0054 you skip two zeroes and say fifty four ten thousandths.

Decimals like .666..., or .242424..., are called repeating decimals. In a repeating decimal the same numeral or the same set of numerals is repeated over and over again indefinitely.

We can express rational numbers as decimal numerals. See how it may be done.

$$\frac{31}{100} = 0.31. \quad \frac{4}{25} = \frac{4 \times 4}{4 \times 25} = \frac{16}{100} = 0.16$$

The digits to the right of the decimal point name the numerator of the fraction, and the number of such digits indicates the power of 10 which is the denominator. For example, .217 denotes a numerator 217 and a denominator of 10^3 (ten cubed) or 1000.

In our development of rational numbers we have named them by fractional numerals. We know that rational numerals can just as well⁵ be named by decimal numerals. As you might expect, calculations with decimal numerals give the same results as calculations with the corresponding fractional numerals.

Before performing addition with fractional numerals, the fractions must have a common denominator. This is also true of decimal numerals.

When multiplying with fractions, we find the product of the numerators and the product of denominators. The same procedure is used in multiplication with decimals.

Division of numbers in decimal form is more difficult to learn because there is no such simple pattern as has been observed for multiplication.

Yet, we can introduce a procedure that reduces all decimal-division situations to one standard situation, namely the situation where the divisor is an integer. If we do so we shall see that there exists a simple algorithm that will take care of⁶ all possible division cases.

In operating with decimal numbers you will see that the arithmetic of numbers in decimal form is in full agreement with⁷ the arithmetic of numbers in fractional form.

You only have to use your knowledge of fractional numbers.

Take addition, for example. Each step of addition in fractional form has a corresponding step in decimal form.

Suppose you are to find the sum of, say, .26 and 2.18. You can change the decimal numerals, if necessary, so that they denote a common denominator. We may write .26 = .260 or 2.18 = 2.180. Then we add the numbers just as we have added integers and denote the com-

mon denominator in the sum by proper placement of the decimal point.

We only have to write the decimals so that all the decimal points lie on the same vertical line. This keeps each digit⁸ in its proper place-value position.

Since zero is the identity element of addition it is unnecessary to write .26 as .260, or 2.18 as 2.180 if you are careful to align the decimal points, as appropriate⁹.

Laboratory Assignment II

XVIII. *Listen and repeat. Guess the meaning of the words in italics.*

to 'separate—sepa'ration—in'separable; in'definitely—'definitely—'definite—in'definite; situ'ation—to 'situate; to intro'duce—intro'duction; to place—to re'place—to dis'place—'placement—dis'placement; i'dentity—i'dentical—i'dentify; to re'peat—repe'tition; to ob'serve—obser'vation; full—fully; care n—to care—'careful—'carefully—'careless—'carelessness; to a'lign—a'lignment; to ,corres'pond—,corres'pondence—,corres'pondent n, a.

XIX. *Answer the speaker's questions.*

Sp.: Has the procedure been introduced? (just)

St.: The procedure has *just* been introduced.

a) 1. Has an attempt been made to overcome these difficulties? (already). 2. Have proper periods been observed? (certainly). 3. Have the expected data been obtained? (already). 4. Have all the points been placed to the left of the vertical line? (to the right). 5. Has an appropriate solution been found? (by this group of researchers). 6. Have they been separated for a long time? (for two years).

Sp.: Have mixed fractions been spoken about? (No, not yet)

St.: No, mixed fractions have not yet been spoken about.

b) 1. Has the given quantity been divided into two? (No). 2. Have all the necessary steps been taken? (No, not yet). 3. Has the situation been taken under control? (No, not yet). 4. Has the previous chapter been rewritten? (No). 5. Have opposite signs been used? (No). 6. Has the general pattern been accepted? (No).

Sp.: Was he told about the accepted standards? (he said)

St.: He said he had been told about the accepted standards.

c) 1. Were the results summarized? (he said). 2. Were all the members of the group asked to come? (I was sure). 3. Was he satisfied with the result? (they said). 4. Were direct methods of control used? (he told me). 5. Was he included in the delegation? (he said). 6. Were they allowed to replace these conventional patterns? (they told me).

Sp.: Are they controlling the situation? (for some time)

St.: They have been controlling the situation for some time.

d) 1. Are you studying these reactions? (for some time). 2. Are they playing chess? (since the morning). 3. Is he staying with his parents? (since Sunday). 4. Is she writing her paper? (for two weeks). 5. Are they working in the English language lab? (for half an hour). 6. Are they repeating English words and sentences? (over and over again).

XX. *Ask the speaker a question to find out the details.*

1. He had to dwell on the disadvantages of the old procedure. (why). 2. They were to prove that the generally accepted method was not good. (how). 3. We were able to visit this ancient town twice. (when). 4. They had to come to a certain agreement. (what kind of). 5. I was allowed to replace this complicated and old machine. (when). 6. They were able to choose some articles for publication. (which articles).

XXI. *Open your text-book. Listen to the speaker as he is reading the new words of the lesson.*

XXII. a) *Follow the speaker as he is reading the text 'Decimal Numerals';* b) *Listen to the text again without looking into your book.*

XXIII. *Listen to the questions about the text and write down your answers (+, -).*

1. Are there five digits in the decimal system of notation? 2. Does the position of the digit affect its value? 3. Does a point separate each period? 4. Do the digits to the right of the decimal point represent whole numbers? 5. Do you obtain a tenth by dividing 1 by 10? 6. Can rational numbers be named by decimal numerals? 7. Must we have a common denominator before we add decimal numerals? 8. Is division in decimal form difficult? 9. Can we express rational numbers as decimal numerals? 10. Is zero the identity element of addition?

Homework II

XXIV. *Arrange the words of ex. XVIII according to the parts of speech they belong to.*

XXV. a) *Ask questions to which the following sentences could be answers.*

1. We consider your data very helpful. 2. All these combinations have been repeated over and over again. 3. There is a diagram below. 4. The change of the order may affect the result. 5. It has to be pointed out that the procedure developed is very complicated. 6. On the right and on the left of the comma you see three digits. 7. He obtained the difference after he had subtracted the numeral. 8. The identity property is being considered by the students. 9. The value of the digit is defined by its position. 10. Yes, the necessary procedure has always been followed. 11. The given definition corresponds to

the idea of uniqueness. 12. You may change 3.29 to 3.290 if it helps you to obtain the correct answer. 13. When you deal with decimal numbers you are to align the decimal points. 14. In the operation of multiplication it is the product of the numerator and the denominator that we actually find. 15. We can multiply these numbers as we have so far been doing with integers. 16. Students must study this illustration carefully. 17. In the given example we have been trying to show the validity of these principles. 18. This system of notation has to be observed. 19. These digits are separated from 6 by a point. 20. The scientists have been shown the pattern of the future system. 21. I have no idea of the situation. 22. All the points have been aligned on the vertical line.

b) *Name the predicate in each one of the sentences above. Pay special attention to the functions of the verb 'to have'.*

XXVI. *Go back to the text 'Decimal Numerals'. a) Shorten the text leaving out the unimportant details; b) Write a few questions to ask your class-mates; c) Be prepared to render and discuss the text in class.*

XXVII. a) *Ask questions about the text to follow.*

Developing the definition of addition of rational number, the students discover that the basic rule of addition applies to every addition involving rational numbers.

In a rigorous treatment (строгий подход) to rational numbers a mathematician will define addition as follows:

$$\frac{a}{b} + \frac{c}{d} = \frac{ad + bc}{bd}.$$

Then he will check to determine whether or not this definition preserves (сохранять) the usual closure, commutative, and associative properties and whether or not the number zero remains the identity element.

b) *Now that you have written your questions, be prepared to answer them in class.*

Classwork III

XXVIII. *Read these words and give Russian equivalents of the words in italics.*

digit—*digital*; use—*useful*—*usefulness*—*uselessness*; possible—*possibly*—*possibility*; value—*valuable*—*valueless*; separate—*separable*—*inseparable*; to suppose—*supposition*; to repeat—*repetition*; power—*powerless*—*powerful*; to expect—*unexpected*; difficult—*difficulty*; integer—*integration*; to exist—*existence*; agreement—*disagreement*; to use—*usable*; to change—*changeless*—*unchanged*; placement—*displacement*; identity—*identify* [ai'dentifai]; element—*elementary*; appropriate—*appropriately*.

XXIX. Read the text 'Decimal Numerals'.

XXX. Listen to your teacher's statements and say whether they are true or false. If you think they are false, say why.

XXXI. Answer your teacher's questions in connection with the text.

XXXII. Render the text (you may work in pairs).

XXXIII. Say the following in English.

1. Эти числа использованы в различных комбинациях. 2. Диаграмма оказалась полезной. 3. Запятая отделяет периоды. 4. Этот знак называют десятичной точкой. 5. В числе 5.2 цифра 5 находится слева от точки и обозначает целое число. 6. Если мы разделим 1 на 10, то мы получим одну десятую. 7. Периодические дроби были введены сегодня на уроке. 8. Рациональные числа могут быть выражены в десятичных дробях. 9. Покажите мне диаграмму. 10. Где схема? 11. Эту дробь нельзя сократить. 12. Отдели запятой эти три цифры. 13. Нам пришлось изменить процедуру. 14. Они получили нужную информацию? 15. Он сказал, что они уже обсудили ситуацию. 16. Она согласилась прийти?

XXXIV. Discuss the text of ex. XXVII. Work in pairs.

Home-reading

A Short Introduction to The New Math

Many who have been out of school for a number of years find, if they want to refresh their knowledge of mathematics, that there has been a great change, a sort of mathematical revolution while they were away from school. The old, classical math has had its face lifted and has taken on a new look which modern instructors claim is a great improvement.

In the classical math often taught in high-school courses, many simple truths were taken for granted and there was a failure to analyze these truths to find out why they are true and under what particular conditions they might not be true.

During the past centuries, great, world-shaking theories were born, notably the Maxwell electromagnetic theory, the theory of relativity, and the concept of differential and integral calculus. And all these extremely important doctrines came about as a result of questioning and continually asking WHY?

The results obtained using the New Math agree, of course, with those obtained using the old, classical math, but the method of the former is much more thorough and therefore more satisfactory to the student who has never before studied math. The New Math teaches a student to think a problem through rather than try to recall tricks of manipulation.

Let's take a simple example of the two methods:

We all learned that if $x^2-4=0$, x must equal either 2 or -2 . Either of these numerical replacements for the letter x makes the statement meaningful. This is so elementary it hardly needs comment. But just how did we arrive at this ± 2 ? Did we actually «transpose» the -4 to the other side of the equal sign where it became $+4$, the equation becoming $x^2=4$ and x becoming ± 2 ? Any child might well ask, «Why do we change signs when we «transpose» from one side to the other in an equation». This, of course, is a sensible question. In the New Math this is dealt with before the child asks the question. We say:

If $x^2-4=0$, then by adding $+4$ to both sides of the equation we get

$$x^2-4+4=0+4.$$

Next we show that -4 and $+4$ cancel each other and that $0+4=4$. Then $x^2+0=4$ or $x^2=+4$. Thus $x=\pm 2$.

As a matter of fact, it is not at all difficult to demonstrate that we solved our little problem by making use of some of the eleven laws that form the foundation of arithmetic. Yes, that is a truly startling fact—and a truly startling discovery. Numbers are one of the most basic of the great ideas of mathematics. And believe it or not, eleven laws—not an infinity of manipulative devices—are the tools available to us when we want to solve problems. These are the eleven laws of real numbers:

1. *The Closure Law of Addition.* The sum of any two real numbers is a unique real number. For example, the sum of 10 and 117 is 127.

2. *The Commutative Law of Addition.* The order in which we add is trivial. For example, the sum of 3 and 4 is 7; the sum of 4 and 3 is also 7.

3. *The Associative Law of Addition.* Since addition is defined for pairs of numbers, the addition of three numbers depends on our first adding any two of the numbers and then adding their sum to the third number; the order in which we do this is trivial. For example, when 3, 4 and 5 are added in three different orders, the same sum is obtained:

$$\begin{aligned} 3+4 &= 7, & 7+5 &= 12 \\ 4+5 &= 9, & 9+3 &= 12 \\ 3+5 &= 8, & 8+4 &= 12 \end{aligned}$$

4. *The Identity Law for Addition.* The number zero is the additive identity, for the addition of it to any other number leaves the second number unchanged. For example, the sum of 0 and 9 is 9.

5. *The Inverse Law for Addition.* The sum of any number and its negative is zero. For example, the sum of 5 and -5 is 0.

6. *The Closure Law for Multiplication.* The product of any two real numbers is a unique real number. For example, the product of 117 and 10 is 1,170.

7. *The Commutative Law of Multiplication.* The order in which we multiply is trivial. For example, the product of 3 and 4 is the same as the product of 4 and 3.

8. *The Associative Law of Multiplication.* Since multiplication is defined for pairs of numbers, the multiplication of three numbers depends on our first multiplying two of the numbers and then multiplying their product by the third number; the order in which we do this is trivial. For example:

$$\begin{aligned} 3 \times 4 &= 12, & 12 \times 5 &= 60 \\ 3 \times 5 &= 15, & 15 \times 4 &= 60 \\ 4 \times 5 &= 20, & 20 \times 3 &= 60 \end{aligned}$$

9. *The Identity Law for Multiplication.* The number one is the multiplicative identity, for the product of it and any other number leaves the second number unchanged. For example, the product of 1 and 8 is 8.

10. *The Inverse Law for Multiplication.* The product of any number (except zero) and its reciprocal is one. For example, the product of 3 and $\frac{1}{3}$ is 1; the product of 5 and $\frac{1}{5}$ is 1; the product of $\frac{3}{10}$ and $\frac{10}{3}$ is 1. Division of a number by zero is meaningless.

11. *The Distributive Law.* Multiplication «distributes» across addition. For example:

$$\begin{aligned} 6 \times (4+5) &= 6 \times 9 = 54 \\ 6 \times (4+5) &= (6 \times 4) + (6 \times 5) = 24 + 30 = 54 \end{aligned}$$

LESSON 17

Classwork I

Grammar:

Sequence of Tenses. Direct and Indirect Speech The Subordinate Clause

1. *Read these sentences paying special attention to the sequence of tenses. Compare the groups of sentences in (a) and (b).*

a) She says	{	the diagram is helpful.
	{	the diagram was (has been) helpful.
	{	the diagram will be helpful.
I know	{	he works there.
	{	he worked there last year.
	{	he will work there after the University.
She says	{	she is writing her abstract.
	{	she was writing her abstract at that time.
	{	she will be writing it all day tomorrow.
I am told	{	you speak English.
	{	you spoke English to that foreign scientist.
	{	you will speak English at the conference.

b) He said	{ he knew that system. he had studied that system. he would study it.
They said	{ they considered the plan. they had considered the plan. they would consider it.
I was told	{ she wanted to go to Leningrad. she had gone to Leningrad. she would go to Leningrad.

II. Read the sentences below. Mind the changes taking place in the tense forms and the pronouns.

He said (to me):	{ «I can find the value <i>now</i> ». «She was able to perform the operation <i>yesterday</i> ». «We shall discuss various aspects of it <i>tomorrow</i> ».
He said (He told me)	{ <i>he</i> could find the value <i>then</i> . <i>she</i> had been able to perform that operation <i>the day before</i> . <i>they</i> would discuss various aspects of it <i>the next day</i> .
He said (to me):	{ «Do <i>you</i> work in this field?» «Did <i>she</i> present her thesis <i>yesterday</i> ?» «Will <i>you</i> consider the situation <i>tomorrow</i> ?»
He asked (me) whether (if)	{ <i>I</i> worked in this field. <i>she</i> had presented her thesis <i>the day before</i> . <i>we</i> would consider the situation <i>the next day</i> .
I said (to him):	{ «When do <i>you</i> attend seminars?» «Where did <i>you</i> see (have you seen) her?» «How will <i>you</i> solve this problem?»
I asked him	{ when <i>he</i> attended seminars. where <i>he</i> had seen her. how <i>he</i> would solve that problem.
She wanted to know	{ why <i>I</i> worked in that field. when they had built the machine. who would speak at the conference.
He said (to me):	{ «Write the word!» «Do not go!»
He told (asked) me	{ to write the word. not to go.
I am not sure whether (if) he	{ works there. wrote his thesis. will come in time.
I was not sure whether (if) she	{ obtained information from them. had given the definition. would need my help.

Words to be Learned

Follow your teacher. Read these international words and try to give their Russian equivalents.

popular ['pɒpjulə] *a*, production [prə'dʌkʃn] *n*, India ['indɪə] *n*, constantly ['kɒnstəntli] *adv*, legend ['ledʒənd] *n*, alternative [ɔ:l'tə:nə-tiv] *n, a*, vizier ['vi:ziə] *n*, bushel ['buʃl] *n*.

Follow your teacher.

king [kiŋ] король
game игра
chess шахматы
nowadays ['naʊədeɪz] в наши дни
according to [ə'kɔ:diŋ] в соответствии
invent [in'vent] изобретать
latter ['lætə] последний (из не-речисленных выше)
please [pli:z] доставлять удовольствие
desire [di'zaɪə] *n* желание; *v* желать
seem казаться
fulfil [ful'fil] выполнять
grain [greɪn] зерно
wheat [wi:t] пшеница
square [skweə] квадрат

chessboard ['tʃesbɔ:d] шахматная доска
cover ['kʌvə] *n* покрытие; *v* покрывать, охватить
count [kaʊnt] считать
empty ['empti] *v* опустошать; *adj* пустой
increase ['ɪnkri:s] *n* увеличение; *v* [ɪn'kri:s] увеличивать
rapidly ['ræpidli] быстро
average ['ævərɪdʒ] *v* усреднять; *adj* средний
amount [ə'maʊnt] количество
remain [ri'mein] оставаться
debt [det] долг
head [hed] *n* голова, глава; *v* возглавлять
about [ə'baut] приблизительно

Notes

1. the thing is — дело в том, что
2. the king had... no idea — король... не представлял себе
3. remain constantly in debt — постоянно оставаться в долгу
4. cut his head off — отрубить ему голову
5. he thought it best — он решил, что лучше всего

Laboratory Assignment I

III. *Listen and repeat after the speaker. See how one and the same vowel is pronounced in various cases.*

- a* — hat, hate, hail, hay, fair, have, hall, law, cause, language, pair, said;
e — ten, tell, teil, tea, teeth, term, tear, they, new, earn;
i — fist, first, sign, file, fight, field, find, ski [i:];
o — knock, so, normal, nod, node, hold, journal, noisy, ought, could, some, you, work, look, loop, low, though, double, soul, south, boat;

u — tub, tube, turn, true, pull, put, due, use, bugle;
y — gym, try, tyre, yes, type, you, duty, cycle.

IV. Follow the speaker as he is reading ex. I, II.

V. Listen to the speaker and answer his questions according to the models below. Don't forget to make the necessary changes while transforming the sentences into indirect speech.

Sp.: What does he say? (My name is Peter)

St.: He says his name is Peter.

a) 1. What does he say? (I am seventeen). 2. What does he say? (I am a student). 3. What does he say? (I live in the students' hostel). 4. What does he say? (I have come from Tula). 5. What does he say? (I came a few days ago). 6. What does he say? (I am going to take my exams in January). 7. What does he say? (As soon as my exams are over I shall go to Tula for a short vac). 8. What does he say? (I am missing my parents and I shall be happy to see them).

Sp.: What does she say? (I do not speak English well)

St.: She says she does not speak English well.

b) 1. What does she say? (I do not attend English classes). 2. What does she say? (I have no time to learn English now). 3. What does she say? (I did not learn English at school). 4. What does she say? (My brother will not be able to help me with my English).

Sp.: What did she say? (I like modern music)

St.: She said she liked modern music.

c) 1. What did she say? (I often go to concerts). 2. What did she say? (I sometimes go to the theatre). 3. What did she say? (I am fond of playing the piano). 4. What did she say? (My sister and I want to see this picture gallery). 5. What did she say? (We are going to leave home at eleven o'clock).

Sp.: What did you say? (I saw her)

St.: I said I had seen her.

d) 1. What did you say? (I spoke to her about her family). 2. What did he say? (I was able to go and see my mother and father). 3. What did she say? (My sister and I visited our old friends). 4. What did he say? (We were awfully glad to see our friends). 5. What did she say? (One of my friends came back from an international conference). 6. What did she say? (He told us a lot of interesting things about it).

Sp.: What did she say? (I shall be ready)

St.: She said she would be ready.

e) 1. What did he say? (I shall need this information). 2. What did you say? (I shall look through these papers tomorrow). 3. What did he say? (I will not consider their request). 4. What did they say? (We shall not change the procedure). 5. What did they say? (We shall not go to the country for the week-end). 6. What did they say? (We shall have an important conference in Dubna).

VI. Answer the following questions. Mind the sequence of tenses and the pronouns.

Sp.: What did she tell you? (I have changed my mind)

St.: She told me she had changed her mind.

1. What did he say? (The exams were very difficult). 2. What did she say? (I have taken my final examinations). 3. What did she tell you? (I shall present my thesis next month). 4. What did you say? (I am trying to solve this complicated problem). 5. What did they tell him? (We were going to publish their results). 6. What did she say? (I shall learn two foreign languages). 7. What did he say? (I have managed to obtain these data). 8. What did she tell you? (I was not able to attend his lecture). 9. What did you tell him? (I did not understand that article). 10. What did he tell them? (I am a physicist and I work at a research centre). 11. What did she tell you? (I do not believe this man).

VII. Answer the speaker's questions.

Sp.: What did she say to you? (Do you agree with me?)

St.: She asked me if I agreed with her.

a) 1. What did he say? (Do all of you know this basic law?) 2. What did she say? (Have you made up your mind about the time of the meeting?) 3. What did he say? (Has the situation been changed recently?) 4. What did he say? (Does this expression contain an equality sign?) 5. What did you say to her? (Can a correct solution be found?) 6. What did she say to you? (Are you having a lesson?)

Sp.: What did he say? (When will you come?)

St.: He asked when I should come.

b) 1. What did he say? (What kind of examples did she give?) 2. What did she say? (When will it be possible to introduce the new methods?) 3. What did he say? (What field of mathematics is she concerned with?) 4. What did she say? (Why do not you like the exhibition?) 5. What did you say to him? (Who has provided you with this material?) 6. What did he say to you? (Why are you interested in his letter?) 7. What did she say? (When did he enter this medical college?) 8. What did he say? (Why could not you recognize this woman?) 9. What did you say to him? (What kind of computers do you have here?) 10. What did he say? (In what case will the room in the hostel be given to this postgraduate?)

Homework I

VII. Change the following sentences according to the model below. Mind the rules for the sequence of tenses.

I know he is in Moscow.

I knew he was in Moscow.

1. He says she is working in the library. 2. Everybody knows that he has taken part in this discussion. 3. She says he has chosen

the topic (tema) of his graduation paper. 4. I want to know why he has been included in their group. 5. I am going to find out if the advantages of the new system will be made use of. 6. He wants to ask his science adviser if he can leave Moscow for a few days. 7. I know he has found a unique solution for the problem. 8. He wants to know whether she will do research in topology. 9. I want to know if it is possible to provide them with the results obtained. 10. He is going to find out whether the library will be open on Sunday.

IX. Write a direct question. Follow the model.

I am not sure if he will come.

Will he come?

1. He asked me whether that scientist was popular. 2. I am not sure if he has brought the new chessboard. 3. She wants to know if I have ever played chess. 4. He asked me if we had increased the production of those machines. 5. I am not sure if he has counted correctly. 6. He asks me if he has to double the number. 7. I wanted to know if he had any alternative. 8. I want to know whether this field of science is being constantly developed. 9. I want to know what her desire was. 10. I asked her if she had emptied her bag. 11. I wanted to know what the average number of students in an English class was. 12. She asked them why he had remained there. 13. I wanted to know what legend he was telling them. 14. He asked me whether the girl agreed with my words. 15. He asked me why the world had changed so much in recent years. 16. I am not sure if he will be able to pay his debt in due time. 17. I should like to know whether the average production of wheat has increased in recent years. 18. I am not sure if my children can count well enough. 19. I was not sure whom this machine had been invented by. 20. He did not know if they had covered all the problems.

Classwork II

X. Read these words. Observe the rules of reading.

latter, lain, fair, halt, paste, apply, war, cause, harm, draw, August, letter, lend, sell, seem, seam, term, learn, worse, fear, great, grey, eight, feudal, ready, few, lid, fine, little, find, field, fire, design, bright, mild, formula, hope, hold, coil, come, couple, worm, took, tool, blow, brown, fought, brought, tune, use, cue, cut, quite, quickly, fury, true, blue, fur, bugle, fry, myth, your, cycle, tyre.

XI. Refer the sentences to the past. Change according to the model. Mind the sequence of tenses.

T.: He says he will do it.

St.: He said he would do it.

a) 1. I hope they will choose the proper time for the seminar. 2. I know he will give interesting examples. 3. I am sure he will solve the problem in the best possible way. 4. He expects the situation

will be improved. 5. He says they will build a new electric power-station. 6. I think you will recognize this scientist.

T.: I am not sure if they will discover the truth.

St.: I was not sure if they would discover the truth.

b) 1. I want to know whether we have another alternative. 2. He is not sure if they took their final exam. 3. I do not know whether you are able to understand such things. 4. I am not sure if you have observed the general pattern. 5. I want to find out if they have invented that story. 6. He asks me if we are constantly doubling the production of this material. 7. It seems to me they have increased the production of wheat. 8. I know they will fulfil their plan successfully.

XII. Listen to your teacher and address one of your class-mates with a question or with a request.

T.: Nina, ask Nick if he likes English.

St.: Nick, do you like English?

XIII. Change into indirect speech.

T.: It is not possible. (He said)

St.: He said it was not possible.

1. They were able to design this machine in due time. (She was sure). 2. They study theoretical mechanics. (I thought). 3. He got an appointment. (She said). 4. He is fond of ancient poetry. (He said). 5. You are lucky. (She said). 6. I shall never pass this exam. (He told me). 7. She is happy. (I was sure). 8. I usually take a shower before breakfast. (He said). 9. I have just written a letter to one of my friends. (She told me). 10. She is taking a walk in the park. (I learned).

XIV. Ask questions to which the sentences of ex. VIII could be answers.

XV. Listen to the new words of the lesson as read by your teacher and repeat them.

XVI. Read the text 'The Game of Chess' and find in it answers to the following questions.

1. Where and by whom was the game of chess invented? 2. What was the vizier's desire? 3. What is the world's average production of wheat? 4. Why did the king decide to have his vizier's head cut off?

The Game of Chess

You will probably know that the game of chess so popular nowadays all over the world comes from India. According to an old legend it was invented by king Shirham's vizier Sissa Ben Dahir and presented to the king by the latter. The King was very pleased and asked Sissa Ben Dahir whether he could do anything to thank him for the

present. His vizier's desire seemed quite easy to fulfil. He asked his king to give him a grain of wheat to put on the first square of the chessboard, and two grains to put on the second square, and four grains to put on the third square and eight grains to put on the fourth and so on doubling the number for each square that came next. He said he wanted the grains to cover all 64 squares of the board.

The king thought his vizier did not ask too much for what he had done and said that he would certainly give him what he asked for.

And he told his men to bring a large bag full of wheat.

But when the counting began, with 1 grain for the first square, 2 for the second, 4 for the third and so on the bag was emptied before the twentieth square was covered with wheat. More bags were brought before the king but the number of grains needed increased so rapidly that the king soon saw he would not be able to keep his word.

The thing is¹ that a bushel of wheat contains about 5,000,000 grains. The king had, certainly, no idea² of it and did not expect that he would have to give 4000 billion bushels to Sissa Ben.

Since the world production of wheat averages about 2,000,000,000 bushels a year, the amount of wheat asked by the vizier equalled the world's wheat production for the period of some two thousand years.

Thus king Shirham found that he either had to remain constantly in debt³ to his vizier or cut his head off⁴. He thought it best⁵ to choose the latter alternative.

Laboratory Assignment II

XVII. *Listen and repeat. Guess the meaning of the words in italics.*

'probably—'probable—*proba'bility*—*im'probable*; to know—*know'ledge*—*unknown*; 'popular—'popularize—*popu'lation*—to 'popu'late—*popu'lar*ity—*un'popular*; ac'cording (to)—*ac'cordingly*—*ac'cord* n; to in'vent—*in'ventor*—*in'vention*; 'present n, to pre'sent v—to *repre'sent*—*represen'tation*; to please—to *displease*—'pleasant a—'pleasure—*dis'pleasure*; to thank—*thankful*—*thankless*—*thankfulness*; de'sire n, v—*de'sirable*—*desira'bility*; to ful'fil—*ful'filment*; square n, v—*squared*; 'cover n, v—to *dis'cover*—to *un'cover*; certainly—*certain* a—'certainty—*un'certain*; large—*largely*—to *en'large*; full—*fully*; to in'crease—'increase n—to *de'crease*—'decrease n; to con'tain—*con'tainer*; to ex'pect—*expec'tation*—*unex'pected*—*unex'pectedly*; 'rapid—'rapidly; to keep—*keeper*; 'equal—'equalize—*un'equal*—*e'quality*; to re'main—*re'mainder*; 'constantly—'constant a, n; al'ternative—to 'alternate.

XVIII. *Change the sentences below into indirect speech.*

Sp.: The diagram is helpful. (He said)

St.: He said that the diagram was helpful.

1. This museum is very popular. (She said). 2. I have not heard this legend. (He said). 3. They will constantly increase the production of wheat. (I was sure). 4. I am fond of chess. (I said). 5. He will be able to do the exercise according to the model. (He was sure). 6. They have invented an extremely interesting device (устройство). (I was told). 7. I want to please my children with the present. (She said). 8. The bag is empty. (I thought). 9. I have counted all the students in the lecture hall. (The teacher said). 10. The production of these old machines is rapidly decreasing. (I knew).

XIX. Follow the model and transform these sentences into indirect speech.

Sp.: Count (Do not count) the people in the room.

St.: He asked me to count (not to count) the people in the room.

1. Do not play chess with him. 2. Show me the rules of this game. 3. Tell us the legend. 4. Cover the distance in 10 minutes. 5. Do not empty this box. 6. Do not square this number. 7. Do not invent things that everybody knows. 8. Count the number of grains on the third square of the chessboard.

XX. Listen to the speaker and ask him a direct question. Mind the sequence of tenses.

Sp.: He asked me if the grains would be good.

St.: Will the grains be good?

1. He asks me if I like to read books by popular authors. 2. He asked me when radio had been invented. 3. I want to know if the production of atomic energy is constantly increasing. 4. I asked him when we should play chess. 5. He asked me if she would remain at the faculty. 6. I wanted to know if they had covered all the problems. 7. He asked me if I usually kept my word. 8. He asked her if she was in dept. 9. I asked him what his desire was. 10. He asked me where I had put the chessboard. 11. He wanted to know whether they would do everything according to the plan. 12. I asked him whom this device had been invented by.

XXI. Answer the speaker's questions. Mind the sequence of tenses.

Sp.: Will he come? (I do not know)

St.: I do not know if he will come.

1. Has he fulfilled his desire? (I do not know). 2. Did she tell them the legend? (I am not sure). 3. Does he play chess well? (I was not sure). 4. Have they increased the production of wheat? (I am not sure). 5. Are they inventing new machines? (I do not know). 6. Has she counted correctly? (I was not sure). 7. Did she remain at the Institute after graduation? (I did not know). 8. Did they double the production of electric energy? (I did not know). 9. Does he constantly live in the hostel? (I did not know).

XXII. *Open your text-book. Listen to the speaker as he is reading the new words of the lesson.*

XXIII. a) *Follow the speaker as he is reading the text «The Game of Chess»;* b) *Listen to the text again without looking into your book.*

XXIV. *Listen to these questions about the text and write down your answers (+, -).*

1. Does the game of chess come from Germany? 2. Has this game been invented in India? 3. Was the game invented by king Shirham? 4. Was it invented by the king's vizier? 5. Did the king like the game? 6. Was he ready to thank his vizier? 7. Did the vizier ask the king to give him money? 8. Did the king think that the vizier had asked him an impossible thing? 9. Did the king agree to give his vizier the wheat? 10. Did the king understand how much wheat he would have to give? 11. Are there 60 squares on the chessboard? 12. Does the bushel of wheat contain about 1,000,000 grains? 13. Is the world production of wheat equal to 5,000,000 bushels a year? 14. Did the king want to remain constantly in debt?

Homework II

XXV. *Arrange the words of ex. XVII according to the parts of speech they belong to.*

XXVI. *Write questions to which the following sentences could be answers.*

1. Nowadays the game of chess is very popular all over the world. 2. Scientists all over the world know Newton's name. 3. Leibnitz actually invented and built the first computer. 4. There are 64 squares on the chessboard. 5. You have to double this number. 6. We expect to cover all these problems. 7. I have just played a game of chess with a friend. 8. The production of these machines remains constant. 9. The average number of students in an academic group is constant. 10. He has spoken to the head of our laboratory today. 11. It is possible to count the amount of work. 12. She seemed pleased and thanked us for our help. 13. His desire to become a mathematician has been fulfilled. 14. The number of words we are to memorize increases rapidly. 15. The room is empty since everybody has left. 16. As I had no other alternative I agreed. 17. Every year the amount of information all over the world is rapidly increasing. 18. According to the legend the king chose the latter alternative.

XXVII. *Change the following statements and questions into indirect speech.*

Sp.: She went to college. (I knew)

St.: I knew that she had gone to college.

1. I have not met your wife. (He said). 2. It is a long way to the lake. (I knew). 3. His house is quite close to the forest. (He

said). 4. He has progressive ideas. (I knew). 5. The avenue will be long and wide. (He said). 6. Give me another journal. (He asked me). 7. Do not translate such easy texts. (She told me). 8. He came only a week ago. (She said). 9. Will you enter the Physics faculty? (He asked me). 10. Is he an outstanding scientist? (I asked her). 11. I like both classic and modern music. (He told me). 12. She has a nice apartment in the centre of the city. (He told me). 13. She is a lovely young woman. (I knew). 14. Will he join the construction team in June? (I asked him). 15. People of various nationalities take part in the conference. (He wanted to know). 16. I have got a ticket for the theatre. (She said). 17. I have already had dinner. (He told us). 18. Take a walk round this big building. (He told her). 19. I hope to have a short vacation in September. (He said). 20. Think about the future. (She told me).

XXVIII. Go back to the text 'The Game of Chess'. a) Write down your variant of the text; b) Be prepared to render the text in class.

XXIX. a) Read and translate the text below; b) Entitle it; c) Write several questions about the text to ask your class-mates at the next lesson.

You have just learned a story about some Indian king who wished (хотел) to thank his vizier for presenting him with the game of chess. You certainly remember that the vizier asked for one grain of wheat for the first square, two for the second, and so on, doubling the number of grains for each square on the board.

The sequence ([ˈsi:kwəns] последовательность, ряд) 1, 2, 4, 8... represents the vizier's request. In this sequence the ratio ([ˈreɪʃiəʊ] отношение, коэффициент) of each term to the preceding ([priːˈsiːdɪŋ] предшествующий) term is a constant, 2; that is 2:1, 4:2, 8:4 (ratio of 2 to 1), and so on. Any succession ([səkˈseʃən] непрерывный ряд) of terms in which there is a common (общий) ratio is a geometric progression [prəˈɡreɪʃən] (abbreviated G. P. [əˈbriːviɛt]). A geometric progression is a sequence of numbers obtained by repeated multiplication. If a , b , and c are three numbers in a G. P., then $b:a=c:b$.

Consider the first three terms in a geometric sequence. Let a represent the first term; and let r represent the common ratio. First term: $a=ar^0$ (power zero); second term: $a \cdot r^1$; third term: $a \cdot r \cdot r=ar^2$. For each term, the number of times r is used as a multiplier is 1 less than the number of the term. If the total number of terms in a G. P. is n , then to find the n -th or last term, r should be used as a multiplier $(n-1)$ times. That is, $b_n=ar^{n-1}$ (power $n-1$). In the chessboard G. P. 1, 2, 4, 8..., the value of a is 1 and r is 2. Since there are 64 squares on the chessboard, $n=64$. Then $b_{64}=1 \cdot 2^{64-1}$ or accordingly $b_n=2^{63}$. You can readily find the value of b_{64} by making use of logarithms [ˈlɒɡərɪðəm]; in standard form it is about 9.2×10^{18} . Assuming ([əˈsjumɪŋ] допущая) that a bushel contains approximately [əˈprɒksɪmətli] 540,000

grains of wheat, the vizier's request for the last square alone ([ə'lo-
un] только) amounted to well over (на много больше чем) one hundred billion bushels of wheat. The chessboard G. P. clearly represents an increasing *progression*. So does any G. P. with a positive first term in which the common ratio is a number *greater than 1*. Any such G. P. in which r is a positive number *less than 1* is called a *decreasing* sequence.

Classwork III

XXX. *Read these words and give their Russian equivalents.*

previous—previously; represent—representation, constant—constantly; succession—successive; common—commonly—uncommon; 'progress n —progressive—progression—pro'gress v ; repeat—repeated—repeating; multiplier—multiplicand; ready—readily; value—valuable—valueless—to evaluate—evaluation; use—useful—useless—uselessness—unused; assume—assumption; approximately—approximation—to approximate; to increase—to decrease; positive—positively.

XXXI. *Read the text 'The Game of Chess' aloud.*

XXXII. *Listen to your teacher's statements in connection with the text and either agree or disagree. If you disagree, say why.*

XXXIII. *Answer your teacher's questions in connection with the text.*

XXXIV. *Render the text. Work in pairs.*

XXXV. *Say the following in English.*

1. Он сказал, что знает эту игру. 2. Она сказала мне, что довольна моей работой. 3. Он сказал, что эта машина была изобретена группой ученых. 4. Он спросил меня, сосчитал ли я количество студентов в комнате. 5. Я хотела знать, увеличится ли производство этих компьютеров. 6. Они надеялись, что профессор останется в их лаборатории. 7. Какова другая альтернатива? 8. Он сказал мне, что постоянно думает о решении этого уравнения. 9. Я хотел знать, согласились ли они обсудить наш доклад. 10. Эта игра, кажется, очень популярна. 11. Все было сделано в соответствии с планом. 12. Вторая (последняя) из двух задач, данных выше, более трудная.

XXXVI. *Discuss the text of ex. XXIX. Work in pairs.*

LESSON 18.

Classwork I

Grammar:

The Subjunctive Mood. Conditional Sentences

I. *Compare the groups of sentences (a, b, c, d) given below.*

a) 1. If we have time tomorrow, we shall go on with our discussion. 2. We shall perform all the necessary operations provided you help us. 3. The article will be published unless he fails to present it in time. 4. If these students attend lectures in algebra, they are able to answer this kind of questions. 5. I am sure that if they worked systematically, they realized the program.

b) 1. If they tried to use this method, they would come across a lot of difficulties. 2. If they needed our assistance they would ask us for it. 3. He would not go into detail now if he did not want to know the whole situation. 4. She would not attend the conference tomorrow if she were not ready with her paper. 5. If the book were less complicated, I would write a review of it in a couple of days.

c) 1. He would have read his paper at the seminar provided he had been given more time. 2. The whole thing might not have happened provided they had been more careful. 3. He might have made that great discovery earlier if he had had better conditions for work. 4. I would not have agreed to take part in your investigation unless I had been sure of its importance.

d) 1. Were he there tomorrow, he would explain everything. 2. Were she here now, she would be able to tell us about the point of view of the head of their lab. 3. Had they obtained the information required, they would have certainly turned it over to us. 4. Had we not failed our recent experiment, we might have obtained some interesting results by now.

e) But for her (if it were not for her), we would not learn the truth. But for (if it had not been for) the teacher's help, the students would not have solved the problem.

II. *Compare these pairs of sentences. Mind the omission of the conjunction and the shift of the preposition.*

Give me the book about which you have told me.

Here is the man to whom I spoke in the morning.

I showed him the journal through which you have looked.

Give me the book you have told me about.

Here is the man I spoke to in the morning.

I showed him the journal you have looked through.

Words to be Learned

Follow your teacher. Read these international words and try to guess their meaning.

'brilliant *a*, universal [ˌjuːniˈvɜːsəl], gravi'tation, formu'lation, 'telescope, accuracy [ˈækjʊrəsi], to deduce, focus [ˈfoukəs] (*pl* foci [ˈfousai]), radius [ˈreɪdʒəs] (*pl* radii [ˈreɪdiəi]), 'vector, sec'torial, 'cube, pro'portion, 'orbit, acceleration [ækˌsele'reɪʃən], to in'duce, mass, mo'mentum, uniform [ˈjuːnɪfɔːm], im'pressed.

Follow your teacher.

'body тело, предмет
mankind [mænˈkaɪnd] челове-
чество
un'shaken непоколебимый
clarify [ˈklærɪfaɪ] прояснять,
уточнять
particular [pəˈtɪkjʊlə] 1. осо-
бый; 2. определенный
in particular в частности
describe [dɪsˈkraɪb] описывать
sun солнце
Earth [əːə] земля
motion [ˈmouʃn] движение
area [ˈeəriə] площадь, про-
странство
rate темп, скорость
mean *n* средняя величина
major [ˈmeɪdʒə] главный, ос-
новной
assumption [əˈsʌmpʃən] пред-
положение, допущение
compatible [kəmˈpætəbl] сов-
местимый, согласующийся
axis [ˈæksɪs] (*pl* axes [ˈæk-
sɪːz]) ось
weight [weɪt] вес
achieve [əˈtʃiːv] достигать

achievement достижение
possess [pəˈzes] обладать
towards [təˈwɔːdz] по направ-
лению (к)
furthermore [fəˈðəməː] более
того
surface [ˈsɜːfɪs] поверхность
mutual [ˈmjuːtʃʊəl] взаимный
view [vjuː] *n* взгляд; *v* разгля-
дывать, рассматривать
lead [liːd] (*led*) вести
fall (fell, fallen) падать
predecessor [ˈpriːdɪsesə] пред-
шественник
distinguish [dɪsˈtɪŋɡwɪʃ] 1. раз-
личать(ся), отличать(ся);
2. разглядеть
preserve [prɪˈzɜːv] сохранять
force *n* сила; *v* заставлять
compel [kəmˈpel] вынуждать
alter [ˈɔːltə] 1. изменять(ся);
2. переделывать
upon [əˈpɒn] *prep* на
ever [ˈevə] постоянно
require [rɪˈkwaɪə] 1. требовать;
2. нуждаться

Notes

1. a great deal — много
2. amounted to — равнялись
3. with the Sun being at a focus — с солнцем в фокусе
4. in its turn — в свою очередь

Laboratory Assignment I

III. a) *Follow the speaker. Practise the following for pronunciation.*

sh [ʃ]	c + i (+a, e, o)	ss + ion [jən]	t + ion [jən]	sure [ʃ]
	[ʃ]			
wash	social	discussion	action	as'sure

shine	sufficient	session	solution	en'sure
fashion	spacious	o'p'pression	direction	'pressure

b) *Compare these words.*

deal [i:]	dead [e]	dear [iə]	react [ri'ækt]*
cream	spread	clear	create [kri:'eit]
lead	'leather	fear	real ['riəl]

diameter [dai'æmitə], diagram ['daɪəgræm], geometry [dʒi'ɒmit-ri], geography [dʒi'ɒgrəfi], co-operate [kou'ɒpəreit], co-ordinate [kou'ɒ:dnit], biology [bai'ɒlədʒi], biography [bai'ɒgrəfi].

IV. *Follow the speaker as he is reading ex. I, II.*

V. *Follow the model and insert the required form of the verb.*

Sp.: It would be helpful if you (to find) the article.

St.: It would be helpful if you found the article.

1. It would be natural if they (to give) you their data. 2. It would be useful if they (to see) how you worked. 3. It would be natural if they (to stimulate) the research. 4. It would be very helpful if she (to make) these calculations.

VI. *Answer these questions.*

Sp.: What would you do to draw a straight line? (use a ruler).

St.: I would use a ruler to draw a straight line.

a) 1. What would you do to solve this problem? (find the value of the unknown). 2. What would you suggest for improving the situation? (some modification). 3. What would you do to be sure of the result? (check the result). 4. What would you suggest for evaluating this formula? (make use of the logarithms).

Sp.: Would you come if I asked you to? (to have time)

St.: Yes, I would come if I had time.

b) 1. Would you speak to him? (to know him). 2. Would you assist her? (to know how). 3. Would you learn French now? (to have more time). 4. Would you give them the data now? (to see them).

Sp.: What would you do if he were here? (*speak to him*).

St.: If he were here, I would speak to him.

c) 1. What would you do if you had more time? (learn French). 2. What would he do if he were in the lab? (help us). 3. What would she do if she were ready? (start immediately). 4. What would you do if you went home now? (do my homework).

VII. *Say the same thing using 'unless'.*

Sp.: I would not go there if I did not have to.

St.: I would not go there unless I had to.

* В данном случае стоящие рядом гласные относятся к разным слогам. Отдельно от последующих гласных произносятся и латинские приставки.

1. I would not speak to him if I did not know him well. 2. I would not agree to write this article if I did not know the subject. 3. I would not begin the work if I were not sure. 4. We would not be able to go on with the experiment if you did not help us.

VIII. *Change according to the model.*

Sp.: If he were ready, he would come.

St.: Were he ready, he would come.

Sp.: If he had been ready, he would have come.

St.: Had he been ready, he would have come.

1. If she were at home now, I should go and see her. 2. If they had finished the work, they would have told us about it. 3. If she were not late for the lecture, she could give you her notes. 4. If they had been asked to take part in the research, they would have agreed. 5. If he had had more time, he would have helped you. 6. If I were you, I should think about this proposal.

Homework I

IX. *Read these sentences and find out whether they express present, past or future situations. Translate them.*

1. If you wished to abbreviate the expression «geometric progression», you might write G.P. 2. If you had made use of logarithms, you could have found them very helpful. 3. If you used any such succession of terms, you would be using an arithmetic progression. 4. He could readily evaluate the formula, provided he applied his knowledge of logarithms. 5. If your teacher had introduced the law of exponents at the previous lecture, you could have made use of it for evaluating the result. 6. It would be rather unusual if they fulfilled our request now. 7. It would be rather unexpected if he did the work by himself. 8. If he had known about our difficulties, he would have certainly helped us. 9. If they had understood the situation, they would have acted differently. 10. I shall speak to him if I see him tonight.

X. *Refer these sentences to the past. Do it in writing.*

1. If he clarifies his statement, we can have a better understanding of the situation. 2. We could go on with our work if our assumption were correct. 3. If you know the length of the radius, you can easily find the diameter. 4. You would understand his work in case you knew the work of his predecessors in this area. 5. If the distance between the Sun and the Earth were less, the temperature on the surface of the Earth would be much higher. 6. If they describe the process in greater detail, it will be easier to make a correct conclusion.

XI. *Ask questions for which the sentences below could be answers.*

1. The first body has been constantly moving in the direction of the second one. 2. All planets move along certain orbits. 3. This sta-

tement has to be clarified. 4. The process needs further generalization. 5. A number of details have been clarified in the course of the experiment. 6. Everybody was greatly impressed by his brilliant solution of that complicated problem. 7. The rate of revolution can be easily estimated. 8. A falling body possesses acceleration. 9. He was compelled to agree to our decision. 10. The program has been fulfilled due to their mutual assistance. 11. The final results were not compatible with the ones we had expected. 12. The mean distance is to be carefully calculated. 13. The accuracy of these computations is particularly essential. 14. You have to distinguish between weight and mass. 15. We require a different view to this kind of reactions.

XII. Read the sentences below and say in which ones you can omit the conjunction and why. Translate these sentences.

1. The assumptions which he has made are compatible with our understanding of the problem. 2. The alterations which they were planning to make were particularly important. 3. He spoke of the motion which remained constant. 4. The knowledge of astronomy which you have is not enough to distinguish between these two phenomena. 5. He has agreed to speak on that particular subject, which means that he finds it very essential. 6. The weight of the body which has fallen down is easy to determine. 7. The force of gravity which acts on all the bodies on the Earth keeps these bodies on the surface. 8. He spoke of Newton's predecessors which showed that he knew the history of science very well. 9. They discussed the future of mankind which seemed to them quite optimistic. 10. The weight of the body which you are describing is easily determined.

Classwork II

XIII. Read these words. Translate them.

'theory, cre'ate, 'realize, bi'ology, co'ordinate, 'dialogue, re'action, re'union, reap'pear, bi'onics; im'pression, 'publish, 'social, ma'chine, ef'ficient, com'mercial, suf'ficiently, es'sentially, 'special, tech'nician, 'partial, 'ratio, i'nitial, i'nitiative, diffe'rential, gravi'tation, ex'pression, di'mension, 'Asia, 'tension, sure, as'sure, en'sure, reas'sure, ex'pansion.

XIV. Ask questions about each one of the sentences of ex. IX. Begin your questions with: 'Why', 'When', 'In what case', 'Under what condition', 'What', and so on.

XV. Refer the following sentences to the past. Translate the transformed sentences into Russian.

1. If you read this chapter, you will have a better understanding of the theory of universal gravitation. 2. If you had a detailed account of the situation, you would come to a different conclusion. 3. If the child is careful, he will not fall down. 4. They will let us know as soon as they come to an agreement. 5. He could obtain more accu-

rate results provided he observed all the rules. 6. If we discussed the major problems facing us, instead of the details, we could realize our plan more successfully. 7. Were the force applied greater, the body would move more rapidly. 8. You will certainly try to find a different solution provided you consider his assumption.

XVI. *Answer the following questions. Mind the tense forms.*

T.: Could you help her? (she, to ask me about it)

St.: Yes, I could help her, *if she asked me about it.*

1. Can you find the mean distance? (I, to know the rate of motion). 2. Will they alter the procedure? (they, to be given enough time). 3. Could they apply these new concepts and principles? (they, to know them). 4. Could he come earlier? (he, to have to). 5. Would they consider the whole situation? (they, to know the details). 6. Would he take his entrance exams? (he, to be ready). 7. Will they develop this branch of industry? (they, to find it essential and necessary).

XVII. *Complete the following sentences.*

T.: She would have done it. (she, to follow his advice).

St.: Yes, *I am sure* she would have done it *if she had followed* his advice.

1. He would try to explain everything. (they, to want to listen to him). 2. You would have obtained a correct answer. (you, to be more accurate). 3. They would have published his article. (he, to present it in due time). 4. She would take part in this competition. (she, not to be so lazy). 5. They would do independent research. (conditions of work, to be better). 6. They would have agreed to your plan. (you, to have better argumentation). 7. They could construct that building within a very short time. (a proper place, to be found). 8. We can reproduce this process in our lab. (conditions, to make it possible).

XVIII. *Ask questions to which the sentences below could be answers.*

1. The history of mankind is full of dramatic facts. 2. We expected that he would clarify his point of view. 3. I was interested in this particular bit of information. 4. The average amount of population in this country has remained constant for a considerable period of time. 5. Such a decrease of production cannot be accounted for. 6. They easily came to a mutual agreement. 7. They have been compelled to alter their original plan. 8. These are the major facts to be taken into consideration. 9. The acceleration this particular body possesses is not constant. 10. The words «mean» and «average» sometimes mean the same thing. 11. Stars and planets move along certain orbits. 12. A lot of additional information was required and they had to obtain it.

XIX. a) *Listen to the new words of the lesson as read by your teacher*; b) *Read the text 'Isaak Newton' and find in it answers to the following questions.*

1. What are the two great achievements of Isaak Newton? 2. Whom were a great number of observed data collected by? 3. What was Kepler's deduction? 4. What is the acceleration of each planet towards the Sun inversely proportional to? 5. Did Newton's predecessors distinguish between mass and weight? 6. How many laws of motion did Newton formulate?

Isaak Newton

Sir Isaak Newton (1643—1727) was a brilliant English mathematician and physicist. It is justly believed that he is one of the greatest men of science in the history of mankind.

Newtonean theory of universal gravitation and his formulation of the basic concepts and principles of mechanics are known as his two great achievements. They have made possible the creation of a physical picture of the Universe which remained unshaken until the beginning of the 20th century. It is very important for us to examine, in some detail, the concepts he introduced and clarified in the course of his work.

Ever since Galileo had invented his telescope men had been studying the motions of the planets with ever increasing interest and accuracy. In particular, a great deal¹ of observed data had been collected by Tycho Brahe, a Danish astronomer (1546—1601). From these Kepler deduced his famous three laws describing the motion of the planets about the Sun. They amounted to²:

- (1) The planets describe ellipses, with the Sun being at a focus³.
- (2) The radius vector joining the Sun with the planet describes equal areas in equal times, i. e. (that is) the rate of description of sectorial area is constant.
- (3) The cubes of the mean distances of the planets from the Sun are proportional to the squares of their times of revolution, i. e. if $2a$ is the major axis of the elliptic orbit and t is the periodic time, then we have $t^2 \propto a^3$.

Newton was able to show that these laws were compatible with the assumption that each planet possesses an acceleration towards the Sun which is inversely proportional to the square of their distance from it. Furthermore, he believed that this acceleration was of the same nature as the acceleration of bodies falling near the Earth's surface. This generalization led him to the concept that all bodies taken in pairs, induce in each other mutual acceleration. Translating this into terms of force required a new principle and Newton supplied this principle in his law of: «action and reaction» — and this in its turn⁴ provides us with a view of mass not possessed by any of Newton's predecessors. This concept distinguishes between mass and weight. The laws of motion which Newton published in his *Principia* amount to the following:

Law I. Every body preserves in its state of rest or of uniform motion in a straight line unless it is compelled to alter that state by impressed force.

Law II. Change of momentum is proportional to the impressed force and takes place along the line of action of that force.

Law III. Action and reaction are always equal and opposite; that is to say, the actions of two bodies upon each other are equal and directly opposite.

Laboratory Assignment II

XX. *Listen and repeat. Guess the meaning of the words in italics.*

'brilliant—'brilliantly; justly—just a—'justify; uni'versal—uni-ver'sality; formulation—to 'formulate—'formula; basic—'basically; a'chievement—to a'chieve; 'possible—im'possibility; cre'ation—cre-'ator—cre'ative; 'clarify—clarifi'cation; 'motion—'motionless; 'accuracy—'accurate a—in'accurate a; par'ticular—par'ticularly; to des'cribe—des'cription; 'distance—'distant a; revo'lution—to re'volve; 'axis—'axial; 'orbit—'orbital; as'sumption—to as'sume; ac'cele'ration—to ac'celerate; 'mutual—'mutually; to re'quire—re'quirement; mass—'massive; 'uniform—uni'formity; to 'alter—alte'ration—al'ter-native n, a; to im'press—im'pression—im'pressive; 'action—re'ac-tion—re'actionary; 'opposite—to op'pose—,oppo'sition.

XXI. *Answer the speaker's questions.*

Sp.: In which case could you come? (I, to have time)

St.: I could come if I had time.

a) 1. Under what condition could they finish the work? (they, to have more information). 2. In what case would they follow this method? (they, to find it appropriate). 3. Under what condition would she join the discussion? (she, to find it interesting). 4. In which case would you agree to speak to him? (I, to be sure of the result).

Sp.: Will you come? (I, to be in Moscow)

St.: Yes, I'll come *provided I am in Moscow*.

Sp.: Would you help her? (she, to need my help)

St.: Yes, I would help her *provided she needed my help*.

b) 1. Will she go to college? (she, to work hard). 2. Would he live in the hostel? (he, to be allowed). 3. Would he go to his home town for a vacation? (he, to pass his exams well). 4. Would you consider his request? (I, to know all the details). 5. Will she defend her thesis in October? (she, to present it in time). 6. Would he get this appointment? (he, to graduate successfully).

XXII. *Say the same in a different way using inversion.*

Sp.: *If he were in Moscow, he would come.*

St.: *Were he in Moscow, he would come.*

Sp.: *If they had obtained the expected result, they would have told us.*

St.: *Had they obtained* the expected result, they *would have told* us.

1. If she were married, we should know about it. 2. If he had been asked to read his paper at the conference, he would have agreed. 3. If she were at the theatre to-night, she would enjoy the play. 4. If I had recognized him, I should have spoken to him. 5. If he were in Moscow, we should ask him to come to our place for the weekend.

XXIII. *Insert the conjunction wherever necessary.*

Sp.: Here is the book he gave me. (which, whom, that)

St.: Here is the book *which* he gave me.

1. Here is the man I have told you about. 2. Give me the article they have published. 3. Here is the result we expected. 4. Show me the computer you are going to place in your lab. 5. The student I have spoken to you about is in the next room. 6. Here is the equation he could not solve. 7. Show me the program your group must fulfil. 8. The increase of production they are planning is not realistic.

XXIV. *Open your text-book. Listen to the speaker as he is reading the new words of the lesson.*

XXV. a) *Follow the speaker as he is reading the text 'Isaak Newton';* b) *Listen to the text again without looking into your book.*

XXVI. *Listen to these questions and write down your answers (+, -).*

1. Are we justified in saying that Newton is one of the greatest scientists in the history of mankind? 2. Is the physical picture of the Universe the same now as it was at the time of Newton? 3. Was the telescope invented by the Danish astronomer Tycho Brahe? 4. Did Kepler deduce his famous laws on the basis of the observed data collected by his predecessors? 5. Does each planet possess an acceleration towards the Sun? 6. Did Newton distinguish between mass and weight? 7. Does every body preserve its state of rest under the action of applied force? 8. Are action and reaction always equal and opposite?

Homework II

XXVII. *Arrange the words of ex. XX according to the parts of speech they belong to.*

XXVIII. *Ask questions for which the following could be answers.*

1. It is believed that the language of mathematics is Universal. 2. He was compelled to change his point of view after some discussion. 3. Every physical body possesses weight and mass. 4. They require more information on the subject than they have at the moment. 5. I am not satisfied with your description of the phenomenon which is being considered. 6. Your conclusion is not compatible with the

results obtained in our lab. 7. His views remain unshaken. 8. The average rate of motion is to remain constant. 9. Students have to distinguish between these two types of equations. 10. The area of the surface of the cube must be doubled. 11. Human relations must be based on mutual respect and understanding. 12. Increase of production requires a lot of additional work.

XXIX. *Insert the missing conjunctions wherever necessary. Translate these sentences.*

1. The laws Newton discovered are widely used in physics and mechanics. 2. This is a type of equation you can easily understand. 3. One of the problems this scientist is working at is the problem of controlled thermonuclear reactions. 4. The problem this postgraduate is trying to solve is of great practical value. 5. The situation they had to face was a very unpleasant one. 6. He provided me with the information I needed for further work. 7. One of the advantages this computer has is its ability to solve various kinds of problems. 8. The methods of control they were going to use were unacceptable. 9. The description of the experiment they have made was very accurate. 10. The major advantage of the system the teacher was speaking about seemed essential.

XXX. *Give the required form of the verb.*

1. In case he remains in Moscow, he (to work) at their department. 2. In case he were more careful, he (to give) a correct answer. 3. Had he known the time of the meeting, he (to inform) you about it. 4. Had he asked me about it, I (to play) chess with him. 5. He will certainly help you if you (to have) any difficulties. 6. If you added three to the given numbers you (to get) the required sum. 7. She would have acted differently provided she (to understand) the situation. 8. If you studied hard, you (to manage) to achieve your task. 9. You would not succeed with your experiment unless you (to take into account) every detail. 10. They would not have asked you to take part in the discussion unless they (to be sure) of its importance. 11. We could have given a proper answer to your question provided we (to have) more time. 12. If he were late, we (not to meet) our friends at the station.

XXXI. *Go back to the text 'Isaac Newton'. Write a plan of the text that will help you while speaking about Newton in class. You may supply your story with some additional information about Newton, if you like.*

XXXII. a) *Read and translate the text. You may guess the meaning of some of the international words.*

Newton realized that a body possesses an invariable ([in'veəriəbl] постоянный) property known as mass and that, when it possesses an acceleration f then the force acting on the body will be $P = kmf$, where k is a constant of proportionality. In modern notation

Law II would be written as follows: Force $\propto \frac{d}{dt} (mv)$ or $m \frac{dv^*}{dt}$ when the mass m does not artificially (искусственно) change with time. Thus we see that since the weight of a body is force mg , it can vary ([v'eəri] изменяться) if g varies, whereas ([w'eər'æz] тогда как) the mass m will at the same time remain constant. Furthermore (более того), the masses of two bodies could be accurately compared if these bodies were weighed in the two pans (чаши) of a balance and the weight of any one body could be found if it were weighed with a spring balance (пружинные весы). If we suppose that the unit of measurement (измерение) is chosen appropriately, we can write $k=1$ and define Law II as Force=mass $\times$ acceleration.

Unfortunately Newton defined mass as density (плотность) $\times$ volume (объем), and since density involves the idea of mass, this «definition» is clearly not adequate [ædikwɪt].

b) Now that you have translated the text, entitle it and get ready to render it in class giving only the gist (суть) of the text. Write two or three questions to ask your class-mates.

Classwork III

XXXIII. a) Read these words and give their Russian equivalents.

just *a*—unjust; physicist—physics; great—greatness—greatly; formulation—unformulated; me'chanics—me'chanical; to in'vent—in'ventor—in'ventive; to in'crease—to de'crease; to col'lect—col'lection—col'lective *a*; to de'duce—de'duction—de'ductive; to des'cribe—des'criptive; to ob'serve—obser'vation—ob'server; 'period—peri'odic—perio'dicity; 'able—a'bility—ina'bility; com'patible—incom'patible—compati'bility; to be'lieve—be'lievable—unbe'lievable; to 'generalize—generalization; to act—active—ac'tivity—in'active; direct *a*—di'rectness; to in'duce—in'duction.

b) Go back to ex. XX. Read the words in italics and give their Russian equivalents.

XXXIV. Read the text 'Isaak Newton'.

XXXV. Listen to your teacher's statements and say whether they are true or false. Why?

XXXVI. Answer your teacher's questions in connection with the text.

XXXVII. Render the text 'Isaak Newton'. Work in pairs.

XXXVIII. Say the following in English.

1. Вы не получите ожидаемого результата, если они не помогут вам. 2. Если бы вы вчера присутствовали на его лекции, то вы из-

* f (force) is proportional to the first derivative of (mv) , or f is proportional to m multiplied by the derivative of v .

менили бы свою точку зрения. 3. Будь он готов, он мог бы завтра сдать экзамен вместе с нами. 4. Знай она тогда правду, она была бы более осторожной. 5. Он мог бы работать на кафедре дифференциальных уравнений, если бы решил остаться в Москве. 6. Если бы они знали английский, они могли бы принять участие в недавней международной конференции. 7. Мы бы поехали на каникулы домой в случае, если бы мы сдали экзамены в начале следующего месяца. 8. Мы были бы очень рады, если бы они согласились проводить исследование вместе с нами.

XXXIX. *Discuss the text of ex. XXXII. Either render it or ask and answer questions about it.*

Home-reading

Mathematics and Computation

In the minds of a great many people the terms «mathematics» and «calculations» are synonymous. To be a great mathematician is to be a rapid computer. The idea is superficial. It is true that some of the great mathematicians were also skilled and accurate computers. But those were the exceptions. As a rule rather the contrary is the case. To take but one example, let us quote a statement made by Henri Poincare, one of the greatest mathematicians that ever lived: «As to myself, I have to admit that I am absolutely unable to perform an addition without making a mistake» (Science et Methode, Paris, 1909).

In some branches of mathematics calculations do play a very minor role. Any high school student, past or present, who studied a course in plane geometry found that out for himself. But even when calculations are used in a mathematical problem, they are seldom the core of the matter.

If a mathematician has to answer a problem which calls for a number, he may have to do some calculations to obtain the required result. However, the essential part of the solution of the problem is not the computation, but the reasoning process which enables the mathematician to choose the appropriate computation. It is this intellectual effort of analyzing the situation that constitutes the mathematical character of the problem.

You, certainly, remember the wolf-goat-cabbage riddle (загадка о волке, козе и капусте) which is an illustration very much to the point.

In this case the most important thing is not the arithmetical skill of the solver of the problem but his intellectual ability to understand the interrelations involved.

Below are two other examples of this kind.

Problems: 1. If each boy at a picnic were given three apples from the available supply, one of the boys would have to be satisfied with

only two apples. If each boy were given two apples, eight apples would remain. How large was the supply of apples?

2. Two automobiles start out at 7. a. m., one from A going to B and the other from B going to A . The first automobile covers the distance in 8 hours and the second in 12. At what hour of the day will the two automobiles pass each other?

Solutions:

1. Each boy will have two apples if we take one apple from him. Thus we shall get eight apples. Hence the supply of apples consists of $8 \times 3 + 2 = 26$ apples.

2. The speeds of the two cars are inversely proportional to the time it takes them to cover the distance AB , hence the ratio of these speeds is equal to $12:8=3:2$, and the distances the two cars cover in the same length of time are proportional to their speeds, that is $3:2$. At the time when the two cars meet, the car from A and the car from B will have covered, respectively, $\frac{3}{5}$ and $\frac{2}{5}$ of the distance AB . The time the car from A travelled to reach the meeting point is $\frac{3}{5}$ of 8 hours, that is 4 hours and 48 minutes, so the cars meet at 11.48 a. m.

PART III

LESSON 19

Classwork I

Grammar:

The Gerund. Its forms and functions

1. Read the sentences below. Define the functions and the forms of the Gerund. Name the predicate in every sentence of a, b, c.

a) 1. Writing a sentence in algebraic way, as we have seen, involves two steps. 2. Knowing the properties of equality will help you decide whether a sentence is true or false. 3. Performing the first operation made possible further steps. 4. Locating this point on the y axis gives you the first point on the line.

b) 1. The young scientist began experimenting. 2. Reducing a fraction means bringing it to lower terms. 3. Our task is proving the correctness of the given statement. 4. The researchers began looking for another solution.

c) 1. I remember having seen an article on the subject somewhere. 2. We must consider trying this idea in our experiment. 3. You should avoid giving too general definitions in this case. 4. We expected being given further assistance. 5. Children like being told funny stories.

d) 1. You have already learned to use parentheses as a means (средство) for indicating that one group of terms is to be multiplied by another group of terms. 2. The idea of using symbols instead of words proved very helpful. 3. The procedure of reducing a fraction to its lowest terms is not complicated, provided you observe the necessary rules. 4. The attempt of introducing this principle in research has brought about much difficulty. 5. The period of collecting statistical data has come to an end.

e) 1. In factoring, like in all other algebraic processes, the first step is always to make a careful study of the given expression. 2. In other words, you change the two of the three signs without actually changing the value of the fraction. 3. The product may be found by multiplying the factors contained in the given mathematical sentence. 4. Before trying to multiply terms containing letters, let us summarize the basic facts you will need to remember for performing multiplication. 5. On obtaining the data the scientists went on working. 6. We cannot agree to testing the new method without being given additional time.

II. Compare the Gerund and the Participle in the sentences below.
In every case state the subject and the predicate.

Gerund

a) 1. Reading such books is necessary.

2. Knowing these rules will help you.

3. Finding a proper answer will make it possible...

4. Speaking English well is rather difficult.

b) 1. In comparing the circuits we found...

2. By bringing in this example they can show...

3. In solving these equations one must be very careful with the signs one uses.

Participle

1. Reading such books we obtain...

2. Knowing these rules you will be able to...

3. Finding a proper answer they can...

4. Speaking English during the lesson students will...

1. Comparing the circuits we could see...

2. Bringing in this example they will be able to...

3. Solving these equations one may expect to...

Homework I

Words to be Learned

Read these words and guess their meaning.

Babylonia [bəbi'louniə] *n*, Egypt ['i:dʒipt] *n*, pyramid ['pirəmid] *n*, Egyptian [i'dʒɪpən] *a*, Greece [ɡri:s] *n*, Greek [ɡri:k] *a*, intriguing [in'tri:ɡɪŋ] *a*, mysterious [mis'tiəriəs] *a*, Euclid ['ju:klɪd], object ['ɒbdʒɪkt] *n*, 'segment *n*, fundamental [ˌfʌndə'mentl] *a*, end-point *n*, every'day *a*.

Read these words.

earth [ə:ə] земля

land земля

di'rection направление

volume ['vɒljum] объем

spread (spread) распростра-
нять(ся)

sequence ['si:kwəns] последо-
вательность

improve [im'pru:v] улучшать,
исправлять

letter 1. буква; 2. письмо

straight [streɪt] прямой

imagine [i'mædʒɪn] вообра-
жать, представлять себе

ex'tend простирается

ex'tension протяженность, рас-
ширение, продолжение

com'plete *v* заканчивать; *a* пол-
ный, завершённый

di'mension размер

sky небо

dot точка

refer (to) [ri'fə:] ссылаться, от-
сылать; иметь отношение к

prove [pru:v] 1. доказывать;
2. оказываться

capital ['kæpɪtəl] 1. главный,
основной; 2. прописная (за-
главная) буква

location [lou'keɪʃən] 1. опреде-
ление местонахождения;

2. расположение

figure ['figə] 1. цифра; 2. рису-
нок, фигура

avoid [ə'void] избегать

in'sist(on) настаивать (на)

worth [wə:ə] стоящий, заслу-
живающий

in'clude включать
 shape форма, очертание
 space пространство
 feel (felt) чувствовать
 measurement ['mezəment] из-
 мерение, мера
 move [mu:v] двигать(ся)

pre'vent (from) мешать, пред-
 отвращать.
 suggest [sə'dʒest] предлагать
 common ['kɒmən] общий
 succeed (in) [sək'si:d] добить-
 ся успеха
 object [əb'dʒekt] возражать

Notes

1. Egyptians were mostly concerned with — египтян главным образом интересовало
2. В. С. — до нашей эры (до Рождества Христова)
3. put into a logical sequence — дать в логической последовательности
4. think of a point as — представьте себе точку как
5. points are commonly referred to — обычно точки называют

III. a) *Ask questions using the question words in brackets; b) State the function of the Gerund; c) Translate the given sentences.*

1. By applying your knowledge of geometry you can locate the point in the plane. (how). 2. In measuring the volume of an object one must be very careful. (when). 3. We discussed improving the shape of the model. (what). 4. Imagining the shape of the earth is easy. (what). 5. We cannot draw a complete picture of cosmic space without knowing the dimensions of the Sun. (why). 6. In naming geometric objects we often use capital letters. (when). 7. Drawing a straight line in one direction gives you a one way extension. (what). 8. Instead of being moved to the right the dot is moved to the left. (where). 9. The researchers expected being included in the experimental group.

IV. *Translate the following sentences.*

1. The method is certainly worth applying. 2. I suggested measuring this object. 3. He remembered having seen her at the last conference. 4. He insisted on following the model developed by them. 5. We consider repeating their experiment. 6. You should avoid changing the direction of your further investigation. 7. He suggested exchanging information on the subject. 8. They could not avoid including him in their research group.

V. *Write questions to which the sentences below could be answers.*

1. Both geometry and algebra deal with equations. 2. One can easily measure the amount of work performed. 3. Mathematical measurements have many practical uses. 4. Nowadays information spreads all over the world within a few hours, if necessary. 5. This me-

thod can be applied for measuring volumes. 6. One, two, three, four, and so on make a sequence of numbers. 7. I cannot imagine how one can draw this line without using a ruler. 8. It is possible to find the location of this object in space. 9. The complete picture of the object includes both its dimensions. 10. Knowing fundamental rules is important. 11. Drawing a long straight line without a ruler is not easy. 12. This terminology needs improving. 13. Both the Sun and the Earth move constantly. 14. One cannot feel how the Earth moves.

VI. a) Read the text to follow without consulting the dictionary to get its general idea; b) After you have read the text, analyse the sentences you find difficult to understand and translate them. Pay special attention to sentences 3, 4, 13, 16, 18, 19, 20, 22, 24, 26. Consult the dictionary whenever necessary; c) Read the same text again. You will have to discuss it during the lesson.

The Meaning of Geometry

1. Geometry is a very old subject. 2. It probably began in Babylonia and Egypt. 3. Men needed practical ways for measuring their land, for building pyramids, and for defining volumes. 4. The Egyptians were mostly concerned with¹ applying geometry to their everyday problems. 5. Yet, as the knowledge of Egyptians spread to Greece the Greeks found the ideas about geometry very intriguing and mysterious. 6. The Greeks began to ask "Why? Why is that true?" 7. In 300 B. C.² all the known facts about Greek geometry were put into a logical sequence³ by Euclid. 8. His book, called Elements, is one of the most famous books of mathematics. 9. In recent years men have improved on Euclid's work. 10. Today geometry includes not only the study of the shape and size of the earth and all things on it, but also the study of relations between geometric objects. 11. The most fundamental idea in the study of geometry is the idea of a point. 12. We will not try to define what a point is, but instead discuss some of its properties. 13. Think of a point as⁴ an exact location in space. 14. You cannot see a point, feel a point, or move a point, because it has no dimensions. 15. There are points (locations) on the earth, in the earth, in the sky, on the sun, and everywhere in space. 16. When writing about points, you represent the points by dots. 17. Remember the dot is only a picture of a point and not the point itself. 18. Points are commonly referred to⁵ by using capital letters. 19. The dots below mark points and are referred to as point A, point B, and point C.

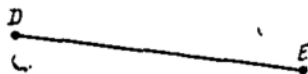
•A

•B

•C

Lines and Line Segments

20. If you mark two points on your paper and, by using a ruler, draw a straight line between them, you will get a figure. 21. The figure below is a picture of a line segment.



22. Points *D* and *E* are referred to as endpoints of the line segment. 23. The line segment includes point *D*, point *E*, and all the points between them.

24. Imagine extending the segment indefinitely. 25. It is impossible to draw the complete picture of such an extension but it can be represented as follows.



26. Let us agree on using the word line to mean a straight line. 27. The figure above is a picture of line *DE* or line *ED*.

VII. Write down the translation of sentences 3, 4, 13, 18, 19, 20, 22, 24, 26 from the text above.

Laboratory Assignment I

VIII. Follow the speaker as he is reading the words. Pay special attention to the stress.

'meaning, 'measure, 'object *n*, building, 'Egypt, 'subject, *n*, 'volume, 'problem, 'knowledge, 'sequence, 'famous, 'recent, 'also, 'study, 'point, 'picture, 'common, 'paper, 'figure, 'segment, 'ruler;

e'xact, pre'sent, re'fer, be'low, in'clude, be'tween, com'plete, extend, a'gree, ap'ply, im'prove, re'late, ob'ject *v*, sub'ject *v*;

'probably, ge'ometry, 'pyramid, 'property, 'capital, 'separate, 'multiply, 'calculate, 'definite, 'transitive, mys'terious, in'definite;

,funda'mental, ,neces'sarily, uni'versity, ,elec'tricity.

IX. Repeat these words after the speaker. Guess the meaning of the words in *italics*.

mysterious—*mystery* *n*—to *mystify*; measure *n*, *v*—measurement—*measurable*—*measurability*—*immeasurable*; to improve—*improvement*; to imagine—*imagination*—*imaginable*; to extend—*extensive*; complete *a*—to complete—*completion*; to include—*to exclude*—*inclusion*; shape *n*—to shape—*shapeless*; to move—*movable*—*immovable*; sun—*sunless*; to refer—*reference*; location—*to locate*—*local*—*locally*, size—*sizeless*; between—*betweenness*; demension—*demensional*; common—*commonly*—*uncommon*; indefinitely—*definite*; land—*landless*.

X. Change the following according to the model.

Sp.: I like to *get up* early. (he)

St.: He also likes *getting up* early.

a) 1. He begins *to work* at 9 o'clock. (we). 2. I expect *to see* him. (she). 4. We expect *to go* there today. (I). 5. She continued *to translate* the text. (they).

Sp.: *Do not tell* him about it.

St.: *It's no use telling* him about it.

b) 1. *Do not go* there now. 2. *Do not begin* the experiment tomorrow. 3. *Do not speak* to him. 4. *Do not attend* that seminar. 5. *Do not discuss* it with her.

Sp.: I am afraid *to go* there.

St.: Are you really afraid *of going* there?

c) 1. I am afraid *to tell* him this news. 2. He is afraid *to take* his exam. 3. She is afraid *to speak* to him. 4. I am afraid *to begin* the work.

Sp.: *Was* he *able to come* in time?

St.: Yes, he *succeeded in coming* in time.

d) *Was* she *able to present* her thesis? 2. *Were* they *able to publish* that article? 3. *Were* you *able to find* the data? 4. *Will* he *be able to solve* the problem? 5. *Will* she *be able to change* the program?

Sp.: It is important *to know* these rules.

St.: Yes, *knowing* these rules is important.

e) 1. It is important *to discuss* the question today. 2. It was necessary *to produce* that information. 3. It will be interesting *to find* that result. 4. It is important *to locate* the point in space.

Sp.: He *multiplied* the numerals and found the product.

St.: He found the product *by multiplying* the numerals.

f) 1. He *drew* a straight line and *cut* the segment. 2. She *performed* the operation of subtraction and found the difference. 3. I *used* a ruler to draw a straight line.

XI. *Listen to the new words of the lesson and repeat them after the speaker.*

XII. *Follow the speaker as he is reading the text 'The Meaning of Geometry'.*

XIII. *Listen to the questions. Write down your answers (+, -).*

1. Is geometry an old subject? 2. Did geometry begin in England? 3. Were Egyptians mostly concerned with the practical use of geometry? 4. Did the knowledge of Egyptians spread to Greece? 5. Is Euclid's book called *Elements* famous? 6. Does geometry include only the study of the shape and size of objects? 7. Is the idea of a point fundamental in geometry? 8. Can one feel, see, move or hold a point? 9. Has a point any dimensions? 10. Are points represented by dots? 11. Does a line segment include its endpoints? 12. Can you draw a straight line by using a ruler?

Classwork II

XIV. *Read these words and stress them properly.*

expect, dislike, geometry, single, agree, simple, capital, indicate, about, specify, famous, fundamental, property, university, planet, contain, exist, discuss, conclude, knowledge, indefinite, refer, communication, mechanical, dissertation, academy, academic, decimal, subject *n*, subject *v*, object *n*, object *v*.

XV. *Go back to ex. IX. Read the words and give Russian equivalents of the words in italics.*

XVI. *Ask your class-mates questions about the sentences of ex. V you have written at home.*

XVII. *Read the text 'The Meaning of Geometry' and translate sentences 3, 4, 13, 16, 18, 19, 20, 22, 24, 26.*

XVIII. *Listen to your teacher's statements and say whether they are true or false. If you think they are false, say why. Begin your statements with: 'I am afraid you are wrong', 'As far as I know', 'I don't think so'.*

XIX. *Answer your teacher's questions in connection with the text.*

XX. *Before you begin working with the text 'Points and Lines' read these words and guess their meaning.*

'alphabet *n*, 'definite *a*, lo'cation, sub'set *n*, to lo'cate, to 'differ (from), 'abstract *a*.

You can guess the meaning of the words: 'arrow' ['ærou] n, 'ray' n and 'vertex' n from the context.

Read these notes.

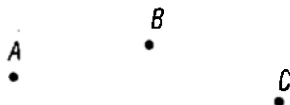
1. serve as models — служат в качестве моделей
2. have in common — имеют общее

Read the text and render it either in Russian or in English.

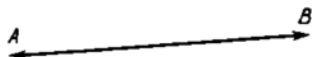
Points and Lines

1. The world around (вокруг) us contains many physical objects from which mathematicians have developed geometric ideas and these objects can serve as models¹ of the geometric figures. 2. The edge (ребро) of a ruler, or an edge of this page is a model of a line. 3. We have agreed to use the word line to mean straight line. 4. A geometric line is the property these models of lines have in common², it has length but no thickness (толщина) and no width; it is an idea. 5. A particle (частица) of dust (пыль) in the air (воздух), or a dot on a piece of paper is a model of a point. 6. A point is an idea about an exact location; it has no dimensions. 7. We usually use letters of the alphabet to name geometric ideas. 8. For example, we

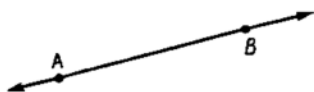
speak of the following models of points as point A , point B , and point C .



9. We speak of the following as line AB or line BA .



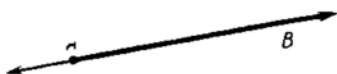
10. The arrows on the model above indicate that a line extends indefinitely in both directions. 11. Let us agree to use the following figure to name a line. The symbol $\overleftrightarrow{AB}$ means line $\overleftrightarrow{AB}$. 12. Can you locate a point C between A and B on the drawing of $\overleftrightarrow{AB}$ above? 13. Could you locate another point between B and C ? 14. Could you continue this process indefinitely? Why? 15. Because between any two points on a line there is another point. 16. A line consists of (состоит из) a set of points. 17. Therefore, a piece (часть, кусок) of the line is a subset of the line. 18. There are many kinds of subsets of a line. 19. The subset (piece) of $\overleftrightarrow{AB}$ shown below is called a line segment as you might remember from the above.



20. The symbol for line segment AB is marked as follows: $\overline{AB}$ (segment AB). 21. You already know that points A and B are the endpoints of the segment. 22. A line segment is a set of points consisting of the two endpoints and all of the points on the line between them. 23. Notice that the symbol for a line segment ($\overline{AB}$) contains the letters naming the endpoints, that is, only the endpoints need to be given while naming a line segment.

24. How does a line segment differ from a line? 25. Could one measure the length of a line? Of a line segment? 26. You can judge ([d3Λd3] судить) from the above that a *line segment* has definite length but a *line* extends indefinitely in each of its two directions.

27. Another important subset of a line is called a ray. 28. The part of $\overleftrightarrow{AB}$ shown in black (черный) below is ray AB and the symbol for it is a one way arrow over $\overleftrightarrow{AB}$.



29. A ray has 'infinite (бесконечный) length and only one end-point which is called a vertex ['vɜ:tɜ:ks].

30. Traditionally, the symbol $\overleftrightarrow{AB}$ in geometry might represent a line, a line segment, or a ray. 31. We draw the figure that is to be named above the letters ($\overleftrightarrow{AB}$, $\overline{AB}$, $\overrightarrow{AB}$) to e'liminate (исключить) the possible ambiguity ([,æmbi'gju:iti] двусмысленность).

32. It should be emphasized ([,emfəsaiz] подчеркивать) that in the drawings given above you see pictures of a line, a line segment, and a ray and not the geometric ideas they represent. 33. Let us agree that to draw a geometric figure means to draw its picture. 34. Obviously ([,ɔbviəsli] очевидно), if a geometric figure, being formed by a set of points, is an 'abstract 'concept, it cannot be seen. 35. Therefore we draw pictures of geometric figures just as we write numerals for numbers.

Homework II

XXI. Translate these combinations of words.

the location of the given point; the vertex of MN ; the arrows indicating both directions; definite length; the people around us; the thickness and the width of this geometric object; particles of dust in the air; the edge of this book; does not extend indefinitely; a geometric figure; words consist of letters; sentences consist of words; a piece of good luck; the book contains a lot of pictures; to judge correctly; to differ in many respects from; to eliminate wars; to avoid the ambiguity; to emphasize certain facts; obvious things; figures formed by; infinite discussions.

XXII. Combine the pairs of sentences changing the first one into the Gerund Construction (written).

We might change our plans. We think of doing it.

We think of changing our plans.

1. I collect information for my scientific paper. I am busy doing it. 2. We should find an appropriate answer to this question. We are interested in it. 3. Scientists from different countries ought to exchange views and information. International conferences help in this. 4. You can measure the length of the segment. A ruler will help you in it. 5. They wanted to solve this problem. They were interested in it. 6. She does not discuss it with him. She avoids doing it.

XXIII. Complete these sentences using the Gerund.

1. I think of... 2. They have recently succeeded in... 3. He suggested... 4. You should avoid... 5. He objected to... 6. I expect... 7. She avoided... 8. They prevented us from... 9. The book is worth... 10. The article is worth...

XXIV. Compare the ing-forms in these sentences and translate the sentences.

1. Measuring land is impossible without special instruments. 2. Measuring the length of a segment one must use a ruler. 3. He is defining the volume of a geometric object. 4. The teacher spoke of defining volumes. 5. Geometry presented practical ways for obtaining information about the size and shape of various objects. 6. Obtaining that information we shall be able to extend our knowledge of space. 7. Extending a line indefinitely can be represented symbolically with the help of arrows indicating opposite directions. 8. Now I am extending the given line both to the left and to the right. 9. We use these figures for eliminating ambiguities. 10. Knowing the length and the width of an object is necessary for finding its volume. 11. Physical objects consist of particles moving about. 12. Emphasizing this fact is very important.

XXV. *Write questions to which the given sentences are the answers.*

1. We use the edge of a ruler for drawing a line. 2. He continued preparing for the conference. 3. Those particles have much in common. 4. The direction is shown by the arrow. 5. Dust particles move in all directions in the air. 6. The book consists of six chapters. 7. A particle may serve as a model of the Earth. 8. The letter *B* names the common vertex of the given rays.

XXVI. *Read the text 'Points and Lines' and analyse the sentences you find difficult to understand. Pay special attention to sentences 1, 3, 4, 7, 23, 26, 31, 34. Translate them in writing.*

XXVII. a) *Write a short summary of both of the texts of the lesson leaving out the unimportant details;* b) *Get ready to render the contents of both texts in class.*

Laboratory Assignment II

XXVIII. *Listen to the speaker as he is reading the words of the text 'Points and Lines' and repeat them.*

alphabet, definite, infinite, to differ, abstract, to locate, arrow, ray, vertex, to serve, edge, dust, common, thickness, particle, air, piece, judge, exact, indefinitely, to consist, subset, to contain, black, ambiguity, emphasize *v*, eliminate, obviously, to form.

XXIX. *Listen and repeat. Guess the meaning of the italicized words.*

alphabet—*alphabetic*; definite—*indefinite a*; judge *v*—*judgement*; infinite—*finite*; to serve—*service*; common—*commonly—uncommon*; air—*airless—to air*; exact—*exactly—exactness*; to contain—*container*; black—*to blacken—blackness*; ambiguity—*ambiguous—inambiguous*; obviously—*obvious*; to form—*formal—informal—formality—formalize—to deform—deformity*; object *n*—*object v—objection*; straight—*to straighten*; to differ—*different—differently—indifferent*.

XXX. *Change into the Gerund. See the models.*

Sp.: He suggested (*to go*) there.

St.: He suggested *going* there.

a) 1. I think of (*to learn*) the Latin alphabet. 2. She insisted on (*to air*) the classroom. 3. They succeeded in (*to locate*) that distant object. 4. He prevented us from (*to find out*) the exact truth. 5. He objected to (*to consider*) this problem at tomorrow's seminar. 6. We insisted on (*to find*) a common language with them. 7. They succeeded in (*to eliminate*) the ambiguity in understanding their task. 8. We avoided (*to change*) the direction of research. 9. He could not imagine (*to apply*) this method in our work. 10. He thought of (*to measure*) the size and the shape of the black box.

Sp.: He should not go *until he sees* her.

St.: He should not go *without seeing* her.

b) 1. One cannot solve the problem *unless one knows* the rule. 2. We must not do it *until we improve* the design of the construction. 3. We cannot measure the volume of this object *unless we know* how to do it. 4. One cannot draw a long straight line *unless one uses* a ruler. 5. They cannot expect to obtain good result *until they apply* the suggested method. 6. She cannot imagine that object *until she sees* it.

XXXI. *Follow the speaker as he is reading the text 'Points and Lines'.*

XXXII. *Listen to the speaker's questions about the text and write down 'yes' or 'no' answers.*

1. Does the world around us contain physical objects? 2. Can these objects serve as models of the geometric figures? 3. Can the edge of a ruler serve as a model of a line? 4. Has a line any thickness? Has it length? 5. Is a point an idea of exact location? 6. Do we usually use letters of the alphabet to name geometric objects? 7. Can you locate as many points as you like between any two points? 8. Is a segment a subset of a line? 9. Does a line segment consist only of two endpoints? 10. Has a line segment definite length? 11. Is there any difference between a segment and a ray? 12. Does a ray extend in two directions?

Classwork III

XXXIII. a) *Read the words of ex. XXVIII and stress them correctly;* b) *Read the words of ex. XXIX and give Russian equivalents of the italicized words.*

XXXIV. *Define the functions of the ing-forms.*

1. Computers, like the one pictured in this book, are capable of solving systems with a hundred or more unknowns, if necessary. 2. They are concerned with applying their knowledge of the subject

to solving these problems. 3. Drawing a correct conclusion is not always easy. 4. Seeing, feeling, or moving a point is impossible since a point has no dimensions. 5. Seeing a straight line we know it is a geometric figure. 6. We usually use letters of the alphabet for naming geometric ideas. 7. I am naming the point by the capital letter A. 8. The arrow indicating the direction in which the line is extending is placed over the letters. 9. Indicating the direction in which the line is extending is necessary. 10. Continuing the process indefinitely is rather difficult. 11. In our case it is easy to know just by looking at the first equation what the following equation should be. 12. The products of several kinds of multiplication problems may be called special products since they can be determined directly from the form of the given problem without writing any of the multiplication.

XXXV. *Read the text 'Points and Lines' and ask questions for which the sentences 1, 3, 4, 7, 23, 26, 31, 44 could be answers.*

XXXVI. *Answer your teacher's questions in connection with the text.*

XXXVII. *a) Speak on the meaning of geometry; b) Why do we say that the most fundamental idea of geometry is the idea of a point? Prove it; c) Speak on points and lines in greater detail.*

XXXVIII. *Say the following in English (use the Gerund).*

a) 1. Мы рассчитываем улучшить систему. 2. Представить такую геометрическую фигуру не трудно. 3. Мы обсуждали включение этой главы. 4. Не зная размеров предмета, нельзя определить его объем. 5. Студенты начали изучение нового текста. 6. Задача состоит в изменении формы. 7. Продолжайте чертить линию в этом направлении. 8. Частицы воздуха продолжают двигаться во всех направлениях.

б) при определении объема; посредством применения этого метода; протяжение прямой линии может; определение местонахождения точки в пространстве будет.

LESSON 20

Classwork I

Grammar: More about the Gerund

1. *Read these sentences. Indicate the Gerund Construction.*

1. His having proved the advantages of the new system is essential. 2. The line's having been extended infinitely is shown in the figure below. 3. We can speak of this object's (object) serving as a model of the Earth. 4. We know of the Earth's revolving around the

Sun constantly. 5. Their continuing the work is unnecessary. 6. The power having been reduced changed the pressure. 7. The fraction's (fraction) having been reduced did not change its value. 8. You know of these properties being used in the operations of division and multiplication. 9. Everybody knows of Newton's (Newton) having done research in the field of gravitation.

II. Compare these sentences.

His asking it shows that...
 Your going there is...
 The problem's being solved will help us to...
 Her being asked that question indicates...
 I know of his having asked you that question.
 I am interested in the article being published.
 Do you mind helping me?
 I object to going there.
 He insisted on changing the plan.

His having asked it shows...
 Your having gone there was...
 The problem's having been solved must help us...
 Her having been asked that question indicates...
 I know of his having been asked that question.
 I know of the article having been published.
 Do you mind his helping me?
 I object to her going there.
 He insisted on the student's changing the plan.

Homework I

Words to be Learned

Read these international words and guess their meaning.

to deduce [di'dju:s], interior [in'tiəriə] *n*, exterior [eks'tiəriə] *n*, to classify ['klæsɪfaɪ], hypotenuse [hai'pɒtɪnju:z] *n*, start *n*, *v*, base *n*, *v*, 'polygon *n*, parallel ['pærələl] *a*, parallelogram [ˌpærə'leləgræm] *n*, congruent ['kɒŋgruənt] *a*, rhombus ['rɒmbəs] *n*, separate ['seprɪt] *a*, to separate ['sepəreɪt].

Read these words.

originate [ə'ridʒɪneɪt] брать начало
 angle ['æŋɡl] угол
 though [ðəʊ] хотя
 right 1. прямой; 2. правый, правильный
 lie [laɪ] (lay [leɪ], lain [leɪ]) лежать
 acute [ə'kju:t] острый
 obtuse [əb'tu:s] тупой
 triangle ['traɪæŋɡl] треугольник
 dis'tinct отчетливый

plane плоскость
 'middle 1. середина; 2. средний
 'boundary граница
 equilateral [i:kwɪ'lətərəl] равно-
 носторонний
 isosceles [aɪ'sɒsɪli:z] равнобе-
 денный
 leg 1. сторона, катет; 2. ножка
 (циркуля)
 quadrilateral [ˌkwɒdri'lətərəl]
 четырехсторонний
 rectangle ['rek'tæŋɡl] прямо-
 угольник

'evident очевидный
 to occur [э'кэ:] иметь место,
 случаться
 frequently ['fri:kwəntli] часто
 degree [di'gri:] 1. градус; 2. сте-
 пень

to cross пересекасть
 to inter'sect пересекаться
 to en'close заключать в себе
 outside *adv* снаружи; *a* наруж-
 ный

III. Translate these sentences.

1. It is evident that there is no hope of our finding a proper solution to the problem at present. 2. We insisted on their following the usual procedure. 3. Without having improved on the properties of this material one cannot expect getting better results. 4. I knew nothing of their having completed the experiment. 5. This results in the product of two or more factors being equal to zero. 6. Besides its being used as an everyday word the term 'work' has a special meaning in mechanics. 7. I did not know anything about your science adviser having spoken at the international congress on mechanics. 8. Euclid's having brought all the known facts about geometry into a logical sequence was very important for the development of geometry. 9. We know of Lobachevsky's having developed a new geometry different from that of Euclid. 10. Upon placing all the elements according to the accepted order we were able to continue the work.

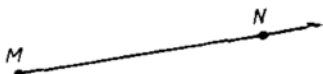
IV. Ask questions to which the given sentences could be the answers.

1. It is possible to deduce, therefore, that between any two points on a line there is another point. 2. Two lines originating from the same point form an angle. 3. The point where these lines originate is called a vertex. 4. An angle of 35° is an acute angle. 5. An angle having 105° is an obtuse angle. 6. A triangle is a closed geometric figure having three sides. 7. A triangle having all sides of equal length is referred to as an equilateral triangle. 8. A triangle containing one right angle is referred to as a right triangle. 9. A rectangle is a closed geometric figure having four sides and four right angles. 10. A rectangle having four sides of equal length is referred to as a square. 11. They are discussing a very acute problem. 12. We have denoted the point lying on the plane by the letter *B*. 13. You are to classify these elements according to the rule. 14. Geometry originated in Egypt.

V. a) Read the text below without consulting the dictionary;
 b) After you have read the text, analyse the sentences you find difficult to understand and translate them. Pay special attention to sentences 1, 4, 6, 7, 12, 15, 26, 28, 32, 38. Consult the dictionary whenever necessary.

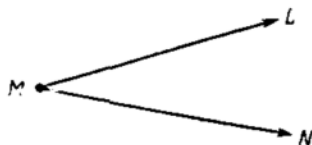
Rays, Angles, Simple Closed Figures

1. You certainly remember that by extending a line segment in one direction we obtain a ray. 2. Below is a picture of such an extension.

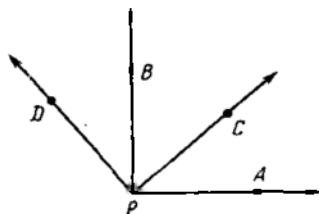


3. The arrow indicated that you start at point M , go through point N , and on without end. 4. This results in what is called ray MN , which is denoted by the symbol $\overrightarrow{MN}$. 5. Point M is the endpoint in this case. 6. Notice that the letter naming the endpoint of a ray is given when first naming the ray.

7. From what you already know you may deduce that drawing two rays originating from the same endpoint forms an angle. 8. The common point of the two rays is the vertex of the angle.



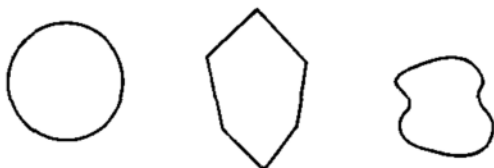
9. Angles, though open figures, separate the plane into three distinct sets of points: the interior, the exterior, and the angle. 10. The following symbol $\angle$ is frequently used in place of the word *angle*. 11. The angle pictured above could be named in either of the following ways: a) angle LMN (or $\angle LMN$); b) angle NML (or $\angle NML$). 12. The letter naming the vertex of an angle occurs as the middle letter in naming each angle. 13. Look at the drawing below.



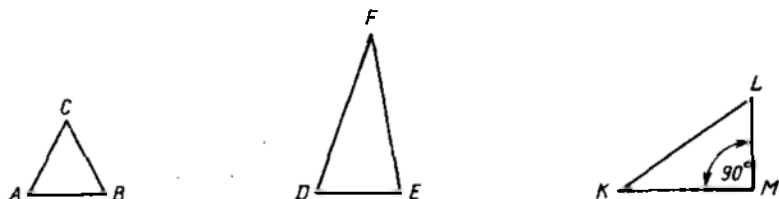
14. Ray PA ($\overrightarrow{PA}$) and ray PB ($\overrightarrow{PB}$) form a right angle, which means that the angle has a measure of 90° (degrees). 15. Since $\overrightarrow{PC}$ (except for point P) lies in the *interior* of $\angle APB$, we speak of $\angle CPA$ being less than a right angle and call it an acute angle with a degree measure less than 90° . 16. Since $\overrightarrow{PD}$ (except for point P) lies in the *exterior* of $\angle APB$, we say that $\angle APD$ is greater than a right angle and call it an obtuse angle with a degree measure greater than 90° .

Simple Closed Figures

17. A simple closed figure is any figure drawn in a plane in such a way that its boundary never crosses or intersects itself and encloses part of the plane. 18. The following are examples of simple closed figures. 19. Every simple closed figure separates the plane into three distinct sets of points. 20. The interior of the figure is the set of all points in the part of the plane enclosed by the figure. 21. The exterior of the figure is the set of points in the plane which are outside the figure. 22. And finally, the simple closed figure itself is still another set of points.



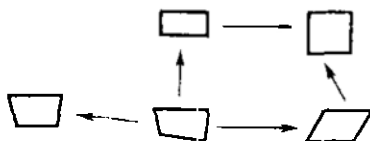
23. A simple closed figure formed by line segments is called a polygon. 24. Each of the line segments is called a side of the polygon. 25. Polygons may be classified according to the measures of the



angles or the measure of the sides. 26. This is true of triangles — geometric figures having three sides — as well as of quadrilaterals, having four sides.

27. In the picture above you can see three triangles.

28. $\triangle ABC$ is referred to as an equilateral triangle. 29. The sides of such a triangle all have the same linear measure. 30. $\triangle DEF$ is called an isosceles triangle which means that its two sides have the same measure. 31. You can see it in the drawing above. 32. $\triangle LMK$ being referred to as a right triangle means that it contains one right angle. 33. In $\triangle MKL$, $\angle M$ is the right angle, sides MK and ML are called the legs, and side KL is called the hypotenuse. 34. The hypotenuse refers only to the side opposite to the right angle of a right triangle. Below you can see quadrilaterals.



35. A parallelogram is a quadrilateral whose opposite sides are parallel. 36. Then the set of all parallelograms is a subset of all quadrilaterals. Why? 37. A rectangle is a parallelogram in which all angles are right angles. 38. Therefore we can speak of the set of rectangles being a subset of the set of parallelograms. 39. A square is a rectangle having four congruent sides as well as four right angles. 40. Is every square a rectangle? Is every rectangle a square? Why or why not? 41. A rhombus is a parallelogram in which the four sides are congruent. 42. Thus, it is evident that opposite sides of a rhombus are parallel and congruent. 43. Is defining a square as a special type of rhombus possible? 44. A trapezoidal has only two parallel sides. 45. They are called the bases of a trapezoidal.

VI. a) *Translate sentences 4, 6, 7, 12, 15, 26, 28, 32, 38 from the text above (written); b) Get ready to give a short outline of the text in class.*

Laboratory Assignment I

VII. *Follow the speaker as he is reading the words. Mind the stress.*

'angle, 'vertex, 'measure, 'square, 'follow, 'aspect, 'area, 'system, 'neither, 'valid, 'clear, 'image, 'logic, 'surface, 'certain;
a'cute, con'cern, re'fer, con'tain, ex'ist, dis'cuss, as'sume, dis'tinct, di'rect, wi'thin, wi'thout, oc'cur, di'gree, en'close;
'opposite, 'postulate a, 'parallel, 'usual, 'special, 'century, 'realize, 'congruent;
ex'terior, hy'potenuse, equi'lateral, in'tuitive, in'terior.

VIII. *Read these words after the speaker and guess the meaning of the italicized words.*

to deduce—*deductive*—*deduction*; to classify—*classification*; congruent—*congruous*—*congruence*; to separate—*separately*—*separation*; to originate—*origin*—*original*; distinct—*distinction*—*indistinct*—*distinctly*—*indistinctly*; triangle—*triangular*; rectangle—*rectangular*; to occur—*occurrence*; outside—*inside*; to intersect—*intersection*; base—*baseless*; opposite—*to oppose*—*opposition*; measure—*measurement*—*measurable*—*measurability*—*immeasurable*; common—*uncommon*—*commonly*; valid—*invalid*—*validity*.

IX. *Change the following according to the model.*

Sp.: *If you do not understand it, you...*

St.: *Without understanding it you...*

a) 1. *If he does not know the rule, he...* 2. *If you have not found the length of the side, you...* 3. *If we do not check division by multiplication, we...* 4. *If she does not classify these triangles, she will not...*

Sp.: *If we are not given the size of the...*

St.: *Without being given the size of the...*

b) 1. *If he is not told about it, he...* 2. *If these numerals are not added, they...* 3. *If I am not given the necessary information, I shall not...* 4. *If these numbers are not placed according to the accepted order, they...*

Sp.: *When I was measuring the distance...* (in)

St.: *In measuring the distance I...*

Sp.: *When we had found the product...* (on)

St.: *On finding the product we...*

c) 1. *When we were applying this rule...* 2. *After they had changed the method...* 3. *When he was developing his idea...* 4. *When we had used the data obtained...* 5. *When you are defining the value...* 6. *After I had defined the width...*

Sp.: *I know that he has given a complete picture of...*

St.: *I know of his having given a complete picture of...*

d) 1. *I know that they included her in the delegation...* 2. *I am told that you have referred to my recent paper.* 3. *She told us that they had moved into a new house.* 4. *We know that this scientist has improved the procedure.*

Sp.: *Do you often go there?*

St.: *No, I avoid going there.*

e) 1. *Have you seen him?* 2. *Has she spoken to you?* 3. *Has he made any mistakes?* 4. *Does she refer to his article?*

X. *Listen to the new words of the lesson and repeat them.*

XI. *Follow the speaker as he is reading the text.*

XII. *Listen to the questions and write down your answers (+ -).*

1. *Do you remember how we form a ray?* 2. *Do we extend a line segment in two directions when we form a ray?* 3. *Will two rays originating from the same endpoint form an angle?* 4. *Do angles separate the plane into 2 distinct sets of points?* 5. *Is the obtuse angle less than the right angle?* 6. *Is the right angle greater than the acute angle?* 7. *Are triangles classified according to the measures of their angles?* 8. *Can any triangle be referred to as equilateral?* 9. *Does a right triangle contain three right angles?* 10. *Are opposite sides of a quadrilateral always parallel?* 11. *Are all the four angles of a square congruent?* 12. *Is every rectangle a square?*

Classwork II

XIII. *Read these words and stress them properly.*

origin, triangle, deduce, exterior, opposite, certainly, segment *n*, below, above, define, enclose, special, extend, extension, refer, concern, hypotenuse, parallel, classify, acute, obtuse, equilateral, rectangle, evident, intersect, occur, middle, boundary, distinct.

XIV. *Go back to ex. VIII. Read the italicized words and give their Russian equivalents.*

XV. Ask your class-mates questions about the sentences of ex. III you have written at home.

XVI. Read these groups of words and translate them.

an uncertain position, to direct the investigation, direct methods, formalization of the results obtained, deductive reasoning, the immeasurable greatness, to lessen the importance, the evidence of these facts, the occurrence of such phenomena, the validity of his statement, the acuteness of the situation.

XVII. Read the text 'Rays, Angles, Simple Closed Figures' and translate sentences 1, 4, 6, 7, 12, 15, 26, 28, 32, 38.

XVIII. Listen to your teacher's statements and say whether they are true or false. If you disagree, begin with the words: 'I am afraid, it is wrong', 'As is known', 'As far as I know'.

XIX. Answer your teacher's questions in connection with the text.

XX. Before you begin working with the text 'Something about Euclidean and Non-Euclidean Geometries' read these words and guess their meaning.

postulate ['pɒstjʊlɪt] *n*, ['pɒstjʊleɪt] *v*, vari'ation, in'tuitively {in'tju:itivli}, diagonal [daɪ'æɡənəl] *n*, ellip'soidal *n*, essentially ['ɪsɛnfəli], para'doxical situation, reason ['ri:zən] *n*, pseudospherical [ˌpsjudo'sferikəl], de'ductive, valid.

Read these notes.

1. so-called — так называемый
2. at least — по крайней мере
3. conclusions which may be drawn — выводы, которые можно сделать
4. so far — до сих пор
5. neither ... nor — ни ... ни
6. it should be borne in mind — следует помнить
7. conclusions are just as valid — выводы столь же справедливы
8. even though — даже хотя

Read the following text, say into how many logical parts it could be divided and render it either in English or in Russian.

Something about Euclidean and Non-Euclidean Geometries

1. It is interesting to note that the existence of the special quadrilaterals discussed above is based upon the so-called¹ parallel postulate of Euclidean geometry. 2. This postulate is now usually stated as follows: Through a point not on line *L*, there is no more than one line parallel to *L*. 3. Without assuming (не допуская) that there exists at least² one parallel to a given line through a point not on the given line, we could not state the definition of the special quadrilaterals which have given pairs of parallel sides. 4. Without the assumption that there exists no more than one parallel to a given line through a point not on the given line, we could not deduce the con-

clusion we have stated (сформулировали) for the special quadrilaterals. 5. An important aspect of geometry (or any other area of mathematics) as a deductive system is that the conclusions which may be drawn³ are consequences (следствие) of the assumptions which have been made. 6. The assumptions made for the geometry we have been considering so far⁴ are essentially those made by Euclid in Elements. 7. In the nineteenth century, the famous mathematicians Lobachevsky, Bolyai and Riemann developed non-Euclidean geometries. 8. As already stated, Euclid assumed that through a given point not on a given line there is no more than one parallel to the given line. 9. We know of Lobachevsky and Bolyai having assumed independently of (независимо от) one another that through a given point not on a given line there is more than one line parallel to the given line. 10. Riemann assumed that through a given point not on a given line there is no line parallel to the given line. 11. These variations of the parallel postulate have led (привели) to the creation (создание) of non-Euclidean geometries which are as internally (внутренне) consistent (непротиворечивы) as Euclidean geometry. 12. However, the conclusions drawn in non-Euclidean geometries are often completely inconsistent with Euclidean conclusions. 13. For example, according to Euclidean geometry parallelograms and rectangles (in the sense (смысл) of a parallelogram with four 90-degree angles) exist; according to the geometries of Lobachevsky and Bolyai parallelograms exist but rectangles do not; according to the geometry of Riemann neither parallelograms nor⁵ rectangles exist. 14. It should be borne in mind⁶ that the conclusions of non-Euclidean geometry are just as valid⁷ as those of Euclidean geometry, even though⁸ the conclusions of non-Euclidean geometry contradict (противоречат) those of Euclidean geometry. 15. This paradoxical situation becomes intuitively clear (ясно) when one realizes (понимаем) that any deductive system begins with undefined terms. 16. Although (хотя) the mathematician forms intuitive images (образы) of the concepts to which the undefined terms refer, these images are not logical necessities (необходимость). 17. That is, the reason for forming these intuitive images is only to help our reasoning (рассуждение) within a certain deductive system. 18. They are not logically a part of the deductive system. 19. Thus, the intuitive images corresponding to the undefined terms straight line and plane are not the same for Euclidean and non-Euclidean geometries. 20. For example, the plane of Euclid is a flat (плоский) surface (поверхность); the plane of Lobachevsky is a saddle-shaped (седлообразный) or pseudo-spherical surface; the plane of Riemann is an ellipsoidal or spherical surface.

Homework II

XXI. Change these sentences according to the model.

He does not like speaking about it. (*she, the man*)

He does not like *her* speaking about it.

He does not like *the man's* speaking about it.

1. They object to taking part in this work. (he). 2. I insist on realizing this plan. (they). 3. We object to taking exams in December. (the student). 4. They insisted on going there more frequently. (we). 5. We did not like discussing it with him. (the teacher).

XXII. Translate these sentences. Note the use of the Gerund.

1. He does not like being contradicted. 2. He knew nothing of our having realized the program. 3. This results in the product of two or more factors being equal to zero. 4. Instead of being divided by three the resulting number must be divided by four. 5. Besides being asked to speak at the conference he was asked to write an article. 6. We know of Lobachevsky's having created a geometry different from Euclid's geometry. 7. Writing a sentence in algebraic form, as we have seen, involves two steps: (a) choosing the important words and groups of words and (b) replacing each of these words with algebraic symbols or expressions. 8. Graphing these two different equations involving the same unknowns gives one and only one pair of values for the unknowns that will check in both equations. 9. Dividing both the numerator and the denominator by the same value gives you the following expression. 10. Having only one solution is a different thing from having two equal solutions. 11. The two scientists' doing research independently made it possible to create two essentially different ways of solving the same problem. 12. One cannot do anything without thinking of the consequences. 13. The two statements being internally consistent is evident. 14. The Earth's moving around the Sun is common knowledge nowadays. 15. Because of its having no dimensions you cannot see a point, feel a point, or move a point. 16. A segment being extended indefinitely is easy to imagine.

XXIII. Ask questions to which the following sentences could be the answers.

1. There is every reason to expect that their assumption is correct. 2. It is difficult to follow your line of reasoning. 3. The statement seems internally consistent. 4. These words contradict the commonly accepted principles. 5. Neither of them realized the necessity of changing the procedure. 6. The surface of the area should either be flat or saddle-shaped. 7. Since we do not know the situation it is difficult to imagine the consequences. 8. They came to the same conclusion independently of one another.

XXIV. Read the text (2nd) and analyse the sentences you find difficult to understand. Pay special attention to sentences 3, 4, 5, 6, 9, 11, 14, 15, 17. Translate them in writing.

XXV. a) Write a summary of both of the texts of the lesson, b) Get ready to render the contents of both texts in class.

Laboratory Assignment II

XXVI. Listen to the speaker as he is reading the new words of the text 'Something about Euclidean and Non-Euclidean Geometries'.

to postulate, postulate *a*, variation, intuitive, diagonal, ellipsoidal, paradox, paradoxical, reasoning, reason *n*, *v*, pseudo-spherical, deductive, valid, bear (bore, born(e)), assume, assumption, area, consequence, lead (led, led), creation, consistent, however, sense, contradict, realize, term, image, surface, flat, necessity, undefined, saddle, thus.

XXVII. *Listen and repeat. Guess the meaning of the words in italics.*

intuitive—*intuition*—*intuitively*; valid—*validity*—*invalid*; to lead—*leader*; consistent—*inconsistent*; sense—*senseless*—*sensible*—*sensibility*; to contradict—*contradiction*; realize—*realization*—*unrealized*; image—*imagination*—*imaginable*; flat—*flatness*—*flatly*; deductive—*to deduce*; exist—*existence*; famous—*fame* *n*; drawing—*to draw*; internally—*internal*—*external*; to correspond—*corresponding*; shape—*shapeless*; to depend—*dependence*—*dependent*—*independent*—*interdependently*—*interdependence*.

XXVIII. *Change the following sentences according to the models.*

Sp.: *Shall I do it?*

St.: *No, you should avoid doing it.*

a) 1. *Must they change* the design now? 2. *Must he take part* in the discussion? 3. *Shall we go* there? 4. *Must we stop* the experiment?

Sp.: *Did you complete* the work?

St.: *Yes, we succeeded in completing* the work.

b) 1. Did they *find* a solution for this problem? 2. Did she *pass* this difficult exam? 3. Did he *prove* that their method had certain advantages? 4. Did you *measure* the volume of that object?

Sp.: *Must they translate* the text? (I)

St.: *Yes, I insist on their translating* the text.

c) 1. *Must she go* there? 2. *Must the students write* these words? 3. *Must he present* the data tomorrow? 4. *Shall I come in* the evening?

Sp.: *He did not want to go* there.

St.: *He objected to going* there.

d) 1. She *did not want to speak* on the subject. 2. I *do not want to discuss* such things. 3. He *does not want to work* in the lab today. 4. She *does not want to see* him.

XXIX. *Follow the speaker as he is reading the text (2nd).*

XXX. *Listen to the questions about the text (2nd) and write down 'yes' or 'no' answers.*

1. Did Lobachevsky and Riemann work in the nineteenth century? 2. Did they continue to develop Euclidean geometry? 3. Did Lobachevsky and Riemann develop their geometries independently of one another? 4. Can you draw more than one parallel line through a given

point not on the given line according to Euclid? 5. Are conclusions drawn in non-Euclidean geometries always consistent with Euclidean geometry? 6. Do rectangles exist according to Riemann's geometry? 7. Does any deductive system begin with undefined terms? 8. Are intuitive images logically a part of the deductive system?

Classwork III

XXXI. *Read the words of ex. XXVI and stress them properly.*

XXXII. *Read the words of ex. XXVII and give their Russian equivalents.*

XXXIII. *Form a) adjectives and b) nouns by using the following suffixes. Translate the words.*

a) -able	— to reason, to var(y), to imagin(e), to consider, to realiz(e), to measur(e), to use;
-al	— form, physic(s), mechanic(s), practic(e);
-ous	— congru(ent), to var(y), fam(e);
-ive	— act, product, effect, progress;
-less	— base, air, work, use, sense;
-ful	— help, use, meaning;
b) -ity	— valid, formal, certain, continu(e);
-ness	— right, thick, acute, flat, good;
-ation	— to realiz(e), to imagin(e);
-ion	— to contradict, distinct, definit(e), opposite, to separat(e).

XXXIV. *Go back to ex. XXII you have done at home and state the function of the Gerund in each sentence.*

XXXV. *Read the text 'Something about Euclidean and Non-Euclidean Geometries' and translate sentences 3, 4, 5, 6, 9, 11, 14, 15, 17.*

XXXVI. *Answer your teacher's questions in connection with the text.*

XXXVII. *Discuss the contents of both of the texts of the lesson. You may work in pairs.*

Home-reading

Read and translate the following text. It contains a number of international words whose meaning you can guess. Look up the dictionary for the words whose meaning you do not know. The notes below might be helpful.

Notes

1. took notice of — заметили
2. by no means — ни в коем случае
3. it goes without saying — само собой разумеется

4. however large — как бы велико не было
5. in terms of — в терминах
6. because of — из-за
7. it is lacking the plausibility — ей не хватает убедительности
8. by all means — обязательно
9. would have been considered — рассматривалась бы как
10. in the long run — в конце концов

N. I. Lobachevsky

Nikolai Ivanovich Lobachevsky was born in 1792 in Nizhny Novgorod. After his father's death in 1797 the family moved to Kazan where Lobachevsky graduated from the University. He stayed in Kazan all his life occupying the position of dean of the faculty of Physics and Mathematics and rector of the University. He lectured on mathematics, physics, astronomy.

Lobachevsky is the creator of a non-Euclidean geometry. His first book appeared in 1829. Few people took notice of it¹. Non-Euclidean geometry (as a matter of fact the name is due to Gauss) remained for several decades an obscure field of science. Most mathematicians ignored it. The first leading scientist who realized its full importance was Riemann.

There is one axiom of Euclidean geometry whose "truth", that is, whose correspondence with empirical data about stretching threads (растягивание ниток) or light rays, is by no means² obvious. This is the famous postulate of the unique parallel, which states that through any point not on a given line one and only one line can be drawn parallel to the given line. The remarkable feature of this axiom is that it makes a statement concerning the whole extension of a straight line, imagined as extending indefinitely in either direction, since to say that two lines are parallel, is to say that they never intersect, no matter how far they may be produced. It goes without saying³ that there are many lines through a point which do not intersect a given line within any fixed distance, however large⁴. Since the maximum possible length of an actual ruler, thread or even a ray of light visible to a telescope is certainly finite, and since within any finite circle there are infinitely many straight lines through a given point and not intersecting a given line inside the circle, it follows that this axiom can never be verified by experiment. All the other axioms of Euclidean geometry have a finite character since they deal with finite portions of lines and with plane figures of finite extent. The fact that the parallel axiom is not experimentally verifiable raises the question of whether or not it is independent of the other axioms. If it were a necessary logical consequence of the others, then it would be possible not to regard it as an axiom and to give a proof of it in terms of⁵ the other Euclidean axioms. For centuries mathematicians have tried to find such a proof, because of⁶ widespread feeling among students of geometry that the parallel postulate is of a character essentially different from the others. It is lacking

the plausibility⁷ which an axiom of geometry should by all means⁸ possess.

At that time, any geometrical system not in absolute agreement with that of Euclid's would have been considered⁹ as obvious non-sense. Kant, the most outstanding philosopher of the period, formulated this attitude in his statement that Euclid's axioms are inherent in the human mind, and therefore have no objective validity for *real* space. But in the long run¹⁰ there appeared a conviction that the unending failure in the search for a proof of the parallel postulate was due not to any lack of ingenuity, but rather to the fact that the parallel postulate is really independent of the others.

What does the independence of the parallel postulate mean? Simply that it is possible to construct a consistent system of "geometrical" statements dealing with points, lines etc., by deduction from a set of axioms in which the parallel postulate is replaced by a contrary postulate. Such a system is called a non-Euclidean geometry. It required the intellectual courage of Lobachevsky to realize that such a geometry, based on a non-Euclidean system of axioms, can be perfectly consistent.

Lobachevsky settled the question by constructing in all detail a geometry in which the parallel postulate does not hold.

Non-Euclidean geometry has developed into an extremely useful instrument for application in the physical world.

After 1840 Lobachevsky published a number of papers on convergence of infinite series and the solution of definite integrals. In modern reference books on definite integrals about 200 integrals were solved by Lobachevsky.

Now that you have read the text, a) write questions to help you while discussing the text in class; b) Be prepared to speak about Lobachevsky. You may make use of some additional information.

LESSON 21

Classwork I

Grammar:

The Participle. Its forms and functions

1. Read these sentences. Mind the use of the Participle, its forms and functions.

a) 1. The moving point is... . 2. The speaking man may... . 3. The improving picture will... . 4. The developing system has produced... .

b) 1. The rays originating from the given point may... . 2. This line extending indefinitely will... . 3. The angle separating the plane is... . 4. The intuitive images corresponding to it were... .

c) 1. The divided diagonal remained... . 2. The given postulate states... . 3. The applied method will give... . 4. The improved picture of the process showed... .

d) 1. The sentences written in algebraic form are... 2. The two lines drawn parallel will never... 3. Their work continued the next day showed... 4. This object taken as a model served to show...

e) 1. The statement made is consistent with... 2. The problem dealt with seems important. 3. The calculations made were very accurate. 4. The number subtracted equals the difference.

f) 1. Drawing a rectangle one must... 2. Finding the measure of the perimeter you can... 3. When realizing this plan we... 4. While giving his reason for it he... 5. Assuming this as an axiom we can... 6. When applying these rules one must remember... 7. While checking these operations he... 8. While considering the property of identity the students...

g) 1. When asked about the consequences he... 2. When applied carefully this method may... 3. If continued further the work will be helpful. 4. If changed a little the problem will be easy to solve.

h) 1. Being checked carefully the result must... 2. Being reduced the fraction will not... 3. Being spread all over the world the information may... 4. Being given the dimensions of an object one can...

i) 1. Having prepared the article for publication he... 2. Having obtained the necessary information the student could... 3. Having imagined this figure one must... 4. Having been asked to remain in the lab the researcher said...

II. Compare the *ing*-forms.

Applying this method is...—Applying this method they can... They are applying it. Defining the volume showed...—Defining the volume we must...—We are defining it. On (upon) extending the segment he...—Having extended the segment he... In looking for a solution they...—While looking for the solution they... Being asked such questions seemed strange...—Being asked such questions he... His having been invited to the conference was quite unexpected.—Having been invited to the conference he... Without knowing the subject one should not...—Not knowing the subject one should not...

Homework I

Words to be Learned

Read these international words and guess their meaning.

radius (*sing*) ['reidiəs] *n*, radii (*pl*) ['reidiai], symbolize ['sim-bəlaiz], to fix, diameter [dai'æmitə], chord [kɔ:d] *n*, 'centre *n, v*.

Read these words.

sharp острый
compass ['kʌmpəs] циркуль
sheet лист (бумаги)
enclose [in'klaʊz] заключать,
окружать

circle ['sə:kl] круг
equidistant ['i:kwi'distant] равноудаленный
through [θru:] через, сквозь
arc дуга

circumference [sə'klɪmfərəns]
 окружность
 entire [ɪn'taɪə] весь
 'matter материя
 'slightly ['slaitli] слегка
 fortunately ['fɔ:tʃənətli] к сча-
 стью
 discover [dis'kʌvə] обнаружи-
 вать

ratio ['reɪʃiə] соотношение
 twice [twais] дважды
 designate ['deziɡneɪt] обозна-
 чать
 curve ['kə:v] *n* кривая линия;
v изгибать(ся)
 path [pa:θ] путь

III. *State the functions and the forms of the Participles. Translate these sentences.*

1. Any expression like $x+5$ or $2x-3$ containing two or more terms may be called a polynomial which means an expression with many parts. 2. Such quantities as 5, x , $a-1$, and n^2+1 are prime, since they are not divisible by any quantities excepting themselves and 1. 3. In problems dealing with abstract numbers, negative answers are just as acceptable as positive ones. 4. Think of this point as lying not on the line. 5. Most of the problems concerning digits (0 through 9) are based on the fundamental principle of our decimal system: that is, the position of a digit with respect to the decimal point indicates the value represented by it. 6. The signs of the two numbers being added in each of the problems above are the same, that is, they are both positive or both negative. 7. An axiom is a statement generally accepted as true without proof. 8. The feature referred to seemed important. 9. No matter how the problems dealing with the division of polynomials are stated they should always be copied in the form used for long division in arithmetic. 10. Having divided both the numerator and the denominator by x you will get the following expression. 11. Having defined the volume of this geometric object we can solve the given problem.

IV. *Ask questions to which the sentences below could be answers.*

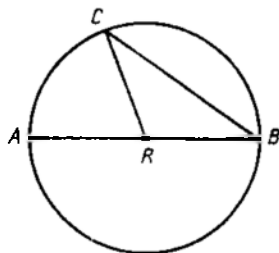
1. A circle can easily be drawn with the help of a compass. 2. These points are fixed. 3. The line segment AR joins point A of the circle with its centre. 4. A circumference is another name for a circle. 5. A circumference encloses part of a plane. 6. Yes, points A and B representing the opposite points of a circle are equidistant from the center. 7. The diameter of a circle passes through the centre. 8. They considered the matter carefully. 9. The ratio has been slightly changed. 10. Yes, the article is twice as long as his. 11. When changed slightly, the plan was accepted. 12. The area enclosed in the circle can be measured provided one knows the measure of the circumference. 13. Having fixed the sharp end of the compass he drew a curved line. 14. They attend their English class twice a week. 15. The ratio of the distance to time must be stated first of all.

V. *a) Read the text below; b) Analyse the sentences you find difficult to understand and translate them. Pay special attention to sen-*

tences 4, 10, 13, 14, 17; c) Read the same text again. Make sure you understand it in detail.

Circles

1. If you hold the sharp end of a compass fixed on a sheet of paper and then turn the compass completely around you will draw a curved line enclosing parts of a plane. 2. It is a circle. 3. A circle is a set of points in a plane each of which is equidistant, that is the same distance from some given point in the plane called the center. 4. A line segment joining any point of the circle with the center is called a radius. 5. In the figure above R is the center and RC is the radius. 6. What other radii are shown? 7. A chord of a circle is a line segment whose endpoints are points on the circle. 8. A diameter is a chord which passes through the center of the circle. 9. In the figure above AB and BC are chords and AB is a diameter. 10. Any part of a circle containing more than one point forms an arc of the circle. 11. In the above figure, the points C and A and all the points in the interior of $\angle ARC$ that are also points of the circle are called arc AC which is symbolized as $\widehat{AC}$. 12. $\widehat{ABC}$ is the arc containing points A and C and all the points of the circle which are in the exterior of $\angle ABC$. 13. Instead of speaking of the perimeter of a circle, we usually use the term circumference to mean the distance around the circle. 14. We cannot find the circumference of a circle by adding the measure of the segments, because a circle does not contain any segments. 15. No matter how short an arc is, it is curved at least slightly. 16. Fortunately mathematicians have discovered, that the ratio of the circumference (C) to a diameter (d) is the same for all circles. This ratio is expressed $\frac{C}{d}$. 17. Since $d=2r$ (the length of a diameter is equal to twice the length of a radius of the same circle), the following denote the same ratio.



$$\frac{C}{d} = \frac{C}{2r} \text{ since } d=2r.$$

18. The number $\frac{C}{d}$ or $\frac{C}{2r}$, which is the same for all circles, is designated by π . 19. This allows us to state the following:

$$\frac{C}{d} = \pi \text{ or } \frac{C}{2r} = \pi.$$

20. By using the multiplication property of equation, we obtain the following:

$$C = \pi d \text{ or } C = 2\pi r.$$

VI. Which sentences in the text answer these questions?

1. How can one draw a curved line enclosing part of a plane?
2. In what geometric figure are all the points equidistant from the center?
3. Which line segment passes through the center of the circle?
4. Is a short arc also curved?
5. What have mathematicians discovered about the ratio of the circumference C to the diameter d ?
6. Do we usually speak of a perimeter of a circle or do we rather use the term circumference? Why?

VII. Translate sentences 4, 10, 13, 14, 15, 17 of the text above (written).

Laboratory Assignment I

VIII. Follow the speaker as he is reading the words. Mind the stress.

'compass, 'circle, 'center, 'figure, 'fortune, 'ratio, 'segment, 'symbol, 'distance, 'cover, 'equal; con'tain, a'bove, al'low, ob'tain, be'cause, de'note, en'close, in'stead, a'round, en'circle, dis'cover; 'radius, 'radii, di'ameter, pe'rimeter, in'terior, ex'terior, 'property.

IX. Read these words after the speaker and guess the meaning of the italicized words.

radius—*radial*; sharp—*sharply*—to sharpen; center (centre) *n*—to center—central—*centralize*—to concentrate; circle—circular—*to encircle*; fortunately—*fortune n*—unfortunately—*misfortune n*; to discover—discovery—*undiscovered*; to express—*expressive*—expression—*expressionless*; same—*sameness*; to add—addition—*additive*; slightly—*slight a*; part *n, v*—*partly*—*partial*; curve—*curvature*.

X. Change the following according to the model.

Sp.: When we study geometry we...

St.: When studying geometry we...

- a) 1. When we measure the distance we... . 2. When they use this system they... . 3. When you divide a decimal fraction you... . 4. When we deal with this kind of problems we... .

Sp.: When the scientist was showing the film he...

St.: While showing the film the scientist...

- b) 1. When the student was speaking at the seminar he... . 2. When the operator was getting ready for the work he... . 3. When the young men were discussing their plans they... . 4. When they were considering the results of our experiments they... .

Sp.: If you know the measure of the sides you can...

St.: Knowing the measure of the sides you can...

- c) 1. If you apply this rule you will... 2. If he uses an automatic computer he must... 3. If one extends the segment one will... 4. When they perform such operations they...

Sp.: I have got a book which deals with computers.

St.: I have got a book dealing with computers.

- d) 1. I know the man who teaches you English. 2. Give me the journal which lies on the table. 3. I must see the scientists who work in this lab. 4. The letters which name the angles are A, B, C.

Sp.: The material which is used in the article is...

St.: The material used in the article is...

- e) 1. The calculations which were made are... 2. The value which was divided equalled... 3. The information which was produced by them was... 4. The result which was obtained had to be published.

- XI. a) *Listen to the new words of the lesson and repeat them;*
b) *Follow the speaker as he is reading the text 'Circles'.*

XII. *Listen to the questions below and give 'yes' or 'no' answers.*

1. Can one draw a circle by using a compass? 2. Are all the points in a circle equidistant from the center? 3. Does a diameter contain two radii? 4. Is the center of the circle one of the endpoints of the radius? 5. Is a chord curved? 6. Is an arc curved? 7. Can a chord serve as a diameter? 8. Can we find the measure of the circumference by adding the measure of the segments? 9. Does a circle contain any segments? 10. Does the formula $\frac{C}{d} = \pi$ mean the same as

$$\frac{C}{2r} = \pi?$$

Classwork II

XIII. *Read these words and stress them properly.*

compass, complete, around, enclose, curve, sharply, circle, equidistant, distance, radius, radii, diameter, contain, interior, exterior, symbolize, instead, perimeter, circumference, measure, matter, because, fortune, fortunately, express, denote, twice, ratio, property, obtain, design.

XIV. *Go back to ex. IX. Read the words of the exercise and give the Russian equivalents of the italicized words.*

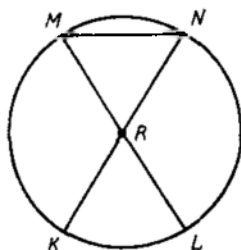
XV. *Ask questions to which the sentences of ex. III could be answers.*

XVI. *Listen to your teacher's statements and ask questions about them.*

XVII. *Read the text 'Circles' and translate sentences 4, 10, 13, 14, 15, 17.*

XVIII. Use the figure for completing the following statements.

a) 1. RM is called a ... of the circle. 2. KN is twice as long as ... 3. LM is called a ... of a circle. 4. RL has the same length as ... 5. $\triangle MRN$ is an ... triangle. 6. Point R is called the ... of the circle and the ... of $\angle KRL$. 7. $\overline{MN}$ is called ... of a circle.



8. $\widehat{MN}$ is called an ... 9. $\angle MRN$ is an ... angle. 10. $\angle MRK$ is a ... angle.

b) 1. No matter how short an arc is, it is... at least slightly. 2. The term circumference means... 3. A diameter is a chord which... 4. A circle is a set of points in a plane each of which... 5. We cannot find the circumference of a circle by adding...

XIX. Answer your teacher's questions in connection with the text 'Circles'.

XX. Before you begin working with the text 'Circumference of a Circle' read the words below and guess their meaning.

'formula n , 'limit n , v , approxi'mation, approximate [ə'prɒksimeɪt] v , approximate [ə'prɒksimɪt] a , bi'sect v , 'regular, 'octagon, to 'illustrate.

Read the notes.

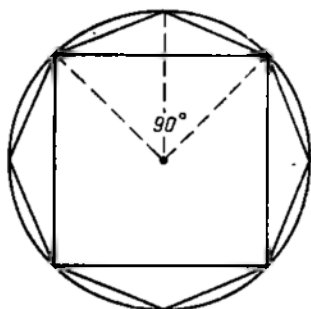
1. in other words — иными словами
2. to arrive at this more precise definition — для того чтобы прийти к такому более точному определению

Read the text below.

Circumference of a Circle

1. In traditional approaches (подход) to mathematics, the circumference of a circle has not always been clearly defined. 2. That is, sometimes the circle itself was called the circumference, and at other times, the measure of the distance around the circle was called the circumference. 3. Here we shall define the circumference as the perimeter of the circle, in other words¹, the measure of the entire path (весь путь) formed by the circle. 4. This definition is symbolized by the formula $C = \pi d$ or the formula $C = 2\pi r$. 5. There exist more precise (точные) definitions of a circumference. 6. To arrive at this more precise definition², it is necessary to introduce the concept of limits. 7. By using the limit concept, the circumference of a circle may be defined as the limit of the perimeter of an inscribed (вписанного) regular polygon. 8. To illustrate this, we can first inscribe a square in a circle. 9. The sum of the sides of the square will be an approximation of the circumference of the circle. 10. Then, bisecting the central angles, which are subtended (стянуты) by the sides of

the square we can inscribe a regular octagon. 11. The sum of the sides of the octagon will be a closer approximation of the circumference. 12. Next, bisecting the central angles subtended by the sides of the octagon, we can inscribe a regular 16-gon. 13. The sum of the sides of the 16-gon will be an even closer approximation of the circumference. 14. By a similar process we can then inscribe a regular 32-gon and 64-gon, and so on. 15. Clearly the sum of n sides of an inscribed regular n -gon can be made to approximate the circumference of the circle as closely (близко) as desired by choosing n sufficiently (достаточно) large. 16. Thus the circumference of a circle may be defined as the limit of the perimeter of an inscribed regular n -gon as n increases.



Homework I

XXI. Translate these combinations of words.

to introduce new ideas and concepts; clearly defined; unlimited possibilities; the closest approximation; at regular intervals; precise calculations; an approximate number; approximately 5,000,000 people; an irregular octagon; can be illustrated experimentally; the perimeter of the polygon; subtended angles; an inscribed quadrilateral; sufficient time; insufficient information; to bisect an angle; an unusual approach; to approach closely; a traditional understanding.

XXII. Compare these groups of sentences. Translate them.

When asked about it he had to...
When given the information,
they were able to...
If asked to do it, we could...

When he was asked about it he...
When they were given the
information they had to...
If we are asked to do it, we
shall have to...

If told about it, she will...

If she is told about it, she will
be able to...

When (if) shown the machine he
may...

When (if) he is shown the machine
he may...

XXIII. Note the use of the Participle in the sentences to follow. Name the subject and the predicate in the sentences and translate them.

1. The procedure being used seems complicated. 2. Newton created his theory of Universal Gravitation being only 24 years old. 3. Having made a great number of experiments Faraday discovered electromagnetic induction. 4. The definition arrived at was sufficiently precise. 5. The results obtained changed the entire picture. 6. The students found the laboratory closed. 7. Having been properly approached

ched the problem appeared easy to solve. 8. Physical facts expressed in terms of mathematics do not seem unusual nowadays. 9. The method followed appeared interesting and quite new. 10. When asked about the measure of the circumference he could not say anything. 11. Given the measure of two of the three sides of the triangle and the angle between them, one can define the length of the third side. 12. If directed properly, the particles will be constantly accelerated. 13. The approach to the problem being considered remained traditional.

XXIV. *Ask questions to which the sentences below could be the answers.*

1. This is a traditional approach to the solution of such equations. 2. Having obtained sufficient information the scientists continued research. 3. I insist on his making precise measurements. 4. The entire situation was quite clear. 5. The words 'way' and 'path' sometimes mean the same thing. 6. We are to limit our discussion to only a few questions. 7. Yes, all the foreign delegates have already arrived. 8. Yes, the concepts introduced should be considered in detail.

XXV. *Read the text (2nd) and analyse the sentences you find difficult to understand. Pay special attention to sentences 3, 5, 6, 7, 8, 10, 14, 15.*

XXVI. *Write a plan of both of the texts of the lesson to help you while speaking on 'Circles' and 'Circumference of a Circle' and discussing the subject with your class-mates.*

Laboratory Assignment II

XXVII. *Listen to the speaker as he is reading the new words of the text 'Circumference of a Circle'.*

formula, traditional, to introduce, limit n , v , approximation, approximate a , to approximate, to bisect, regular, octagon, to illustrate, to subtend, to inscribe, sufficient, approach n , v , closely, entire, path, to arrive.

XXVIII. *Listen and repeat. Guess the meaning of the words in italics.*

circle—*circular*—to encircle; clear—*clearly*—to clarify; entire—*entirely*; to exist—*existence*—*existent*; to arrive—*arrival* n ; precise—*precision*—*precisely*; necessary—*necessity*—*unnecessary*; limit n , v —*limited*—*unlimited*—*limitless*—*limitation*; regular—*regularly*—*regularity*—*irregular*; to illustrate—*illustration*—*illustrative*; square—*squared*; to approximate—*approximation*—*approximately*; octagon—*octagonal*; close—*to disclose*—*closure*—*closeness*—*closely*; sum n , v —*summarize*; similar—*similarly*—*similarity*; to desire—*undesired*—*desirable*—*undesirable*; sufficiently—*sufficient*—*insufficient*; formula—*to formulate*.

XXIX. *Change the following according to the model.*

Sp.: *After we had found the measure we...*

St.: *Having found the measure we...*

a) 1. After we had defined the area of the triangle we were to... 2. After they had slightly changed the path they were able to... 3. After we had discussed the traditional approach we decided... 4. After you had inscribed the regular polygon you had to... 5. After the teacher had introduced the limit concept he passed over to... 6. After they had arrived at this conclusion they expected... .

Sp.: When (if) *the method* is used properly *it* must...

St.: When (if) used properly *the method* must...

b) 1. When *an angle* is bisected *it* may... . 2. If *the students* are given this task *they* will be able to... . 3. When *a polygon* is inscribed *it* will... . 4. If *the plan* is changed slightly *it* can... . 5. If *the article* is translated correctly *it* can be sent... . 6. When *the student* was allowed to take part in this work *he* was able to... .

Sp.: The method *which is being applied* seems...

St.: The method *being applied* seems...

c) 1. The procedure which is being followed is... . 2. The area which is being enclosed is... . 3. The segments which are being extended in both directions represent... . 4. The ratio which is being defined must... . 5. The octagon which is being inscribed has... . 6. The illustration which is being presented has disclosed... .

Sp.: The lecture *was followed* by experiments.

St.: The lecture *followed* by experiments *was*...

d) 1. The angle was subtended by a chord. 2. The lecture was followed by a discussion. 3. The discussion was followed by a statement. 4. The statements were followed by some illustrations.

XXX. *Follow the speaker as he is reading the text 'The Circumference of a Circle'.*

XXXI. *Listen to the questions about the text and write 'yes' or 'no' answers.*

1. Can one define the circumference of a circle? 2. Has the circumference of a circle been always clearly defined? 3. Is there only one definition of a circumference? 4. Can we define the circumference as the perimeter of the circle? 5. Is the definition of the circumference symbolized by the formula $C=2\pi d$? 6. Is the limit concept necessary for a precise definition? 7. Can one inscribe only a limited number of polygons in a circle? 8. Is the radius twice as long as the diameter? 9. Is the diameter twice as long as the radius? 10. Can one continue the process of bisecting the central angle indefinitely? 11. Is the area of the inscribed polygon greater than the area of the circle? 12. Is the area of the circle less than the area of the inscribed polygon?

Classwork III

XXXII. Read the words of ex. XXVII and stress them properly.

XXXIII. Read the words of ex. XXVIII and give their Russian equivalents.

XXXIV. Go back to ex. XXIII. Ask questions to which the sentences of this exercise could be answers.

XXXV. Note the differences in the functions of the italicized words. Translate these sentences.

1. There was a man in the *center* of the circle. 2. All the children *centered* around the teacher. 3. Each angle of an equilateral triangle *measures* 60° . 4. All radii of the same circle have the same *measure*. 5. Computers like the ones *pictured* in this book are complicated. 6. Will you draw a *picture* of some polygon? 7. Mathematical measurements have many practical *uses* everywhere. 8. Without *using* your knowledge of unit *measure* you cannot expect to *measure* perimeters or volumes of geometric objects.

XXXVI. Read the text 'Circumference of a Circle' and translate sentences 3, 5, 6, 7, 8, 10, 14, 15.

XXXVII. Listen to your teacher's statements and say whether they are true or false. If you disagree, say why.

XXXVIII. Answer your teacher's questions in connection with the text.

XXXIX. Discuss both texts of the lesson. Ask each other questions or render the texts making use of the plan you have written at home. Work in pairs.

XL. Say the following in English.

инными словами; это определение представлено следующей формулой; существует более точное определение; независимо от того как; путем деления угла пополам; можно легко вписать; дважды в месяц; прийти к заключению; к счастью для математиков; традиционный подход к решению таких задач; это соотношение выражено; поскольку длина диаметра вдвое больше длины радиуса; вместо того, чтобы определять; чтобы проиллюстрировать это, мы можем рассмотреть; периметр круга может быть измерен; с помощью аналогичной процедуры; вписанный правильный n -угольник.

Classwork I

Grammar: The Absolute Participle Construction

I. *Read these sentences and see how the Absolute Participle Construction is translated into Russian.*

a) 1. The sides of a triangle having the same measure, the angles opposite these sides have the same degree measure. 2. Numbers 5.168 and 3.8 being names for fractional numbers, we may write the above division as a complex fraction. 3. The measure of the circumference (being) given, you can find the area of the interior of the circle. 4. a and b being real numbers, the general expression $a+bi$ represents a complex number. 5. The problem having been stated, the students could begin solving it. 6. With the distance (having been) defined, you can expect to find the speed. 7. With the temperature changing constantly, we could not make precise measurements. 8. With an object moving at constant speed, the distance covered is directly proportional to time.

b) 1. Every measurement can be named in many different ways, the most convenient name being chosen in every case. 2. We have drawn a triangle, the measure of its altitude being three times the measure of its base. 3. Electronic computers use binary numerals, 1 being represented by an electric circuit with the switch *ON* and 0 being represented with the switch *OFF*. 4. The area of a circle is given by the formula $A=\pi r^2$, r representing the radius.

II. *Compare the following.*

1. The students having passed their exams, their teacher could...— Having passed their exams the students could... . 2. The article being published, he decided...— Being published the article caused a lot of discussion. 3. The information having been obtained, they were able to...— Having been obtained the information disclosed that... .

Homework I

Words to be Learned

Read these international words and guess their meaning.

region ['ri:dʒən] *n*, theorem ['θiəɾəm] *n*, total *a*.

Read these words.

stretch вытягивать(ся), растягивать(ся)

relationship [ri'leifənʃɪp] взаимодействие, соотношение

ропе веревка, шнур
unit ['ju:nit] 1. единица; 2. единица измерения
dash черточка, штрих
several ['sevrəl] несколько

'credit *n* 1. доверие, вера; 2. за-
слуга; *v* приписывать (за-
слугу)
area ['æriə] площадь

Notes

1. Pythagoras... is credited with — Пифагору... приписывают заслугу

2. to begin with — изначально, для начала

III. *Translate into Russian the following groups of words and sentences. Mind the place of the Absolute Participle Construction with respect to the Principal Clause.*

1. The angle measure being known, we can... . 2. The definition given, it is possible... . 3. The statement being false, one cannot expect... . 4. All the other conditions being equal, it is necessary... . 5. With the experimental work completed, they could publish the results obtained. 6. With the first question considered, we can pass over to the next one. 7. There being no solution for the problem presented, it was difficult to... . 8. The previous chapter dealt with polygons, this type of geometric figures being very important in studying geometry. 9. Pythagoras having noticed this relationship, we credit him with the proof of the problem. 10. Other things being equal, the given relationship holds for this particular case.

IV. *Ask questions using the question-words in brackets.*

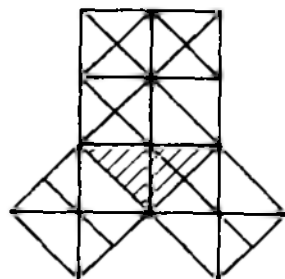
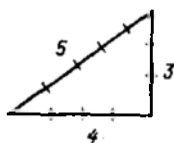
1. Pythagoras succeeded in stating this relationship. (in what way). 2. You have to stretch these ropes. (why). 3. I know several proofs of this theorem. (who). 4. This region of the area is dashed. (why). 5. Two right triangles are to be constructed in the given region. (how). 6. The sum of the four triangles makes the total area of this square. (why). 7. To begin with, we shall divide the entire area into several equal units. (what). 8. The proof of the theorem stated seemed rather complicated. (the proof of which theorem).

V. *a) Read the text below; b) Analyse the sentences you find difficult to understand and translate them. Pay special attention to sentences 1, 2, 7, 8, 9, 16, 21, 24.*

The Pythagorean Property

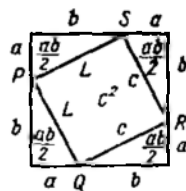
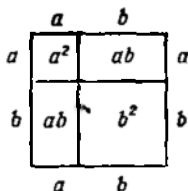
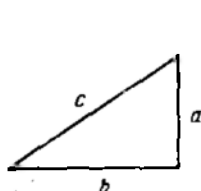
1. The ancient Egyptians discovered that in stretching ropes of lengths 3 units, 4 units and 5 units as shown below, the angle formed by the shorter ropes is a right angle. 2. The Greeks succeeded in finding other sets of three numbers which gave right triangles and

were able to tell without drawing the triangles which ones should be right triangles, their method being as follows. 3. If you look at the illustration you will see a triangle with a dashed interior. 4. Each side of it is used as the side of a square. 5. Count the number of small triangular regions in the interior of each square. 6. How does the number of small triangular regions in the two smaller squares compare with the number of triangular regions in the largest square? 7. The Greek philosopher and mathematician Pythagoras noticed the relationship and is credited with the proof of this property known as the Pythagorean Theorem or the Pythagorean Property. 8. Each side of a right triangle being used as a side of a square, the sum of the areas of the two smaller squares is the same as the area of the largest square.



Proof of the Pythagorean Theorem

9. We should like to show that the Pythagorean Property is true for all right triangles, there being several proofs of this property. 10. Let us discuss one of them. 11. Before giving the proof let us sta-



te the Pythagorean Property in mathematical language. 12. In the triangle above, c represents the measure of the hypotenuse, and a and b represent the measures of the other two sides. 13. If we construct squares on the three sides of the triangle, the area-measure will be a^2 , b^2 and c^2 . 14. Then the Pythagorean Property could be stated as follows: $c^2 = a^2 + b^2$. 15. This proof will involve working with areas. 16. To prove that $c^2 = a^2 + b^2$ for the triangle above, construct two squares each side of which has a measure $a+b$ as shown above.

17. Separate the first of the two squares into two squares and two rectangles as shown. 18. Its total area is the sum of the areas of the two squares and the two rectangles.

$$A = a^2 + 2ab + b^2.$$

19. In the second of the two squares construct four right triangles. 20. Are they congruent? 21. Each of the four triangles being

congruent to the original triangle, the hypotenuse has a measure c . 22. It can be shown that $PQRS$ is a square, and its area is c^2 . 23. The total area of the second square is the sum of the areas of the four triangles and the square $PQRS$. $A = c^2 + 4 \left(\frac{1}{2} ab \right)$. The two squares being congruent to begin with², their area measures are the same. 25. Hence we may conclude the following:

$$a^2 + 2ab + b^2 = c^2 + 4 \left(\frac{1}{2} ab \right)$$

$$(a^2 + b^2) + 2ab = c^2 + 2ab.$$

26. By subtracting $2ab$ from both area measures we obtain $a^2 + b^2 = c^2$ which proves the Pythagorean Property for all right triangles.

VI. Which sentences in the text above answer these questions?

1. Could the ancient Greeks tell without drawing the triangles which ones would be right triangles? 2. Who noticed the relationship between the number of small triangular regions in the two smaller squares and in the largest square? 3. Is Pythagorean Property true for all right triangles? 4. What must one do to prove that $c^2 = a^2 + b^2$ for the triangle under consideration? 5. What is the measure of the hypotenuse if each of the four triangles is congruent to the original triangle?

VII. Translate sentences 1, 2, 7, 8, 9, 16, 21, 24 of the text (written).

Laboratory Assignment I

VIII. Follow the speaker as he is reading the words. Mind the stress.

'method, 'follow, 'region, 'notice, 'credit, 'area, 'useful, 'product, 'either, 'angle, 'square, 'total, 'measure; com'pare, cons'truct, in'volve, ob'tain, re'sult, sup'pose, be'cause, bet'ween, suc'ceed, dis'cover; 'several, 'origin, 'definite, 'radial, 'integer, in'terior, ex'terior, ap'proximate *a*, 'separate *a*.

IX. Read the words after the speaker. Think of the Russian equivalents of the italicized words.

region—*regional*; total—*totally*—*totality*; to credit—*to discredit*; to compare—*comparison*—*comparable*—*incomparable*; relationship—*interrelation*; to succeed—*success*—*successful*—*successfully*—*unsuccessful*; angle—*angular*; to involve—*involvement*; to conclude—*conclusion*; to notice—*unnoticed*.

X. Change the following according to the model. Use the Absolute Participle Construction.

Sp.: Since (as) the definition is given we can...

St.: The definition being given, we can...

a) 1. As the number of elements is known we must... 2. Since the total area equals the sum of the squares we may... 3. Since the temperature increases we may expect... 4. As the theorem is stated correctly we need not...

Sp.: After the region had been separated we began...

St.: The region having been separated, we began...

b) 1. After the data had been obtained the scientist could... 2. After the advantages of the system had been discussed the operator agreed... 3. After the new method had been accepted they changed... 4. After an appropriate solution had been found we decided to continue...

XI. *Listen to the new words of the lesson and repeat them.*

XII. *Follow the speaker as he is reading the text 'The Pythagorean Property'.*

XIII. *Listen to the questions below and give 'yes' or 'no' answers.*

1. Can each side of every triangle be used as the side of a square? 2. Can you inscribe triangular regions in a square? 3. Was Pythagoras a philosopher? 4. Is there only one proof of the Pythagorean theorem? 5. Is the Pythagorean Property true for all triangles? 6. Is it possible to state the Pythagorean Property in mathematical language? 7. Does the proof of the Pythagorean Property involve working with areas? 8. Is each of the four triangles congruent?

Classwork II

XIV. *Read these words and stress them properly.*

ancient, Egypt, Egyptian, cover, discover, angle, succeed, without, triangle, illustration, to illustrate, region, compare, comparable, philosopher, several, represent, hypotenuse, involve, total, area, original, congruent, conclude, conclusion, subtract, property, language, follow.

XV. *Go back to ex. IX. Read the words and give their Russian equivalents.*

XVI. *Change the sentences of ex. III according to the following model.*

T.: The angle measure being known, we can...

St.: Since (as, if, when) the angle measure is known we can...

XVII. *Ask questions to which the sentences of ex. IV could be answers.*

XVIII. *Read the text 'The Pythagorean Property' and translate sentences 1, 2, 7, 8, 9, 16, 21, 24.*

XIX. Answer your teacher's questions in connection with the text.

XX. a) Speak on the 'Pythagorean Property'. Draw a picture to help you while speaking; b) Could you give some other proof of the same theorem? Try.

XXI. Before you begin working with the text 'Square Root' read these words and guess their meaning.

'positive, 'negative, 'radical n , re'sulting a , ir'rational, se'lect.

Read these notes.

1. is about as near to 4^2 as — примерно так же приближается к 4^2 , как

2. in order to make sure — чтобы убедиться

Read the text below and give the gist of it in Russian after you have read it.

Square Root

1. It is not particularly useful to know the areas of the squares on the sides of a right triangle, but the Pythagorean Property is very useful if we can use it to find the length of a side of a triangle. 2. When the Pythagorean Property is expressed in the form $c^2 = a^2 + b^2$, we can replace any two of the letters with the measures of two sides of a right triangle. 3. The resulting equation can then be solved to find the measure of the third side of the triangle. 4. For example, suppose the measures of the shorter sides of a right triangle are 3 units and 4 units and we wish (хотим) to find the measure of the longer side. 5. The Pythagorean Property could be used as shown below:

$$c^2 = a^2 + b^2, \quad c^2 = 3^2 + 4^2, \quad c^2 = 9 + 16, \quad c^2 = 25.$$

6. You will know the number represented by c if you can find a number which, when used as a factor twice, gives a product of 25. 7. Of course, $5 \times 5 = 25$, so $c = 5$ and 5 is called the positive square root (корень) of 25. 8. If a number is a product of two equal factors, then either (любой) of the equal factors is called a square root of the number. 9. When we say that y is the square root of K we merely (всего лишь) mean that $y^2 = K$. 10. For example, 2 is a square root of 4 because $2^2 = 4$. 11. The product of two negative numbers being a positive number, -2 is also a square root of 4 because $(-2)^2 = 4$. The following symbol $\sqrt{\quad}$ called a radical sign is used to denote the positive square root of a number. 12. That is $\sqrt{K}$ means the positive square root of K . 13. Therefore $\sqrt{4} = 2$ and $\sqrt{25} = 5$. 14. But suppose you wish to find the $\sqrt{20}$. 15. There is no integer whose square is 20, which is obvious (очевидно) from the following computation. $4^2 = 16$ so $\sqrt{16} = 4$; $5^2 = 25$ so $4 < a < 5$, $5^2 = 25$, so $\sqrt{25} = 5$. 16. $\sqrt{20}$ is greater

than 4 but less than 5. 18. You might try to get a closer approximation of $\sqrt{20}$ by squaring some numbers between 4 and 5. 19. Since $\sqrt{20}$ is about as near to 4^2 as 1 to 5^2 , suppose we square 4.4 and 4.5.

$$4.4^2 = 19.36 \quad a^2 = 20 \quad 4.5^2 = 20.25$$

20. Since $19.36 < 20 < 20.25$ we know that $4.4 < a < 4.5$. 21. 20 being nearer to 20.25 than to 19.36, we might guess that $\sqrt{20}$ is nearer to 4.5 than to 4.4. 22. Of course, in order to make sure² that $\sqrt{20} = 4.5$, to the nearest tenth, you might select values between 4.4 and 4.5, square them, and check the results. 23. You could continue the process indefinitely and never get the exact (точное) value of 20. 24. As a matter of fact, $\sqrt{20}$ represents an irrational number which can only be expressed approximately as rational number. 25. Therefore we say that $\sqrt{20} = 4.5$ approximately (to the nearest tenth).

Homework II

XXII. *Translate these combinations of words.*

a positive answer, a negative reaction, to get to the root of the matter, either of these two possibilities, the resulting answer, a good selection of journals, the speed is approximately equal to, the wishes and the possibilities, twice as much, twice as many, the radical elements, the radical sign, the exact time, rational and irrational numbers, valuable information.

XXIII. a) *Replace the Absolute Participle Construction with a subordinate clause in sentences 1—5.*

1. All the necessary changes having been made, the experiment showed different results. 2. All the other conditions remaining the same, the temperature differs but slightly from the original temperature. 3. With the period of rotation being constant, we may expect... 4. With the work completed, it was possible... 5. The area was defined, the measurements having been made with the help of a compass and a ruler. 6. While calculating the mass of an object we are to remember... 7. When asked to compare the two approaches he agreed immediately. 8. Having multiplied both fractions by the same number we actually did not change the value of the fractions.

b) *Translate all the sentences given above.*

XXIV. *Ask questions to which the sentences below could be answers.*

1. The origin of mathematics is rooted in the ancient world. 2. Both positive and negative roots will be dealt with in this chapter. 3. Wishing to know the average speed of the automobile one has to divide the total time by the distance covered. 4. The word wish has the same meaning as the word desire. 5. He illustrated his words with the obvious facts. 6. I merely wished to express the same idea in a different way.

XXV. Read the text (2nd) and analyse the sentences you find difficult to understand. Pay special attention to sentences 6, 11, 21, 22. Translate them.

XXVI. Write a short summary of both of the texts of the lesson retaining the most essential information.

Laboratory Assignment II

XXVII. Listen to the speaker as he is reading the new words of the text 'Square Root'.

positive, negative, radical, resulting, wish, merely, root, square root of, a squared (a^2), twice, exact, irrational, approximation, obvious, either, select, particularly.

XXVIII. Listen and repeat. Guess the meaning of the italicized words.

particularly—*particular*; length—*long*; triangle—*triangular*; to express—*expressive*; to replace—*replacement*; to represent—*representation*—*representative* *n*; obvious—*obviously*; approximation—*approximately*—*approximate* *a*, to approximate; rational—*irrational*—*rationalize*; to select—*selection*—*selective*; definite—*indefinite*—*indefinitely*; to continue—*to discontinue*—*continuation*—*continuous*—*continuously*—*continuity*; integer—*integral*—*integrity*—*integration*; able—*ability*—*to enable*.

XXIX. Change the following according to the models.

Sp.: *If the temperature increases*, the volume of the gas will...

St.: *The temperature increasing*, the volume of the gas will...

- a) 1. If a line segment extends in both directions, we shall get... .
2. When the production of these materials increases it will be easier to... . 3. If this rule applies to the method under consideration, we must... . 4. Since these systems differ but slightly it is no use replacing... .

Sp.: All the assumptions *being considered*, they found it possible to...

St.: All the assumptions *considered*, they found it possible...

- b) 1. The existence of these elements *being discovered*, they found it necessary... . 2. All the conditions *being stated*, the solution seemed... . 3. The program *having been realized*, the members of the group could... . 4. A consistent study *having been completed*, we were able to present... .

Sp.: The students *having finished* the translation, their teacher took... (after)

St.: *After the students had finished* the translation their teacher took...

- c) 1. His recent article *being published*, he is able to... . (as).
2. The first results *having been obtained*, they decided to continue... .

(when). 3. The group of scientists having succeeded in finding a new approach to the problem, they were allowed to... (since). 4. Their objections being essential, we agreed to... (since).

XXX. *Listen to the speaker as he is reading the text 'Square Root'.*

XXXI. *Listen to the questions about the text and write 'yes' or 'no' answers.*

1. Can we find the measure of the third side of a triangle by applying Pythagorean Property? 2. Is there a number which when used twice gives a product of 16? 3. Is 2 the square root of 5? 4. Is the product of two negative numbers also a negative number? 5. Is the radical sign used to denote a positive square root? 6. Does the $\sqrt{20}$ represent a rational number?

Classwork III

XXXII. *Read the words of ex. XXVII and stress them properly.*

XXXIII. *Read the words of ex. XXVIII and give their Russian equivalents.*

XXXIV. *Go back to ex. XXIII. Ask questions to which the sentences of the exercise could be answers.*

XXXV. *Read these sentences and state the functions of the ing-forms.*

1. We have defined these sets as being equal. 2. Let us try dividing these numerals. 3. It is no use performing this operation now. 4. Having reduced the fraction we obtained the expected result. 5. The entire situation is being slightly changed. 6. We know of their having succeeded in finding an appropriate explanation. 7. When working with these signs one must be very careful. 8. On obtaining the difference one must check the result by addition to make sure it is correct. 9. Being reduced to its lowest terms the fraction is not changed. 10. Reducing the fraction to its lowest terms leaves it unchanged.

XXXVI. *Read the text 'Square Root' and translate sentences 6, 11, 21, 22.*

XXXVII. *Listen to the following statements and say whether they are true or false. If you think they are false say why. Begin your answer with: 'On the contrary...', 'I am afraid...'*

XXXVIII. *Answer questions in connection with the text 'Square Root'.*

XXXIX. *Speak on 'The Pythagorean Property' and the 'Square Root'. Work in pairs.*

XL. Say the following in English.

а) 1. Если число представляет собой произведение двух равных сомножителей, тогда любой из этих равных сомножителей называется корнем квадратным этого числа. 2. Когда мы говорим, что y есть корень квадратный от K , мы всего лишь имеем в виду, что $y^2 = K$. 3. Свойство Пифагора очень полезно для нахождения длины стороны треугольника. 4. Когда свойство Пифагора выражено в форме $c^2 = a^2 + b^2$, мы можем заменить любую из двух букв величиной двух сторон правильного треугольника. В результате решения уравнения мы получим величину третьей стороны треугольника. 5. Используя свойство Пифагора, мы находим корень квадратный либо суммы, либо разности квадратов.

б) мы можем заменить c^2 величиной; предположим, например; говоря это, мы имеем в виду следующее; 20 больше чем 4, но меньше чем 5; мы можем продолжать этот процесс бесконечно.

Home-reading

Read the text below and translate it into Russian. The text contains some international words whose meaning you can guess.

How to learn a Foreign Language

You can learn a foreign language. This is a true statement. It is true because you know your mother tongue ([tɐŋ] язык). And if you were able to learn it, you can learn any language, provided you really want to know it.

If you want to speak a language, you must hear it spoken. It is all very well if you have a teacher who speaks this language well and fluently ([ˈfluːəntli] бегло, свободно) and never uses a word of your mother tongue in class. This makes it possible to learn a new language the natural way—as babies do—by 'imitating. In case there is no teacher whom you can 'imitate, a 'record (пластинка) or a tape recording (магнитофонная запись) might be of great help. If you are mainly interested in reading a language, you do not necessarily need to hear this language spoken. Many people learn both modern languages and dead ones (мертвые) without the help of any teacher.

In fact, there is not any 'magic formula ([ˈfə:mjʊlə] формула) to follow. But there are some general guides ([gaɪd] руководство) that you may find helpful if you want first to speak and then later to read a new language.

Listen. Begin to learn a language by ear ([ˈiə] ухо). Listen to records. Listen to tapes. Turn on your radio ([ˈreɪdiəʊ] радио) and listen.

Imitate. Pronounce ([prəˈnaʊns] произнесите) the sounds of the language you are learning, especially the sounds that are different from the sounds that you produce while speaking your mother tongue. Imitate as closely as possible the intonations.

You should concentrate [*'kɒnsentreit*] on the words that are more often used. And which is very important, you must try to learn and memorize ([*'meməraiz*] запоминать) whole sentences and phrases [*'freiz*] — not just words. Do not separate [*'sepəreit*] words that are put together.

Study. Every language has its own ([*'aʊn*] собственный) 'grammar rules ([*ru:l*] правило). At first you may think that the grammar rules of your mother tongue are more 'sensible (разумный) than the rules of any other language. Do not attempt to reform the grammar of the language you are learning. Do not make it fit (не подгоняйте ее под) the 'pattern (схема) of your own language. You will be wasting ([*'weist*] тратить попусту) time. You must always remember that each language is organized [*'ɔ:gənaɪz*] according to its own grammar. Study the rules and learn to use them.

Some people believe that learning a foreign language is just a matter of memorizing words. You certainly have to build up your vocabulary [*və'kæbjuləri*], but you will never speak or read a language unless you know its grammar rules and are able to use them.

Read. Practise reading journals, and newspapers in the foreign language you are learning. You should even read children books or any other easy-reading series [*'siəri:z*] books you have at your disposal. The more you read, the sooner you will get the 'feel (ощущение, чувство) of the language.

Repeat. Say words, phrases, sentences over and over again until they came out automatically [*ɔtə'mætɪkəli*]. You have to practise just as a 'pianist has to play the piano for hours. You must keep practising constantly or you will get out of practice.

The more you learn, the easier it is for you to learn still (еще) more. Your knowledge of a language is like a 'rolling snowball ([*'snəʊbɔ:l*] снежный ком).

Work systematically. You should learn systematically whether you are taking a class or studying on your own (самостоятельно). Those who do not work hard enough cannot expect to get good results.

When is the best time to start learning a foreign language? You can learn it at any age, but it is much easier if you start young. So the best time to start learning is *NOW*.

There is a good language laboratory at the Mechanics and Mathematics faculty of Moscow University. It can be of great help. But it cannot take the place of a teacher. It 'merely (только) helps a teacher give more help to more students.

Now that you have read and translated the text, write a plan of it in the form of questions to help you while discussing or rendering the text in class.

LESSON 23

Classwork I

Grammar: The Infinitive. Its Forms and Functions

1. *Read these sentences and state the form and the function of the Infinitive.*

a) 1. To solve this equation multiply each term in it by the quantity that precedes it. The first step in solving such a problem is to read the problem carefully to understand it correctly. In order to leave the number unchanged in value we are to multiply it by the same power of ten. We are to consider the following condition so as to imagine the consequences.

b) 1. To prove this theorem means to find a solution for the whole problem. 2. To check the result of the calculation is very important. 3. To give a true picture of the natural world around us is the aim of science. 4. To define which of these numerals is greater is not difficult.

c) 1. The problem has been to simplify the procedure under consideration. 2. Our aim is to extend the previous definition. 3. The purpose of our article was to show the development of this particular area of mathematics. 4. To do this means to reduce the fraction to its lowest terms.

d) 1. Most of the stated problems in the chapter to follow will be problems with two or more unknowns. 2. Now, you are to change the sign of the number to be subtracted mentally. 3. The procedure to be followed depends entirely on the student. 4. There are some important properties of division to be considered at this lesson. 5. Euclid was the first to bring all the known facts about geometry into one whole system. 6. The method to be applied is rather complicated.

e) 1. Students are to study the laws of mathematics and mechanics. 2. It is to be noted that the decimal point separates every three numbers. 3. Use is to be made of the information presented. 4. In working with numerals one is to be very careful with the signs.

f) 1. They must have attended his lecture. 2. You may have seen this article in the book I gave you. 3. This equation must have been solved. They may have obtained the necessary data.

Homework I

Words to be Learned

Read these international words and guess their meaning.
'person *n*, 'start *n*, *v*, 'comment *n*, com'ment *v*, col'lection.

Read these words.

adjust [ə'dʒʌst] приспособить,
регулировать
plant растение
gain выиграть, приобрести
'likely вероятно
viewpoint ['vju:pɔɪnt] точка
зрения
series ['siəri:z] ряд
hear [hiə] (heard [hə:d]) слы-
шать
similar ['similə] подобный
'contents содержимое
be 'long принадлежать
stamp марка
'match-box спичечная коробка

des'cribe описывать
moreover [mɔ:ɾ'ouvə] более
того
purpose ['pə:pəs] цель
dish тарелка
tool инструмент
nevertheless [,neveðə'les] тем
не менее
brace и фигурная скобка; v за-
ключать в скобки
misunderstanding непонимание,
недоразумение
membership ['membəʃɪp] член-
ство

Notes

1. it is generally agreed — общепринято
2. are not likely to change a great deal — вряд ли существенно
изменяется
3. better understanding ... can be gained — можно добиться ...
лучшего понимания
4. at least — по крайней мере, во всяком случае
5. and the like — и тому подобное
6. so that — так что, так чтобы

11. State the function of the Infinitive. Translate these sentences.

1. To find the truth is the aim of our discussion. 2. To know
the truth you must make sure that you have considered every detail.
3. One has to know all the conditions to arrive at a certain conclu-
sion. 4. To arrive at a certain conclusion was the aim of the discus-
sion. 5. To adjust the new program to the existing machine is the
purpose of this work. 6. To adjust the new program we shall have to
do a great deal of work. 7. We must use braces or brackets so as to
avoid misunderstanding. 8. The purpose of his questioning was to
hear everybody's viewpoint. 9. My task has been to comment on the
game. 10. The method to be described is rather convenient. 11. The
tools to be used for this experiment should be very precise. 12. To
belong to a group means to be a member of this particular group.
13. Similar situations will be described in the chapter to follow.
14. This collection of stamps must have belonged to one of them.
15. You may have played football when being a child. 16. You are
to give your viewpoint on the subject.

III. Ask questions to which the sentences below are the answers.

1. I heard your comment. 2. I cannot agree with what I have
heard since it is not true. 3. He described a few similar situations.
4. There must have been some misunderstanding. 5. Our purpose was

to gain some time. 6. This collection of match-boxes belongs to my little brother. 7. It is likely that they will adjust the new machine to the purpose of their research. 8. We must know the truth so as to help him. 9. The computer must be properly adjusted. 10. He stated his viewpoint at the conference. 11. This object belongs to a set of similar objects. 12. We are going to start a new series of experiments.

IV. a) *Read the text below;* b) *Analyse the sentences you find difficult to understand. Pay special attention to sentences 1, 2, 3, 4, 7, 8, 10, 17.*

Set Theory

1. If you stop to think of all the new things that have been developed since you can remember, you will agree with the often repeated comment that you live in a changing world. 2. Nothing can live and be useful without becoming adjusted to the conditions around it. 3. This is as true of mathematics and other areas of knowledge as it is of plants and people. 4. It is generally agreed¹ that the basic truths and most of the fundamental processes of arithmetic and algebra are not likely to change a great deal². 5. Nevertheless, better understanding of the meaning of these relationships and operations can sometimes be gained³ by studying them from a different viewpoint or expressing them in different terms and symbols.

6. One of the more recent approaches to the meanings of algebra is based on the idea of sets of things. 7. Everyone has used the word set at some time to mean a group or series of things to be used together or for a single purpose as a set of dishes, a set of tools and so on. 8. You may have played or at least⁴ you may have heard of—a set of tennis, meaning a particular series of games considered as a group.

9. The meaning of sets in algebra is very similar to the general use of the word. 10. That is, a set means any collection of objects, persons, or ideas that is so defined or limited that one can always tell whether or not a given object or idea belongs to that collection. 11. In other words, a collection of stamps, match-boxes and the like⁵ can be called a set if the contents of the collection is limited to the objects described in the name of the collection. 12. Moreover, you are a member of several sets. 13. The first set of which you became a member was your family. 14. Then when you started to school you became a member of your class, and so on.

15. A set is usually represented by a capital letter. 16. Any object or idea that belongs to a set is called an element of the set. 17. All elements of a set are to be enclosed in braces { } so that⁶ there should be no misunderstanding of what is included in the set.

18. Sets of mathematical objects or ideas are usually collections of particular numbers, points, lines, angles, and so on. 19. As you work with mathematical sets, remember that the term "set" means a

collection which includes all of the numbers, points, or lines that satisfy the stated conditions for membership and which does not include any numbers, points, or lines, that do not satisfy the given conditions.

V. Write a few questions about the text the answers to which might serve as a plan reflecting the main points of the text.

VI. Translate sentences 1, 2, 3, 4, 7, 8, 10, 17 from the text above.

Laboratory Assignment I

VII. Follow the speaker as he is reading the words. Mind the stress.

'basic, 'differ, 'process, 'recent, 'series, 'brackets, 'purpose, 'person, 'limit, 'always, 'content, 'member, 'object *n*; a'gree, re'peat, a'djust, a'round, ap'proach, de'fine, be'long, ob'ject *v*, wi'thout; 'theory, 'general, 'different, 'difficult, 'algebra, 'similar, 'several, 'usual, 'capital, 'element.

VIII. Read these words after the speaker. Guess the meaning of the italicized words.

to develop—*development*; to remember—*remembrance*; to agree—to disagree—*disagreement*; change—*changeless*; useful—*usefulness*—*uselessness*; to adjust—*adjustment*; *knowledge*—to know; different—indifferent—*differentiate*; base—*baseless*; particular—*particularly*; to consider—*consideration*—*considerable*; similar—*similarity*; general—*generalize*—*generality*; collection—to collect—collective—*collectively*; object *n*—*to object*; person—*personal*; limit—*limitless*—limited—*unlimited*; to close—closed—to *enclose*; to understand—to *misunderstand*; to include—*inclusion*; to satisfy—*satisfaction*; purpose—*purposeless*—*purposeful*.

IX. In the following sentences replace the Gerund with the Infinitive according to the models.

Sp.: *Knowing* English is helpful.

St.: *To know* English is helpful.

a) 1. *Finding* out the truth is necessary. 2. *Playing* tennis is rather difficult. 3. *Attending* this seminar is important. 4. *Solving* this task is essential.

Sp.: I like collecting stamps.

St.: I like *to collect* stamps.

b) 1. I expect *hearing* your comment. 2. He began *collecting* books on mathematics. 3. She likes *playing* chess. 4. I expect *being given* the information. 5. He expects *being asked* to speak at the conference.

St.: Here is an example *which must be followed*.

St.: Here is an example *to be followed*.

c) 1. He showed me the book *which must be translated*. 2. He gave me the tools *which had to be adjusted*. 3. The data *which will be obtained* are rather new. 4. The person *who must be given* this work is quite young. 5. The viewpoint that *will be stated* is rather unexpected. 6. There are certain facts *that are to be considered*.

Sp.: The article *presented* seemed...

St.: The article *is to be presented*...

d) 1. The truth *discovered* by them appeared... . 2. The unit *defined* is... . 3. The distance *covered* equalled... . 4. The statement *made* showed... .

X. *Listen to the new words of the text 'Set Theory' and repeat them.*

XI. *Follow the speaker as he is reading the text.*

XII. *Listen to the questions below and give 'yes' or 'no' answers.*

1. Is the world around us changing? 2. Must people become adjusted to the conditions around them? 3. Do the basic truths of arithmetic change a great deal with time? 4. Is one of the recent approaches to mathematics based on sets? 5. Is the meaning of sets in algebra similar to the general use of the word? 6. Can we say that a family is a set? 7. Is a set usually represented by a small letter? 8. Does the notion "set" include various objects?

Classwork II

XIII. *Read these words and stress them properly.*

general, series, algebra, object n , always, approach, capital, to adjust, limit, to define, similar, several, purpose, around, to object, without, content n , to belong, element, basic, to enclose, to satisfy, to include, particular.

XIV. *Go back to ex. VIII. Read the words and give their Russian equivalents.*

XV. *Read these groups of words. Give their Russian equivalents.*

a theoretical approach; a proper adjustment; algebraic theories; a purposeless discussion; problems of similarity; to generalize the statement; a personal question; an idealistic position; a careful description; a familiar picture; satisfaction with one's work; to misuse one's ideas; a usual misunderstanding; a truthful description; a baseless statement.

XVI. *Ask questions for which the sentences of ex. II provide the answers.*

XVII. *Read the text 'Set Theory' and translate sentences 1, 2, 3, 4, 7, 8, 10, 17.*

XVIII. Discuss the text. Ask each other questions you wrote at home. Observe the logical sequence in asking questions.

XIX. Before you begin working with the text 'Solution Sets' read these words and guess their meaning.

specific, 'planet, 'orbit, 'Jupiter, 'Mercury, des'cription.

Read the notes.

1. you are sure to remember — вы, разумеется, помните

2. in this case — в этом случае

3. orbits of both planets do lie — орбиты обеих планет действительно находятся

Read this text. You are expected to answer a few questions about it.

Solution Sets

1. If each element of a set makes a given statement true, the set is called the solution (решение) set for that statement. 2. You have worked with statements of equality as well as with statements called inequalities. 3. You are sure to remember¹ that the simple fact that one number is not equal to another can be expressed by the symbol of non-equality $\neq$. For example $5-2 \neq 4$. 4. However, to know which of two unequal numbers is the larger we need a more exact description. 5. In this case² we use more specific symbols $<$ or $>$. 6. Therefore a mathematical sentence like $5 \neq 3$ expresses the general inequality, $5 > 3$ stating the specific condition that 5 is greater than 3 and $3 < 5$ showing the specific condition in which 3 is less than 5. 7. In dealing with mathematical sentences you are to choose the correct symbol for a statement to be true. 8. If you choose the incorrect symbol, the statement is false. 9. Similar statements in which the symbol of relationship is given, but one of the required (требуемых) quantities is missing (отсутствует), are called open sentences. 10. Thus, the sentence '— is a planet whose orbit around the sun is smaller than the earth's orbit' is an open sentence. 11. If you write 'Jupiter' in the blank (пробел) you have not made a true statement. 12. The solution set for this open sentence is {Venus, Mercury}, since both of these planets satisfy the two conditions of the required set. 13. That is, the orbits of both planets do lie³ inside (внутри) the earth's orbit and these are the only known planets that do travel (проходят) closer to the sun than the earth does.

14. Mathematical sentences may also be written as open sentences. 15. Thus to write $5 + \_ = 8$ is to write an open sentence whose solution set is {3} since this is the only number that will make this a true statement. 16. The open sentence $5 + \_ > 8$, however (однако), can be completed with any number greater than 3. 17. Therefore, the solution set for this sentence can be written {all numbers greater than 3}. 18. When the numbers from which you are to choose a solution set are limited to a particular group of numbers, it sometimes happens (случается) that there is no solution to satisfy a given

statement. 19. That is, there is no natural number that will make the two statements $5+ \text{---} = 3$ and $5+ \text{---} < 3$ true statements. 20. Therefore, if you are limited to natural numbers the solution for such statements is said to be an empty set, which is indicated by the symbol $\emptyset$.

XX. Now that you have read the text 'Solution Sets', say:

What is specific about these sets? What is an empty set? What is an open sentence?

Homework II

XXI. Note the form and the function of the Infinitive in the sentences below. Look for the Subject and the Predicate. Translate these sentences.

1. The energy to be captured will be directed... 2. Automatic control of the entire process is to be performed. 3. To answer this question means to find a solution for the problem as a whole. 4. To record the information the machine is to be properly adjusted. 5. The article to be published consists of several parts. 6. He may have changed his opinion on the subject. 7. A certain way out of the situation must have been found. 8. The instrument to be used is very sharp. 9. These numerals are to be grouped in a special way so as to represent a certain sequence. 10. Christopher Columbus was the first to have travelled from Europe to America.

XXII. a) Note the use and the meanings of the verb 'do'. Translate these sentences.

1. These two planets do travel at the same speed. 2. The point does lie inside the triangular region. 3. This system as well as the other one does require a certain modification. 4. This term students do not attend as many lectures as they did during the previous term. 5. The article describes the method worse than the book does.

b) Note the various meanings of the italicized words. Translate the sentences.

1. These equations differ *only* a little. 2. *The only* difference between these statements is easily seen. 3. This is *the very* advantage that makes the new system better than the old *one*. 4. The process being described takes place at *very* high temperature. 5. One and the same word is repeated over and over again.

XXIII. Read the text 'Solution Sets' and analyse the sentences you find difficult to understand. Pay special attention to sentences 3, 4, 6, 7, 13, 15, 18, 20. Translate them.

XXIV. a) Write a short summary of both of the texts of the lesson leaving out the unimportant details; b) Be prepared to render and discuss both texts in class.

Laboratory Assignment II

XXV. *Listen to the speaker as he is reading the new words of the text 'Solution Sets'.*

specific, planet, orbit, Jupiter, Mercury, description, solution, to deal (with), dealt, to require, missing, blank, Venus, inside, to travel, however, particular, to happen, empty *a, v*.

XXVI. *Listen and repeat. Guess the meaning of the italicized words.*

specific—to specify; planet—planetary; orbit—orbital; to require—requirement; inside—outside; to travel—traveller; particular—particularly; empty *a*—emptiness; exact—exactly; to choose—chosen; incorrect—incorrectly; satisfy—satisfaction; earth—earthly; to close—closely—to disclose; open *a*—openly; to indicate—indication.

XXVII. *Change the following according to the model.*

Sp.: He *must state* his viewpoint.

St.: He *must have stated* his viewpoint.

a) 1. He *must give* another definition. 2. She *may take* the journal. 3. He *may accept* their conditions. 4. They *must consider* this proof. 5. He *must measure* the volume of the object.

Sp.: These words *must be included* in the statement.

St.: These words *must have been included* in the statement.

b) 1. The work *must be completed*. 2. Such mistakes *must be avoided*. 3. The results *may be improved*. 4. Their suggestion *must be considered*. 5. The exact location of the object *must be determined*.

Sp.: *In order to understand* it you must...

St.: *To understand* it you must...

c) *In order to speak* English well you have to... 2. *In order to complete* the research they are to... 3. *In order to find* the difference the student had to... 4. *In order to make sure* that everything is correct you ought to... 5. *In order to do it* one should imagine that...

Sp.: The book *which must be published* is...

St.: The book *to be published* is...

d) 1. The information *that must be obtained* can... 2. The assumptions *which must be made* are in agreement with... 3. The alterations *which must be presented* will... 4. The measurements *which must be made* may show... 5. The procedure *that must be followed* may...

XXVIII. *Change the following according to the model. Emphasize the speaker's words.*

Sp.: He *speaks (spoke)* English well.

St.: He *does speak (did speak)* English well.

1. They *came* in time. 2. He *finished* the experiment. 3. They *introduced* the new system last year. 4. He *knows* physics rather well. 5. *I understand* the situation well enough.

XXIX. a) Repeat after the speaker degrees of comparison.

good (well)—better—the best
bad (badly)—worse—the worst
little—less—the least
much (many)—more—the most

b) Replace the Russian word with the English one.

1. This is the (наименьший) common factor. 2. He knows these rules (плохо). 3. She solves such equations (лучше) than I do. 4. She has (меньше) time for her English than you. 5. Try to give (наилучшее) definition. 6. This is the (наихудшее) possible solution of the problem.

XXX. Listen to the speaker as he is reading the text 'Solution Sets'.

XXXI. Give 'yes' or 'no' answers to these questions.

1. Are symbols $<$ or $>$ more specific than the symbol of non-equality $\neq$? 2. Does the mathematical sentence $8 \neq 10$ express the general inequality? 3. Will you write a false statement if you choose the incorrect symbol? 4. Does the orbit of Mercury lie inside the Earth's orbit? 5. Is it possible to write mathematical sentences as open sentences? 6. Does it ever happen that there is no solution to satisfy a given statement?

Classwork III

XXXII. Read the words of ex. XXV and stress them properly.

XXXIII. Read the words of ex. XXVI and give their Russian equivalents.

XXXIV. Go back to ex. XXI. Ask questions to which the sentences of the exercise could be answers.

XXXV. Ask a general question about each one of the sentences of ex. XXII a, b.

XXXVI. Translate these sentences. Note the use of the Infinitive.

1. Kummer was the first to succeed in proving Fermat's last theorem for $p=11, 13$. 2. To solve the mathematical sentences in the section to follow one must understand the meaning of these symbols. 3. This means that to locate this geometric object one is to start from some arbitrarily selected zero point. 4. This publication must have made his name famous. 5. The type of symbols to be introduced are basic to every number system. 6. To make sure that the result you have obtained does agree with the expected one, check it. 7. To hold the situation under control is rather difficult. 8. Our task has been to realize this plan.

XXXVII. Read the text 'Solution Sets' and translate sentences 3, 4, 6, 7, 13, 15, 18, 20.

XXXVIII. *Listen to the teacher's statements and say whether they are true or false. If you think they are false, say why.*

XXXIX. *Answer your teacher's questions in connection with the text.*

XL. *Speak on 'Set Theory' and 'Solution Sets'. Work in pairs.*

XLI. *Say the following in English.*

а) это правило справедливо для; это неравенство можно выразить следующим символом; нам нужно более точное описание; особое условие; имея дело с математическими выражениями; нам предстоит выбрать правильный знак; требуемое множество; планеты проходят путь; если мы ограничены натуральными числами; с другой точки зрения; иными словами; заключать в скобки.

б) *Make use of your knowledge of the Infinitive.*

1. Он первым предложил такое решение. 2. Вписать правильный треугольник в круг не трудно. 3. Первый шаг в решении этого вопроса состоит в том, чтобы понять всю ситуацию. 4. Мы пришли сюда, чтобы обсудить подробности операции. 5. Цель этой статьи — показать новые возможности исследований в этом направлении. 6. Таковы факты, которые должны быть тщательно изучены. 7. Должно быть он сказал правду. 8. Возможно информация была получена вовремя.

XLII. а) *Read the following English text and translate it into Russian. Compare your translation with the one given on the right;*
б) *Practise back translation.*

We know a set is defined as any collection of things related for any reason. When the elements of a set are to be listed and expressed in set notation, they are always to be enclosed between braces. A set of Shakespeare, containing all the famous playwright's works, put on a bookshelf and enclosed between the two sidewalls, comes to mind. We speak of a set of drawing pencils, a set of working tools, etc. The drawing pencils are kept in a box especially designed for that purpose. The working tools are kept together in suitable containers.

Мы знаем, что множество определяется как некое собрание предметов, связанных между собой по тому или иному признаку (причине). Когда элементы множества надо перечислить и выразить с помощью системы обозначения множеств, они всегда должны быть заключены в скобки. На ум приходит собрание Шекспира, содержащее все работы знаменитого драматурга, помещенное на книжную полку и заключенное между двумя боковыми стенками. Мы говорим о множестве (наборе) карандашей для рисования, о множестве (комплекте) рабочих инструментов и т. д. Карандаши для рисования хранятся в коробке, специально

сделанной для этой цели. Рабочие инструменты хранятся вместе в соответствующих контейнерах.

In mathematics we have various sets of related numbers and although we are not able to put them in a box or on a shelf, we nevertheless can and do put numerals between braces. Thus to write $\{0, 1, 2, 3...\}$ means to write a set of numbers 0, 1, 2, 3, etc.

В математике мы имеем различные множества чисел, связанных между собой, и хотя мы не можем поместить их в коробку или на полку, мы, тем не менее, можем и помещаем числа в скобки. Таким образом, написать $\{0, 1, 2, 3, \dots\}$ значит записать множество чисел 0, 1, 2, 3 и т. д.

LESSON 24

Classwork I

Grammar:

Complex Object. The for-phrase and the Infinitive

I. Read these sentences and note the form and the function of the Infinitive.

a) 1. Let us assume the product (it) to be equal to 10. 2. Suppose the volume of the box (it) to be n . 3. We expect this sentence to be true. 4. One may assume this law to hold for all similar cases. 5. We know mathematics to have become man's second language. 6. We expect a variable or a mathematical expression containing a variable to represent a number. 7. We know two numbers (them) to be relatively prime to each other if their greatest common factor is 1. 8. We expect this solution (it) to satisfy the given statement. 9. Teachers want their students (them) to attend classes regularly. 10. The students saw their teacher (her) draw (drawing) a line segment. 11. We heard them discuss (discussing) similar questions.

b) 1. We have to consider whether it is possible for this sentence to become true. 2. This question is too difficult for him to answer it immediately. 3. It is impossible for the students to solve this equation without knowing the commutative law. 4. For a book to be useful it must be studied carefully. 5. For this sentence to become true you are to replace the variable with the proper numeral.

Homework I

Words to be Learned

Follow your teacher. Read these international words and guess their meaning.

to in'terpret, hori'zontal, com'mutative, co'-ordinate *n, a*, to co'-ordinate, in'terpre'tation, perpen'dicular, graph, non-com'mutative, nu'merical.

Read these words.

Cartesian [ka:'ti:ziən] декар-
тов(о)

im'portance важность, значение

'ordered упорядоченный

still еще, все еще

purposeless ['rə:pəsli:s] бес-
смысленный

of course [ə'kɔ:s] конечно, ра-
зумеется

vice versa ['vaisi'vɜ:sə] наобо-
рот

'label *n* ярлык; *v* обозначать,
отмечать

wonder ['wʌndə] 1. удивлять-
ся; 2. хотеть знать

pre'cede предшествовать

assign [ə'sain] приписывать

upper верхний

axis (*pl* axes) ['æksis], ['æksi:z]
ось

lo'cate определить местонахож-
дение

a'long вдоль

Notes

1. is of some importance — иметь некоторое значение
2. at first — сначала
3. given that — если дано, если задано
4. the Cartesian product of set *A* with itself — декартово про-
изведение множества *A* само на себя
5. you will wonder — вы будете недоумевать
6. perpendicular to each other — перпендикулярны друг к другу

II. *In the sentences to follow look for the Complex Object and then translate the sentences.*

1. We know this magnitude to depend on temperature. 2. We expect them to have intensified the whole process. 3. They did not believe this cooperation to be of great consequence. 4. I expect you to locate the object by applying the rule you have just learned. 5. You cannot see a point moving (move) along the line. 6. I wonder why he considers your experiment purposeless. 7. Everybody knows matter to consist of small particles called atoms. 8. Nobody heard the machine begin operating. 9. For the calculation to be correct you must carry it out carefully. 10. He found the modification to require a lot of work. 11. We believed the advantages of the new computer to be obvious. 12. I expected the new measuring instruments to have been already sent to the laboratory.

III. *Replace the Object Clause with the Complex Object. See the models.*

I want to label this number line with *x*. (*he*)

I want *him* to label this number line with *x*.

- a) 1. They expect to locate this distant object in the sky. (*we*).
2. I should like to draw both of the axes. (*she*). 3. He expects to

4. I want to assign the letter *Y* to the horizontal line. (you). 5. I should like to interpret these facts correctly. (he).

I know *that they use* conventional methods.

I know *them to use* conventional methods.

b) 1. I suppose *that he is* involved in this discussion. 2. I believe *that they are* wrong. 3. He knows *that she has decided* to join his group. 4. I assume *that they have applied* the previously obtained data. 5. They expect *that he continues* working on the last chapter of his book.

I know *him to be* right.

I know *that he is* right.

c) 1. I expect *him to know* these basic laws. 2. I believe *her to understand* such simple sentences. 3. I know *them to be* concerned with developing new machines. 4. We expect *you to be* able to account for this mistake. 5. He expects *you to have* proved the advantages of this system of notation in this particular case.

IV. a) Read the text below; b) Analyse sentences you find difficult to understand. Pay special attention to sentences 4, 8, 14, 18, 19, 20, 21, 25, 26.

The Coordinate Plane

1. Now, we want you to consider two sets: A and B , such that $A = \{a, b, c\}$ and $B = \{d, e\}$. 2. We will form a new set from sets A and B , which we will call the Cartesian product, or simply the product set, by forming all possible ordered pairs (x, y) such that x is from set A and y is from set B . 3. This new set is denoted by $A \times B$ (read A cross B).

$$A \times B = \left\{ \begin{array}{l} (a, d), (a, e) \\ (b, d), (b, e) \\ (c, d), (c, e) \end{array} \right\}$$

4. Let us use the notation $n(A)$ to mean the number of elements in set A and $n(A \times B)$ to mean the number of elements (ordered pairs) in $A \times B$. 5. Observe that $n(A \times B) = 6$ and that $n(A) = 3$ and $n(B) = 2$. 6. Since $3 \times 2 = 6$, we see there is a relationship of some importance¹ between the set operation of forming the Cartesian product and multiplication of numbers $n(A) \times n(B) = n(A \times B)$. 7. Now let us form $B \times A$.

$$B \times A = \left\{ \begin{array}{l} (d, a), (d, b), (d, c) \\ (e, a), (e, b), (e, c) \end{array} \right\}$$

8. You may have noticed that no elements (ordered pairs) of $B \times A$ are the same as those of $A \times B$, though their numbers are still the same. 9. This means that $A \times B \neq B \times A$, while $n(A) \times n(B) =$

$=n(B) \times n(A)$. 10. Forming the product set is a non-commutative operation. 11. In this case it is a non-commutative multiplication.

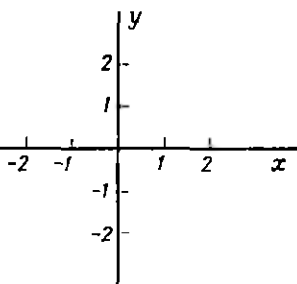
12. In our next step we do something that at first² will seem purposeless. 13. Given that³ set $A = \{a, b, c\}$, we will form the new set $A \times A$.

$$A \times A = \left\{ \begin{array}{l} (a, a), (a, b), (a, c) \\ (b, a), (b, b), (b, c) \\ (c, a), (c, b), (c, c) \end{array} \right\}$$

14. This is, of course, the Cartesian product of set A with itself⁴, and you will wonder⁵ what you can do with it. 15. Its use will become clear if we let $X = \{0, 1, 2\}$ and let $Y = \{0, 1, 2\}$. 16. Then find $X \times Y$ the Cartesian product of a set with itself since $X = Y$.

$$X \times Y = \left\{ \begin{array}{l} (0, 0), (0, 1), (0, 2) \\ (1, 0), (1, 1), (1, 2) \\ (2, 0), (2, 1), (2, 2) \end{array} \right\}$$

17. We then interpret this set of ordered pairs of numbers as a *set of points in a plane* such that to each point there corresponds one ordered pair of numbers and vice versa. 18. Now it is necessary for us to set up a model for geometric interpretation. 19. To do this we intersect two number-lines at the zero-point, or the origin of the graph, so that the lines are perpendicular to each other⁶. 20. Label the number lines as shown in the following figure by choosing X to denote the set of points on the horizontal line and Y to denote the set of points on the vertical line. 21. Now we are to assign positive numbers to the right half-line of X and negative numbers to the left half-line of X . 22. Similarly we assign positive numbers to the upper half-line of Y and negative numbers to its lower half-line. 23. The two number lines are called axes. 24. We speak of x -axis when we refer to the horizontal number line and of y -axis when we refer to the vertical number line. 25. We now have an interpretation such that every ordered pair of numbers labels a point in the plane determined by the x and y axes.



26. Since we find each of the axes to represent an ordered set of points and both axes to cooperate in determining the plane, such a system is called a coordinate system and the plane determined by it is called a coordinate plane.

27. Each ordered pair (x, y) tells you how to locate a point in the coordinate plane, by starting from the origin. 28. (x, y) means: first move x units from $(0,0)$ along x -axis to the right or left (indicated by $+$ or $-$ preceding the *first* numeral of the pair); then move y units from that point parallel to the y -axis (up or down as indicated by $+$ or $-$ preceding the *second* numeral of the pair).

V. Write questions about the text above to ask your class-mates at the lesson to follow. Write as many questions as it is necessary for the text to be discussed in detail.

VI. Translate sentences 4, 8, 14, 18, 19, 20, 21, 25, 26 of the text in writing.

Laboratory Assignment I

VII. Follow the speaker as he is reading the words. Mind the stress.

'product, 'ordered, 'notice, 'purpose, 'wonder, 'label, 'figure; con'sider, de'note, ob'serve, be'tween, im'portance, in'terpret, as'sign, re'fer, de'terminate, pre'cede; 'possible, 'element, 'necessary, perpen'dicular, 'similar, 'positive, 'negative, 'parallel, 'numeral, co-ordinate.

VIII. Read these words after the speaker. Think of the Russian equivalents of the italicized words.

to coordinate—coordinate *a*—coordination; simply—simple—*simplicity*—to simplify—*simplification*; possible—*impossibility*; order *n*—disorder; to form—to *deform*—to *reform*—to *inform*—*formal*—*formality*—to *formalize*; purposeless—*purposeful*; to interpret—*interpreter*; to correspond—correspondent—*correspondence*; origin—original—*originality*—*originally*; sign *n*—to *sign*—to *assign*; positive—*positively*; to determine—*determination*—*undetermined*; to precede—*preceding*; to move—unmoved—movement—movable—immovable.

IX. In the following sentences replace the Object Clause with the Complex Object.

Sp.: I expect *that the article will be written*.

St.: I expect the article to be written.

a) 1. I expect *that these rules will be observed*. 2. I know *that this work is* of great importance. 3. He expects *that the situation will be analysed* carefully. 4. We believe *that the machine has* certain advantages.

Sp.: I found *that he was* unprepared.

St.: I found *him to be* unprepared.

b) 1. I thought *she was* ready. 2. He expected *that I knew* the solution. 3. We found *that they were interested* in the problem. 4. I expect *that she will understand* me.

Sp.: I thought *that she had come*.

St.: I thought *her to have come*.

c) 1. We expected *that he had completed* the experiment. 2. I knew *that you had obtained* similar results. 3 I believed *that they had* closely cooperated with you. 4. We found *that she had studied* the material properly.

X. Listen to the new words of the text 'The Coordinate Plane' and repeat them.

XI. Follow the speaker as he is reading the text.

XII. Listen to the questions below. Give 'yes' or 'no' answers.

1. Is forming the product set a commutative operation? 2. Is it possible to set up a geometric interpretation of a set of ordered pairs of numbers? 3. Do we intersect two number-lines at the zero-point? 4. Are the intersecting lines perpendicular to each other? 5. Do we denote the vertical line with a letter x ? 6. Do we denote the horizontal line with a letter y ? 7. Do we assign positive numbers to the left half-line of x ? 8. Are the two number lines called axes?

Classwork II

XIII. Read these words and stress them properly.

Cartesian, possible, ordered, denote, notation, relationship, importance, non-commutative, purposeless, itself, wonder, interpret, vice versa, perpendicular, vertical, horizontal, assign, similarly, negative, refer, label, to cooperate, numeral, figure.

XIV. Go back to ex. VIII. Read the words and give their Russian equivalents.

XV. Read these groups of words and translate them.

a highly productive method; high productivity; to formalize the results obtained; the necessary formality; the property of commutativity; to falsify the truth; a wonderful thing; our correspondent has informed us; an outstanding geometrician; axial rotation; close and useful cooperation; coordination of various viewpoints.

XVI. Replace the Complex Object with the Object Clause wherever possible. Make use of ex. II.

XVII. a) Read the text 'The Coordinate Plane' and translate sentences 4, 8, 14, 18, 19, 20, 21, 25, 26; b) You have written questions about the text at home. Now discuss the text. Work in pairs.

XVIII. Before you begin working with the text 'More about the Coordinate Plane' read these words and guess their meaning.

to 'generate, o'iginal, corres'pondence, mathe'matically.

Read the Notes.

1. union of sets — объединение множеств

$A \cup B$ — union of sets A and B — объединение множеств A и B

$A \cap B$ — intersection of sets A and B — пересечение множеств A и B

2. they may very well — они могут с успехом

3. one-to-one correspondences — взаимнооднозначные соответствия

Read this text. You are expected to say a few words about it after you have read it.

More about the Coordinate Plane

1. So far our set operations (union of sets¹, intersection of sets) have led (привели) us to new sets whose elements are of the same kind mathematically, as those of the original sets. 2. For example, if the elements of set A are students and the elements of set B are students, then the elements of $A \cup B$ and $A \cap B$ (if it is not empty) are students. 3. In the previous article you have learned about a set operation that generates a new set whose elements are different, mathematically, from the elements of the original sets. 4. This new set whose elements will consist of ordered pairs of elements from the original sets, is called the Cartesian product, as you already know. 5. We have defined two ordered sets to be equal if and only if (iff) they contain exactly the same elements in exactly the same order. 6. For example, if set $X = \{0, 1, 2, 3\}$ and set $Y = \{0, 1, 2, 3\}$ then set $X =$ set Y . 7. You may wonder why we have different names for two equal sets. 8. The answer is that although (хотя) the sets are equal as sets, they may very well² represent different physical entities (сущности). 9. We define set Y as the set of all y such that these y are points on a vertical straight line. 10. By assigning numerals to these points, we establish (устанавливаем) two one-to-one correspondences³ between a set of numbers and a set of points, one for the number line called x and the other for the number line called y . 11. As a result we obtain a model of a rectangular coordinate system. 12. The important thing is that we can use these two one-to-one correspondences to establish one single one-to-one correspondence between all the points in the plane and all ordered pairs of real numbers. 13. This means that every point of the Cartesian plane is uniquely defined by one ordered pair of numbers, and that conversely (наоборот), to every ordered pair of real numbers there corresponds one and only one point of the plane. 14. Since ordered pairs of numbers define points and since points define lines and polygons, we have established a basic pattern whereby (тем самым) number relations can express geometric figures and geometric figures can be reduced to numerical expressions. 15. Thus we find arithmetic and geometry to have become one single mathematical system.

XIX. Now that you have read the text above, say whether anything new has been introduced in it as compared to the previous text as far as the coordinate system is concerned. What is it?

Homework II

XX. Note the forms and the functions of the Infinitive in these sentences and translate them.

1. We consider these two phenomena to be of the same origin. 2. I expect this law to hold for all similar cases. 3. We understand this method to consist of several steps. 4. They wanted us to establish a certain correspondence between these two facts. 5. We assume the program to have been carefully developed. 6. We suppose the particles to be generated at very high speed. 7. For a proper correspondence between these phenomena to be established they first have to be considered separately. 8. For correct conclusions to be drawn all the conditions must be observed. 9. It was impossible for the process to continue. 10. I wonder if it is necessary for them to come. 11. For you to begin the work now is very important. 12. For the problem to be understood it must be read carefully.

XXI. *Translate these groups of words.*

1. The union of sets *so far* considered can be... . 2. The correspondences *so far* established are... . 3. The entities *so far* defined are... . 4. The particles *so far* observed move... . 5. The energy *so far* generated seems... .

XXII. *Note the use of the verb 'to have'. Translate these sentences.*

1. It is difficult for us to realize how extremely important Newton's discovery of the law of gravitation *must have been* in the 17th century. 2. For the problem to be solved it *has to be* stated properly. 3. It is convenient *to have* another name for this kind of sets. 4. *Having combined* these two groups we produced a new set. 5. This fact *has already been* mentioned in the previous article. 6. To solve such mathematical sentences one *has to* understand the meaning of the symbols mentioned above.

XXIII. *Read the text 'More about the Coordinate Plane' and analyse the sentences you find difficult to understand. Pay special attention to sentences 1, 5, 12, 15. Translate them.*

XXIV. *Write down the main points of the text (2nd) in the form of questions to ask your class-mates during the discussion on the coordinate plane.*

XXV. *Write a short summary of both of the texts of the lesson to reflect the main points. Be prepared to speak on the coordinate plane in class.*

Laboratory Assignment II

XXVI. *Listen to the speaker as he is reading the new words of the text 'More about the Coordinate Plane'.*

to lead (led), entity, although, to establish, conversely, whereby, to generate, original, correspondence, mathematically.

XXVII. *Listen and repeat. Guess the meaning of the italicized words.*

union—unity—to unite—universal—uniform; to lead—leader—to mislead; previous—previously; to generate—generator; different—indifferent—indifferently; to define—definite a—indefinite; exactly—exact a—exactness; wonder—wonderful—wonderfully; answer—to answer—answerable—unanswerable; equal—to equalize; sign—to assign—signify; to establish—establishment; to obtain—obtainable; to mean—meaning—meaningful—meaningless; planet—planetary; basic—basically; relation—relationship—interrelation; to express—expressive; order—disorder.

XXVIII. Ask general questions following the model. Replace the nouns with pronouns.

Sp.: We expect *the students* to learn the material.

St.: Do you expect *them* to learn the material?

1. We expect *the scientists* to establish an appropriate pattern. 2. He expects *the student* to speak on the coordinate system. 3. The students wanted *their teacher* to speak on number relations. 4. We found *these statements* to be mathematically correct. 5. I believe *this result* to be of some importance.

XXIX. Change the following sentences according to the model.

Sp.: It's important to find a solution. (he)

St.: It's important *for him* to find a solution.

1. It's necessary to understand this law. (they). 2. It's difficult to change the general pattern now. (we). 3. It's convenient to apply the new method of investigation. (you). 4. It's unnecessary to take part in the discussion. (she). 5. It's impossible to join this group of scientists at the moment. (I).

XXX. Listen to the speaker as he is reading the text 'More about the Coordinate Plane'.

XXXI. Change these direct questions about the text into indirect ones. Follow the model.

Sp.: Are these elements of the same kind?

St.: *I wonder if* these are elements of the same kind.

1. Are these the elements of the original set? 2. Is this an empty set? 3. Have you learned anything about sets in the previous article? 4. Does this new set consist of ordered pairs? 5. Have you defined the two ordered sets to be equal in this case? 6. Why do we have different names for two equal sets? 7. Do these sets represent different physical entities? 8. What do we obtain as a result of this operation? 9. Is every point of the Cartesian plane uniquely defined by one ordered pair of numbers? 10. Can number relations express geometric figures? 11. Can geometric figures be reduced to number relations? 12. Do arithmetic and geometry represent one single mathematical system?

Classwork III

XXXII. *Read the words of ex. XXVI and stress them properly.*

XXXIII. *Read the words of ex. XXVII and give their Russian equivalents.*

XXXIV. *Ask a general question about every sentence of ex. XX.*

XXXV. *Translate these sentences.*

1. We expected a solution to be found as soon as possible. 2. Professor wanted his postgraduate students to take part in his research. 3. I should like them to realize the importance of their assistance. 4. The students wanted the meeting to take place on Tuesday. 5. We believed them to have changed their original plans. 6. For the problem to be solved it must be stated clearly. 6. One necessary condition for the calculation to be correct is for the student to concentrate on his work. 7. It is necessary for you to consider three elements: *distance, rate* and *time* in each of the two relations. 8. We expect the students to revise some of the laws dealt with previously.

XXXVI. *Read the text 'More about the Coordinate Plane' and translate sentences 1, 5, 12, 15.*

XXXVII. *Complete these sentences.*

1. In the previous article you have learned about a set operation that generates a new set whose elements are different, mathematically, from... . 2. This new set the elements of which will consist of ordered pairs of elements from the original sets is called... . 3. We have different names for equal sets since these sets may represent different... . 4. By assigning numerals to the points we establish two one-to-one correspondences between a set and... . 5. Every point on the Cartesian plane is uniquely defined by... . 6. Thus we find arithmetic and geometry to have become one... .

XXXVIII. *Listen to your teacher's statements and say whether they are right or wrong. If you think they are wrong, say why.*

XXXIX. *You wrote questions about the text at home. Now ask your class-mates the questions you have in logical sequence and let them answer your questions.*

XL. *Say the following in English.*

первоначальное множество порождает новое множество; элементы множества состоят из; как вы уже знаете из определения; устанавливать взаимоднозначное соответствие; упорядоченная пара чисел; мы определили; пересечение множеств; объединение множеств; приписать точное числовое значение; если нам дано; подобным же образом; брать начало в точке пересечения; справа от оси x ; двигаться от точки; вверх или вниз вдоль оси.

XLI. a) *Translate the following English text into Russian. Compare your translation with the one given on the right; b) Practise back translation.*

We know the term 'set' to designate a collection of objects of some kind. These objects are called elements or members, or points of the set.

We generally expect sets to be designated by capital letters A, B, C etc., and members of a set by small letters a, b, c , etc. If a set A is said to consist of points a, b, c, d , we write $A = \{a, b, c, d\}$. If A consists of just one point a , we write $A = \{a\}$, thus distinguishing between the point a and the set $\{a\}$ consisting of only the point a . The notation $a \in A$ means ' a is a member of A ' or ' a belongs to A '. The notation $a \notin A$ means just the opposite. It means ' a does not belong to A '.

Мы знаем, что термин «множество» обозначает собрание предметов какого-то типа. Эти предметы называются элементами или членами, или точками множества.

Мы обычно предполагаем, что множества обозначаются заглавными буквами A, B, C и т. д., а члены множества — строчными буквами a, b, c и т. д. Если говорят, что множество A состоит из точек a, b, c, d , мы записываем $A = \{a, b, c, d\}$. Если A состоит всего лишь из одной точки a , мы записываем $A = \{a\}$, тем самым делая различие между точкой a и множеством $\{a\}$, состоящим только из точки a . Символ $a \in A$ означает: « a является элементом A » или « a принадлежит A ». Символ $a \notin A$ означает как раз обратное. Он означает: « a не принадлежит A ».

Home-reading

Read and translate the text below. Guess the meaning of the international words that are new to you. Look up the dictionary for the words whose meaning you do not know. You may find the following notes helpful.

Read these notes.

1. in a similar way — точно так же
2. in view of — ввиду, благодаря
3. relying upon — опираясь на, исходя из
4. no matter what — каковы бы ни

Cartesian Coordinates

One of the great contributions to mathematics made by the famous mathematician and philosopher Descartes is his idea of translating geometry into algebra by associating with each point of the plane an ordered pair of real numbers. A problem in geometry is solved by first translating the problem into a problem in algebra, then solving

this problem, and finally translating the answer into a statement about geometry.

Let us see, then, how to associate an ordered pair of real numbers with each point of the plane. Choose any two perpendicular lines of the plane; call one the horizontal line H and the other the vertical line V . The point of intersection of these two lines is called the origin. We begin by setting up a one-one correspondence between R and the points of the line H . Let a be any real number; then the point on H associated with a is the point whose distance from the origin is $|a|$; of course, in general there are two points on H with this property. If $0 < a$, then choose the point on H to the right of the origin; if $a < 0$, then choose the point on H to the left of the origin. In a similar way¹, we set up a one-one correspondence between R and the points of V . Notice that the number associated with a point on H or on V actually has geometric significance: it measures the distance of the point from the origin.

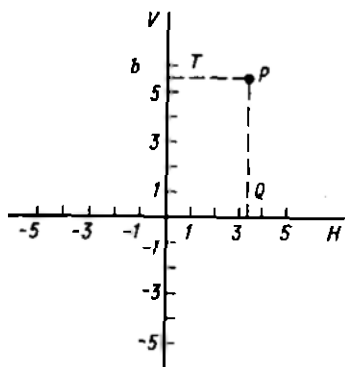


Fig. 1

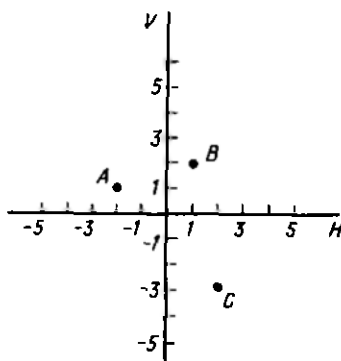


Fig. 2

Now let P be any point of the plane. We shall associate the ordered pair of real numbers (a, b) with P iff the number a is associated with the point on H which is also on the line through P and parallel to V , and the number b is associated with the point on V which is also on the line through P and parallel to H (see Fig. 1). In other words, to determine the ordered pair (a, b) associated with the point P , we construct the line through P parallel to V and find the point of intersection of this line with H . We call this point Q ; then the real number associated with Q on the line H is the first term of our ordered pair. Thus a is determined. Next, we construct the line through P parallel to H and find the point of intersection of this line with V . Call this point T ; then the real number associated with T on the line V is the second term of our ordered pair. Thus b is determined.

Given that (a, b) is associated with the point P , we see that $|a|$ measures the distance of P from the line V and that $|b|$ measures the distance of P from the line H .

In Fig. 2 the ordered pair $(-2, 1)$ is associated with the point A , the ordered pair $(1, 2)$ is associated with the point B , and the ordered pair $(2, -3)$ is associated with the point C . If the ordered pair (a, b) is associated with a given point, we shall say that a is the first coordinate of the point and that b is the second coordinate of

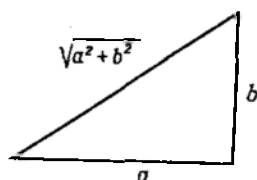


Fig. 3

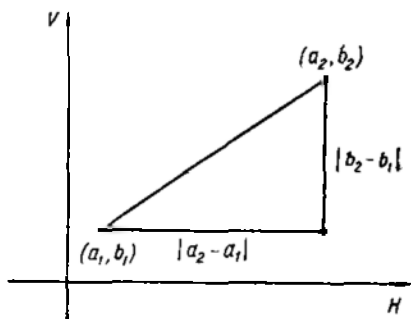


Fig. 4

the point. In view of² our one-one correspondence between $R \times R$ and points of the plane, we shall frequently refer to a point by mentioning the ordered pair that corresponds to the point; thus, we shall speak of the point $(1, 2)$, meaning B above, and we shall speak of the point $(2, -3)$, meaning C above.

As an example of the value of this approach, let us consider the problem of determining the distance between two points of the plane. Relying upon³ the Theorem of Pythagoras for right-angled triangles, which is illustrated in Fig. 3, we shall easily solve our problem. Suppose we wish to find the distance between the point (a_1, b_1) and (a_2, b_2) , where $a_1 \neq a_2$, $b_1 \neq b_2$, and each of a_1, a_2, b_1, b_2 is positive. First we construct the right-angled triangle whose hypotenuse is the line segment joining the given points, and whose two sides are parallel to the lines H and V (see Fig. 4). Now, the distance of (a_2, b_2) from the line V is a_2 , and the distance of (a_1, b_1) from the line V is a_1 ; thus the base of the triangle has length $|a_2 - a_1|$. Also, the distance of (a_2, b_2) from H being b_2 , and the distance of (a_1, b_1) from H being b_1 , the remaining side of our triangle has length $|b_2 - b_1|$. It now follows, by the Theorem of Pythagoras, that the hypotenuse of our triangle has length $\sqrt{(a_2 - a_1)^2 + (b_2 - b_1)^2}$; hence this is the distance between (a_1, b_1) and (a_2, b_2) . Of course, we have arrived at this result on the assumption that each of the real numbers a_1, b_1, a_2 and b_2 is positive. It is not difficult to show, however, that our result applies to any two points, no matter what⁴ the algebraic signs of their coordinates are.

LESSON 25

Classwork I

Grammar: Complex Subject

1. Read these sentences. Name the Complex Subject and the predicate in every sentence.

1. The students are expected to know that law. 2. Their approach is supposed to give a certain advantage. 3. This law has always been thought to be useful. 4. The procedure appeared to be appropriate. 5. He seems to have changed his point of view. 6. A proper interpretation of this fact appears to have been obtained. 7. The computation proved to be complicated. 8. My teacher happened to have read the article. 9. They were understood to agree with our viewpoint. 10. There seems to have been a slight misunderstanding. 11. These rules appear to be just the opposite of the rules introduced previously. 12. Any fraction may be supposed to represent the quotient of its numerator divided by its denominator. 13. If a radicand has both a positive and a negative root, the radical is understood to mean the positive root. 14. Any object or idea that belongs to a set is said to be an element of the set. 15. These laws are known to apply to all kinds of exponents: positive and negative, integral or fractional. 16. After Leibnitz's death, the binary system was almost forgotten but in recent years this system has been found to be very useful. 17. The students are not expected to remember these proportions. 18. It is generally agreed that the basic truths and most of the fundamental processes of arithmetic and algebra are not likely to change a great deal. 19. This law does not appear to hold for all the equations considered. 20. There does not appear to be an agreement between the results obtained.

Homework I

Words to be Learned

Read these words and guess their meaning.

de'cade *n*, gene'ration, com'paratively, many'sidedness, oc'casion, to de'tect, aero'plane, 'section, 'mixture, in'gredient *n*, 'popularly, in'struction, nu'merical, to in'terpret, 'scrupulous, 'accuracy *n*, ab'surd *a*, in'tuitively, in'telligent *a*, ope'rator, stress *n*, *v*.

Read these words

reliable [ri'laɪəbl] надежный
slow [sləʊ] медленный
equipment [i'kwɪpmənt] оборудо-
вание

significant [sig'nɪfɪkənt] суще-
ственный, важный
distinguish [dis'tɪŋɡwɪʃ] разли-
чать

almost ['ɔ:lmoʊst] почти
 de'vice прибор, устройство
 com'plete полный, завершённый
 wing [wɪŋ] крыло
 supply [sə'plai] снабжать, обеспечивать
 major ['meɪdʒə] главный
 obvious ['ɒbvɪəs] очевидный
 sort тип, вид, род
 desire [dɪ'zaɪə] *n* желание; *v* желать
 specify ['spesɪfaɪ] уточнять
 error ['erə] ошибка, погрешность
 per'form осуществлять
 per'formance [prə'fɔ:məns] действие
 task задача
 outset начало
 brain мозг
 mis'nomer неправильное название

sence [sens] смысл
 ex'plicit явный, четкий
 foresee (foresaw, foreseen) предвидеть
 quantity ['kwɒntəti] количество
 cause [kɔ:z] *n* причина; *v* вызывать, быть причиной
 value ['vælju:] 1. величина; 2. значение; 3. стоимость
 'merit *n* достоинство, заслуга; *v* заслуживать
 obey {ə'bei} подчиняться
 mis'take ошибка
 per'haps [prə'hæps] пожалуй, по-видимому
 carry out осуществлять
 sequence ['si:kwəns] ряд, последовательность
 a'rise (arose, arisen) возникать, вставать
 circumstance {sə:kəmstəns} обстоятельство, случай

Notes

1. one and the same — один и тот же
2. at the outset — сначала
3. under every circumstance — в любом случае, при любых обстоятельствах

II. *In the sentences below look for the predicate and the Complex Subject. Translate these sentences.*

1. Scientists are sure to find a reliable method of detecting errors.
2. The hypothesis proved to be based on the wrong assumption.
3. All the circumstances do not seem to have been properly observed.
4. Certain mistakes appear to have occurred.
5. A proper interpretation of this fact is likely to be obtained.
6. The equipment we were interested in happened to be in their factory.
7. Only a century ago the atom was believed to be indivisible.
8. The operator is sure to find errors in the program presented.
9. This question is sure to arise.
10. The computation is expected to have been carried out.
11. Such a mistake is unlikely to have remained unnoticed.
12. This major occasion is known to have caused a lot of argument.
13. This phenomenon does not seem to obey the general law.
14. This solution is believed to be obviously absurd.
15. The preparatory work proved to be very slow and difficult.

III. *Ask questions to which the following sentences could be answers.*

1. If they had supplied us with the required data, we could have finished the work much earlier. 2. Had they foreseen this error, they would have tried to avoid it. 3. If we had more reliable equipment, we would supply them with better devices. 4. If the operator had carried out the preparatory work more accurately, there would not have been so many errors. 5. Were the computer able to foresee possible mistakes, the task of the programmer would be much simpler. 6. If the solution had not been so obviously absurd, we might not have noticed the error. 7. This process requires scrupulous accuracy. 8. Automatic brain cannot foresee all the possible difficulties. 9. A number of digital computers are to be supplied to this lab. 10. If the publishing equipment were more reliable, there would be less mistakes in print. 11. This major error was caused by misunderstanding. 12. The first step is to write explicit instructions. 13. This problem arose only recently and quite unexpectedly.

IV. Change according to the model.

It is believed that he is a reliable of partner.

He is believed to be a reliable partner.

1. *It is expected that they will detect the error.* 2. *It is believed that he is very accurate in making calculations.* 3. *It is known that they have foreseen all the possible mistakes.* 4. *It is likely that he has given them explicit instructions.* 5. *It is unlikely that they have supplied this lab with such complex equipment.* 6. *It appears that they are unable to account for this absurd situation.* 7. *It seems that he is an intelligent researcher.* 8. *It happened so that the error was quickly detected.*

V. a) *Read the text 'Computers' and translate it;* b) *Analyse the sentences you find difficult to understand. Pay special attention to sentences 1, 2, 4, 5, 6, 9, 10, 11, 12.*

Computers

1. Until quite recently computers were small, not very reliable and comparatively slow in operation. 2. Since then, several generations of complex electronic computing equipment have been developed, each being significantly better than the one before it. 3. The most important property of a computer, the property which distinguishes it from all other kinds of machine constructed by man, is its manysidedness. 4. Almost every day a new use is found for these devices to help man. 5. One and the same¹ computer may be required on different occasions to help in the design of aeroplane wing sections, to detect errors in the design of a computer, to calculate the production of some large factory, to control the mixture of ingredients in some chemical process, or even to play a game of chess. 6. In fact, a computer may be said to perform any task provided that the method of performance can be described in complete detail. 7. It is important, however, to realize at the outset² that the term 'elec-

tronic brain' popularly applied to an automatic electronic digital computer is a misnomer. 8. The computer is only automatic in the sense that it can deal with explicit instructions which tell it exactly what to do: it cannot in itself, take steps, deal with difficulties, which have not been foreseen by the person who presents the problem. 9. The computer must therefore be supplied with a complete and detailed set of operating instructions to solve a given problem together with the numerical values of the quantities which are to be operated upon. 10. A set of such operating instructions causing the computer to perform a particular calculation on any values of numerical data presented to it, and to print the results, of the calculation, is called a programme. 11. The great merit of computers is known to be their ability to accept and obey any programme presented to them. 12. But this merit is lessened by the fact that they will interpret their instructions with a scrupulous accuracy even, when, as a result of a small mistake in the programme, the results produced are obviously absurd. 13. Such mistakes will often be of the sort which would be corrected, perhaps even intuitively, by an intelligent operator. 14. We would therefore stress that the programme must be written in such a way that the computer carries out the desired operations in the right sequence, and that it must specify exactly what must be done under every circumstance³ that may arise in the computation.

VI. *Translate sentences 1, 2, 4, 5, 6, 9, 10, 11, 12 of the text above in writing.*

VII. *Now that you have read and analysed the text read it again and shorten it retaining the most essential information.*

VIII. *Write a few questions about the text to ask your class-mates during the lesson.*

Laboratory Assignment I

IX. *Follow the speaker as he is reading the words. Mind the stress.*

'major, 'via, 'cause, 'normal, 'area, 'mixture, 'carry, 'error, 'digit, 'merit; a'rise, re'turn, a'mong, al'low, ap'ply, pre'pare, oc'casion, con'tain, de'tect, ab'surd, oc'cur, per'form, re'ly, o'bey, de'vice, mis'take, al'low, com'plete; 'memory, 'factory, 'various, in'gredient, in'telligent, sig'nificant, 'scrupulous, 'popular.

X. *Read these words after the speaker. Guess the meaning of the italicized words.*

reliable—to rely—reliability; to compare—comparatively—comparable—comparability—incomparable; equipment—to equip; generation—to generate; significantly—significant—insignificant; occasion—occasional; wing—wingless; to require—requirement; popularly—popular—popularity—to populate; sense—sensible—sensibility; explicit—explicitly—implicit; quantity—quantitative; value—valuable—to

evaluate; accuracy—accurate—*inaccurate*; absurd *n, a*—*absurdity*; intuitively—intuitive—*intuition*; to detect—*detection*—*detective*; to carry—*carrier*; desire *n, v*—*desirable*—*undesirable*; complete *a*—*completely*—*incomplete a*.

XI. *Change the sentences below.*

Sp.: The mistake is expected *to be detected*.

St.: The mistake is expected *to have been detected*.

a) 1. The children are expected *to obey* the instructions. 2. The great merits of their work are said *to be* lessened by one error. 3. They are likely *to perform* the task with accuracy. 4. They are sure *to give* a proper interpretation to this phenomenon. 5. This mistake proved *to cause* a lot of unforeseen difficulties.

Sp.: The statement *is shown* to be correct.

St.: The statement *has been shown* to be correct.

b) 1. The law *was found* to hold for all similar cases. 2. The work *is said* to be scrupulous. 3. The results *are assumed* to be significant. 4. The situation *is found* to be absurd. 5 The circumstances *are said* to be specified.

XII. *Replace the following sentences with the Complex Subject.*

Sp.: *It is likely* that everything will be arranged.

St.: *Everything is likely to be* arranged.

1. *It seems* that the computation is too complicated. 2. *It is shown* that the value is constant. 3. *It appeared* that the instructions were explicit. 4. *It happened* so that the desired results were easily obtained. 5. *It is found* that certain facts contradict the theory.

XIII. *Change the sentences below. Follow the model.*

Sp.: The first chapter seems to be long. (other chapters)

St.: Other chapters *do not seem to be* long.

1. Multiplying from left to right appears to be convenient. (from right to left). 2. This law seems to hold for this particular case. (for other cases). 3. The first and the second instructions seem to be explicit. (the third and the fourth). 4. There seemed to be significant changes in their plan. (in the general approach). 5. He seems to have carried out the whole work. (the most significant part of it)

XIV. *Listen to the new words of the text 'Computers' and repeat them.*

XV. *Follow the speaker as he is reading the text.*

XVI. *Answer the speaker's questions. Give 'yes' or 'no' answers.*

1. Does manysidedness distinguish computers from all other kinds of machine? 2. Are modern computers comparatively slow in operation? 3. Can one and the same computer be required to solve various tasks on different occasions? 4. Must the method of performance be

described in complete detail? 5. Can a computer in itself take steps and deal with difficulties which have not been foreseen? 6. Does a computer obey any programme presented to it? 7. Can a computer produce an obviously absurd result? 8. Is the right sequence of operations to be observed?

Classwork II

XVII. *Read these words and stress them properly.*

reliable, comparatively, equipment, significantly, distinguish, many-sidedness, almost, device, occasion, require, error, detect, aeroplane, mixture, ingredient, perform, misnomer, explicit, numerical, value, quantity, merit, obey, scrupulous, interpret, accuracy, mistake, absurd, perhaps, intuitively, intelligent, desire, complete, sequence, arise, circumstance, performance, popular.

XVIII. *Go back to ex. X. Read the words and give their Russian equivalents.*

XIX. *Read these groups of words and translate them.*

an extremely absurd situation; a newly constructed reliable machine; a popularly accepted law; well-informed sections of population; a high-speed aeroplane; a scrupulously carried out investigation; an intuitively correct conclusion.

XX. *Replace the Complex Subject with the subordinate clause wherever possible. Use the sentences of ex. II.*

XXI. *Read the text 'Computers' and translate it.*

XXII. a) *Say whether your teacher's statements are true or false. Support your argument;* b) *Answer your teacher's questions in connection with the text;* c) *Discuss the text 'Computers' making use of the questions you wrote at home. Work in pairs.*

XXIII. *Before you begin working with the text 'Preparation of the Problem' read these words and try to guess their meaning.*

preparation, aspect *n*, preparatory, precise *a*, culmination, programmer, code *n, v*, individual, card, to necessitate, administrative, start *n, v*, to transcribe.

Read these notes.

1. on the part of — со стороны
2. once a programme has been written — как только (когда скоро) программа написана
3. in question — рассматриваемый
4. consists of — состоит из
5. by means of — посредством

Preparation of the Problem

1. The preparation of the problem for the solution by an electronic digital (цифровой) computer involves the following tasks: 2. a) The precise definition of the problem to be solved. 3. This aspect may easily form major part of the preparatory work. 4. b) Planning of the sequence of operations required for the solution of the problem. 5. The culmination of these tasks in the writing of the programme demands (требует) great attention (внимание) to detail on the part of¹ the programmer. 6. Once a programme has been written² the computer is made to read it and store (хранить) it in its memory. 7. After the complete (вся) programme has been read and stored, the computer starts to obey it. 8. Some of the instructions of the programme will require the computer to read additional data, and others to print (напечатать) the results of its calculations; these results are then returned (возвращаются) to the programmer. 9. If the programme is correct, the results are sure to give correct answers to the original problem; otherwise (иначе), the programme will have to be amended (изменена) and presented again to the computer. 10. The latter occurrence (последнее явление) is a very common one, and many programmers find that more time is spent in correcting their programmes than in writing them.

Coding

11. To enable (чтобы дать возможность) a computer to 'understand' a program, the instructions have to be written in a code which is especially designed for the computer in question³. 12. Each individual instruction consists of⁴ a special group of code signs, and when this group of code signs is transferred (передается) to the computer via (посредством) a paper tape (лента) or a set of cards, a certain physical condition is established in a given place in the machine. 13. This condition enables the computer to carry out (осуществлять) the operations as required by that particular instruction. 14. The preparation of the computer code which makes it possible for the computer to solve a given problem is for various reasons a complicated and time-taking process. 15. First, the calculations are to be performed according to formulas of very simple structure because the computer will usually be able to carry out only the four basic arithmetic operations. 16. This condition often requires each of the formulas contained in the original formulation of the problem to be transcribed into a series of simpler formulas. 17. Second, the performance of a single arithmetic operation often necessitates the use of several administrative operations. 18. Finally, the whole procedure is complicated by the fact that everything must be expressed by means of⁵ the code symbols.

Now that you have read the text, say.

1. Which feature is common to all automatic computers? 2. Why is preparation of the computer code a complicated process? What are

the reasons? 3. How many basic operations is a computer able to carry out? 4. What information concerning digital computers can one obtain from the article? 5. What tasks does the preparation of the problem for the solution by an electronic digital computer involve?

Homework II

XXIV. *In the sentences below mind the form and the function of the Infinitive and translate these sentences.*

1. Until quite recently people believed elementary particles to be the simplest material bodies. 2. We should like the correct conclusion to be drawn as soon as possible. 3. For a statement to be true it must satisfy certain conditions. 4. For greater convenience the order is likely to be reversed. 5. Both the first equation and the second one seem to be alike. 6. Gravitation does not let planets leave the Solar system. Likewise, it is known to be the force that keeps material bodies including people on the Earth. 7. Like terms are expected to be arranged in the following way. 8. Reference is to be made to the system commonly accepted. 9. Little information makes it difficult to continue research. 10. The existing conditions make it impossible to speed up the process. 11. Recent scientific developments proved to be of great importance and interest. 12. He must have used the classification suggested by his science adviser. 13. We saw the particles behave in an unusual way under such conditions. 14. The procedure to be followed is rather inconvenient.

XXV. *Note the use of the verb 'to be'. Translate these sentences.*

1. The programmer was to detect all the possible errors. 2. These circumstances have been taken into consideration. 3. Our task has been to discuss the advantages of the programme in question. 4. The calculations are to be performed with the greatest accuracy. 5. The whole procedure is being altered for various reasons. 6. The code to be designed must be convenient.

XXVI. *Read the text 'Preparation of the Problem' and analyse the sentences you find difficult to understand. Pay special attention to sentences 2, 6, 8, 11, 13, 16. Translate them.*

XXVII. *Write a short plan of the text in the form of questions to ask your class-mates during the discussion on computers.*

XXVIII. *Write a short summary of both of the texts of the lesson leaving out the information that is less essential. Be prepared to speak on computers in class.*

Laboratory Assignment II

XXIX. *Listen to the speaker and repeat the new words of the text 'Preparation of the Problem'.*

preparation, precise, aspect, major, preparatory, culmination, demand, attention, start, to return, to amend, otherwise, occurrence, programmer, to consist, to transfer, 'transfer *n*, via, tape, card, to mention, to necessitate, administrative.

XXX. *Listen and repeat. Guess the meaning of the words in italics.*

preparation—*preparatory*—to prepare—*unprepared*; precise—*precisely*—*precision*; attention—*attentive*—*inattentive*—*attentively*; to amend—*amendment*; occurrence—*to occur*; common—*commonly*—*uncommon*; to require—*requirement*; able—*ability*—to enable; question—*questionable*—*unquestionable*; code *n*—to code—*to decode*; sign *n*—to sign—*design*—*to designate*—*designer*; various—*variant*—to vary—*variable*—*invariable*—*invariability*; reason—*reasonable*—*unreasonable*; simple—*simply*—*simplicity*—*to simplify*; similar—*similarly*—*similarity*; complicated—*complication*; to transcribe—*transcription*; necessary—to necessitate—*unnecessary*; to establish—*establishment*.

XXXI. *Listen to the speaker and disagree with him.*

Sp.: You *are expected to decode* the result. (now)

St.: We *are not expected to decode* the result now.

- a) 1. He is expected to do the necessary amendments. (now).
2. They seem to have found a reasonable solution. (up till now).
3. You are expected to transcribe these words. (all of them). 4. The preparatory work seemed to be done well. (unfortunately). 5. They are likely to require this complicated equipment. (in the nearest future).

Sp.: *He is expected to prepare* this programme.

St.: But *he has already prepared* this programme.

- b) 1. He is likely to give them precise information. 2. They are unlikely to make the necessary amendments. 3. You are expected to do your homework properly. 4. They are supposed to hold a conference. 5. He is supposed to read the programme attentively.

Sp.: I think *he is ready*. (seem)

St.: *No, he does not seem to be ready*.

- c) 1. I think *he* understands the situation. (appear). 2. I am sure *she* realizes our difficulties. (seem). 3. I believe *he* has found a solution. (seem). 4. I am sure *they* have arrived at this conclusion. (appear). 5. I am sure *she* is attentive and careful. (seem).

XXXII. *Listen to the speaker as he is reading the text 'Preparation of the Problem'.*

XXXIII. *Change these direct questions about the text into indirect ones. Follow the model.*

Sp.: Is the programme written?

St.: *I wonder if the programme is written.*

1. Does the preparation of the problem for the solution involve several steps? 2. Is the precise definition of the problem to be solved important? 3. Does writing a programme demand great attention to detail? 4. Do some of the instructions require the computer to read additional data? 5. Do some of the instructions require the computer to print the results? 6. In what case will the programme have to be amended? 7. Is the latter occurrence a very common one? 8. Do the instructions have to be written in a specially designed code? 9. Does each instruction consist of a special group of code signs? 10. Is this group of code signs transferred to the computer via a paper tape? 11. Will the computer be able to carry out only the four basic arithmetic operations? 12. Does the performance of a single arithmetic operation necessitate the use of several administrative operations?

Classwork III

XXXIV. *Read the words of ex. XXIX and stress them properly.*

XXXV. *Read the words of ex. XXX and give their Russian equivalents.*

XXXVI. *Ask questions to which the sentences of ex. XXIV could be answers.*

XXXVII. *Read these sentences. State the forms and the functions of the Infinitive. Translate the sentences. You can guess the meaning of some of the words you have not learned.*

1. The consideration of more complex and less understood phenomena does not seem to have much clarified the situation. 2. B. Pascal is known to have made considerable use of binomial series. 3. In the case of binomials, the first thing to look for in a trinomial to be factored, is a monomial factor contained in each term. 4. The result of this operation has been to change the original equation in two ways. 5. First of all read the given statement from the beginning to the end to get the general idea of the problem and to decide what you are asked to find. Then choose an appropriate letter to represent the unknown in the problem. 6. The next problem to arise concerns the conditions under which the experiment is to be carried out. 7. However 'complete' the sequence is supposed to be, we are always able to add a new number. 8. It does not require much mental effort to recognize a common fraction as a rational number. 9. The theory of ideals turned out to be of great importance for several fields of mathematics. 10. The scientist made an approximate calculation of the result to be expected. 11. Until recently only few of the mathematically interesting numbers could be shown to be transcendental. 12. This scientist was the first to use this method of investigation. 13. The general problem to be solved is to find the dependence between these phenomena. 14. When a new number is

under investigation, for example 3^2 , it may sometimes be important for a mathematician to determine if it is irrational.

XXXVIII. Read the text 'Preparation of the Problem' and translate it.

XXXIX. a) Ask your class-mates questions about the text you wrote at home; b) Speak on computers according to the summary you have written. Work in pairs.

XL. a) Read the following text (on the left) and translate it into Russian; b) After you have translated the text compare your translation with the given one and then practise back translation.

Before you begin translating the text read these notes.

1. to depend on — зависеть от
2. to be intended — быть предназначенным
3. among the former — среди (к числу) первых (из перечисленных)

Digital Computers

1. The fully automatic computers, produced in great numbers all over the world during recent years, may differ widely from one another, but one feature is known to be common to all: a program must be prepared and stored in the computer before the machine is capable of performing any calculations.

2. A program consists of a set of instructions, where each instruction causes the computer to carry out a certain operation.

3. The instructions that may be used during the preparation of a program depend on¹ the kinds of operations built into the particular computer for which the program is intended².

4. The built-in operations fall into two groups: arithmetic and administrative operations.

1. Полностью автоматические компьютеры, созданные в большом количестве повсюду в мире в последние несколько лет, могут сильно отличаться друг от друга, но одна черта, как известно, присуща всем им: программа должна быть подготовлена и заложена в компьютер до того, как машина сможет проводить вычисления.

2. Программа состоит из набора инструкций, где каждая инструкция обеспечивает выполнение компьютером определенной операции.

3. Инструкции, которыми можно пользоваться при подготовке программы, зависят от вида операций, встроенных в данный компьютер, для которого эта программа предназначена.

4. Встроенные операции разделяются на две группы; арифметические и управляющие операции.

5. Among the former³ are normally found operations allowing the computer to add, subtract, multiply, and divide.

6. The latter allow the computer to carry out the input and output functions, that is, to read in data—for example, from a paper tape or a card—and to print the results on a typewriter connected with the computer.

7. Other administrative operations may be used to move numbers from one part of the computer to another, etc.

8. The differences that are to be found in electronic computers are often due to the variation in the kind and number of the built-in operations.

5. К числу первых относятся, обычно, операции, позволяющие складывать, вычитать, умножать и делить.

6. Последние позволяют компьютеру выполнять входные и выходные функции, т. е. считывать данные, например, с (перфо)ленты или карты и печатать результаты на пишущей машинке, связанной с компьютером.

7. Другие управляющие операции могут быть использованы для перемещения чисел из одной части компьютера в другую и т. д.

8. Различия, встречающиеся в электронных компьютерах, зачастую обусловлены разнообразием видов и количества встроенных операций.

LESSON 26

Classwork I

Grammar: The Subjunctive Mood

1. *Read these sentences. Pay special attention to the predicate of the subordinate clause. Translate the sentences.*

a) 1. It is necessary that the pressure (should) be further increased. 2. It is essential that the behaviour of these particles (should) be carefully studied. 3. It is desirable that they (should) give a proper explanation. 4. It is important that you (should) find a means for carrying out this work. 5. It is unlikely that atomic power (should) have been used for these purposes.

b) 1. He suggested that during the experiment the direction of light (should) be slightly altered. 2. Professor insisted that we (should) first hear everybody's opinion on the subject. 3. It is required that the procedure (should) be slightly reversed. 4. The head of our laboratory insisted that the materials to be used in constructing the machine (should) be carefully tested. 4. They suggested that we (should) use the data obtained at once. 5. I wish they finished writing the program next week. 6. I wish they had carried out all the calculations before noon. 7. I wish the amendment had been made in due time. 8. I wish the required data were supplied as soon as possible.

c) 1. He speaks about computers as if he were an expert on them. 2. The Earth behaves as though it were a large magnet. 3. I wrote down the translation of the words lest I should (so that I should not) forget what they mean. 4. In order that the relation might be valid two conditions should be observed. 5. We ought to discuss every detail lest there should be (so that there should not be) a misunderstanding. 6. Whatever be the error we must detect it.

Homework I

Words to be Learned

Read these words and guess their meaning.

'certainty, 'normal *n.* *a.*, reali'zation, expec'tation, suc'ceed, 'fa-vour *n.*, *v.*

Read these words.

probability [prəbə'biliti] вероят-
ность
finger ['fɪŋgə] палец
white белый
in'deed в самом деле
trial ['traɪəl] попытка, проба
failure ['feɪljə] неудача, неблагоприятный исход
toss подбрасывать

odds (*pl*) 1. шансы; 2. преимущество; 3. разница; нера-
венство
e'vent событие
a'gainst против
'coin монета
heads (*pl*) *зд.* орел
tails (*pl*) *зд.* решка
chance шанс
'even равный

Notes

1. in all — всего
2. the odds are *S* to *f* in favour of success — шансы $S < f$ — в пользу успеха
3. against success — против успеха
4. there is no reason why — нет причины, почему бы...
5. rather than — а не (скорее чем)

II. Translate these sentences.

1. It is desirable that cooperation among various research centers be stimulated. 2. It is natural that the head of a scientific institution should control research carried on in the laboratories. 3. It is important that the program to be introduced should be carefully examined. 4. They suggested that the possibilities of obtaining the material required be considered immediately. 5. They recommended that measures be taken against the possible failure of the control system. 6. In order that scientific information may reach the researchers concerned, there should be a wider distribution of articles and papers. 7. I insist that the reason for the failure of the experiment be care-

fully analysed. 8. The temperature must be increased in order that the process should reach its normal state. 9. The required conditions are to be observed so that the reaction may occur. 10. My research adviser spoke as though he were in favor of another trial. 11. However important the idea may seem, it is impossible to consider it at the present moment. 12. Whatever be the nature of the phenomenon described, it ought to be discovered. The sooner we do it the better. 13. He insisted that every possible chance be taken into consideration. 14. We explained everything lest they should speak against our suggestion.

III. *State the part of speech the italicized words belong to. Translate these groups of words.*

1. The *number* of events; a *number* of trials; room *number* two; a rational *number*; a *number* name; *number* the objects in the room. 2. An unexpected *result*; as a *result* of these trials; the experiment *resulted* in a failure. 3. All the students were *present*; *present* day science; he *presented* him with an old coin; the data were *presented*; I gave him a set of pens as a *present*; the new material *presents* certain difficulty; the information *presented* was of interest.

IV. *Ask questions for which the sentences of ex. I provide answers.*

V. a) *Read the text below; b) Analyse the sentences you will find difficult to understand. Pay special attention to sentences 4, 5, 15, 17, 19, 22, 23, 26, 27, 29, 30.*

Probability of Occurrence



1. Here are nine circles. 2. Look at them. 3. Five are black; four are white. 4. If you were told to cover one circle with your finger, you might choose any one of the nine. 5. But you are more likely to choose a black circle than a white, because there are more black circles than white ones. 6. Indeed, the probability that you will cover a black circle is $\frac{5}{9}$, the ratio of the number of black circles to the total number of circles.

7. In mathematical language the choice, the probability of success is the ratio of the number of ways in which the trial can succeed to the total number of ways in which the trial can result. 8. Here nothing favors the choice of any particular circle; they are all on the same page, and you are just as likely to cover one as another. 9. The trial can succeed in five ways; there are five black circles. 10. The trial can result in nine ways; there are nine circles in all. 11. If p represents the possibility of success, then $p = \frac{5}{9}$.

12. Similarly, the probability of failure is the ratio of the number of ways in which the trial can fail to the total number of ways in which it can result. 13. If q represents the probability of failure, in this case $q = \frac{4}{9}$. 14. Notice that the sum of probabilities of success and failure is 1. 15. If you put your finger on a circle, it is certain to be either a black circle or a white one, for no other kind of circles is present. 16. Thus $p + q = \frac{5}{9} + \frac{4}{9} = 1$. 17. The probability an event will occur cannot be more than 1. 18. When $p = 1$, success is a certainty. 19. When $q = 1$, failure is sure.

20. Let S represent the number of ways in which a trial can succeed. 21. And let f represent the number of ways in which a trial can fail.

$$p = \frac{S}{S+f} \quad q = \frac{f}{S+f} \quad p + q = \frac{S}{S+f} + \frac{f}{S+f} = 1$$

22. When S is greater than f , the odds are S to f in favor of success², thus the odds in favor of covering a black circle are 5 to 4. 23. Similarly, when f is greater than S , the odds are f to S against success³. 24. And when S and f are equal, the chances are even; success and failure are equally likely. 25. Tossing a coin illustrates a case in which S and f are equal. 26. There are two sides to a coin, and there is no reason why⁴ a normal coin should fall one side up rather than⁵ the other. 27. So if you toss a coin and call heads, the probability that it will fall heads is $\frac{1}{2}$.

28. Suppose you toss a coin a hundred times. For each of the hundred trials the probability that the coin will come down heads is $\frac{1}{2}$. 29. You might expect fifty of the tosses to be heads. Of course, you may not get fifty heads. 30. But the more times you toss a coin, the closer you come to the realization of what you expect.

31. If p is the probability of success on one trial, and K is the number of trials, then the expected number is Kp . Mathematical expectation in this case is defined as Kp .

VI. Translate sentences 4, 5, 15, 17, 19, 22, 23, 26, 27, 29, 30 from the text above.

VII. Write a short plan of the text to help you while speaking on the 'Probability of Occurrence'.

Laboratory Assignment I

VIII. Listen to the speaker and repeat after him the words. Mind the stress.

'circle, 'cover, 'finger, 'ratio, 'total, 'favour, 'trial, 'certain, 'present, 'equal, 'even, 'normal, 'other, 'coin, 'reason; be'cause, in'deed, pro'ceed, suc'ceed, re'sult, pre'sent, a'gain, as'sume, suc'cess, oc'cur,

a'gainst, sup'pose; par'ticular, 'similar, 'illustrate, 'realize, possi'bi-
lity, mathe'matical, probability.

IX. Read these words after the speaker. Try to guess the meaning of the italicized words.

to realize—*realizable*—*realizability*; normal—normally—*normal-
ize*—*normalization*; probability—*probable*—*improbable*—*probably*; fa-
vour—to favour—*favourable*—*unfavourable*—*unfavourably*; white—
whiteness; black—*blackness*—to *blacken*; like a—*likeness*—*likely*—
unlike; to like—to *dislike*; odd—*oddly*; to expect—*expectation*; rea-
son n—to *reason*—*reasonable*—*unreasonable*; close a—*closeness*—to
close—to *disclose*; failure—to *fail*, to choose—choice—chosen; even—
evenly.

X. Say the same thing leaving out 'should'.

Sp.: It is important that you *should be given* the data.

St.: It is important that you *be given* the data.

1. It is necessary that the conference *should be attended*. 2. It is
desirable that the program *should be fulfilled*. 3. It is important that
research *should be properly planned*. 4. It is desirable that proces-
sing of information *should be done* by computers. 5. It is unlikely
that there *should be* a failure.

XI. a) Replace the Infinitive Construction with the Subjunctive.

Sp.: It is necessary for you to go.

St.: It is necessary *that you should go*.

1. It is important *for them to see* his work. 2. It is impossible
for him to continue research. 3. It is necessary *for the plan to be*
accepted. 4. It is important *for everybody to know* these rules. 5. It
is necessary *for the failure to be avoided*.

b) Replace the Infinitive Construction with the Subjunctive.

Sp.: I want him to present his paper. (suggest)

St.: *I suggest that he should present* his paper.

1. He wants *her to speak* at the conference. (insist). 2. They want
us to stop experimenting. (suggest). 3. He wants *her to give* her
reasons. (insists). 4. I want *you to include* the material in your ar-
ticle. (recommend).

XII. Express the same thing in a different way.

Sp.: He gave me the book *so that I could* read it.

St.: He gave me the book *in order that I could* read it.

1. She showed me the data *so that I might* use them. 2. He gave
her a pen *so that she could* write with it. 3. I gave him my reasons
so that he could understand the situation. 4. We helped him *so that*
he might have another chance.

XIII. Listen to the new words of the text 'Probability of Occur-
rence' and repeat them.

XIV. Follow the speaker as he is reading the text.

XV. *Listen to these direct questions and change them into indirect ones. Follow the model.*

Sp.: Have you got nine or ten circles?

St.: *I wonder if you have got nine or ten circles.*

1. Are you more likely to choose a black circle? 2. Are you more likely to choose a white circle? 3. Is the probability that you will cover a black circle $\frac{5}{9}$ (five ninths)? 4. Does anything favor the choice of any particular circle in this case? 5. Does p represent the possibility of success? 6. Does p represent the possibility of failure? 7. Is the sum of probabilities of success and failure equal to 1? 8. Can the probability that an event will occur be more than 1. 9. Is success a certainty if $p=1$? 10. Are chances even in case S and F are equal?

Classwork II

XVI. *Read these words and stress them correctly.*

cover, circle, probability, indeed, ratio, favor, succeed, success, failure, another, represent, finger, event, even, occurrence, occur, equally, likely, reason, hundred.

XVII. *Go back to ex. IX. Read the words and give their Russian equivalents.*

XVIII. *Read these pairs of words. Explain the change in pronunciation.*

production—produce; reduction—reduce; introduction—introduce; induction—induce; deduction—deduce; combination—combine; division—divide; precision—precise.

XIX. *Ask questions the answers for which are provided by the sentences below.*

1. When we try to do something several times we say that we have had several trials. 2. If you failed your examination, you would have to take it again. 3. Obviously he failed to come in time. 4. He asked me if I would do him a favor. 8. If man did not have ten fingers, people might have a different system of numeration. 9. Under these conditions the probability of occurrence is not very high. 10. The number of times an event will occur is unknown. 11. Whether this event will occur nobody knows with certainty. 12. He asked to be given another chance.

XX. *Read the text 'Probability of Occurrence'. a) Answer your teacher's questions in connection with the text; b) Give a short outline of the text following your plan. Work in pairs.*

XXI. *Before you begin working with the text below read these words and guess their meaning.*

independent *adj.*, dependent *adj.*

Read the text below. You will have to answer a few questions about the text.

Dependent, Mutually Exclusive, and Independent Events

1. Sometimes one event is dependent on another. 2. Consider a group of your class-mates drawing (вытягивает) slips (листки) of paper numbered from 1 to 20. 3. Suppose that anyone drawing a number exactly divisible by 5 is rewarded that is there are four ways of succeeding and twenty possible results. 4. X draws first, you draw next. 5. If X were successful, your chances of success would be decreased; if X were unsuccessful your chances would be increased.

7. Probability of X 's trial succeeding: $p = \frac{4}{20}$. 8. Probability for you, if X succeeds: $p = \frac{3}{19}$. 9. Probability for you if X fails: $p = \frac{4}{19}$. 10.

Some events are mutually (взаимно) exclusive (исключающие). 11. Thus, there might be a penalty (штраф) attached to (в связи с) drawing the number 13 in the situation described above. 12. But no one can draw both the number 13 and at the same time draw a number divisible by 5; drawing one excludes (исключает) the possibility of drawing the other. 13. Of course, the probability of X 's getting either a reward (награды) or a penalty is $\frac{5}{20}$; if she got neither, the

probability that you would get one or the other is $\frac{5}{19}$. 14. When two events are mutually exclusive the probability that either *one or the other* will occur is the sum of the separate probabilities. 15. Many events with which people must deal are independent; they occur without affecting each other in any way. 16. Thus if two coins were tossed at the same time or one after the other, the fact that one fell (упала) heads would not affect the way the other fell. 17. Suppose you toss two coins. 18. If you call them coin A and coin B , it is easy to see that the trial can result in four ways.

18. (1) Both coins, A and B , might come down heads.
- (2) Both coins, A and B , might come down tails.
- (3) Coin A might show heads and coin B might show tails.
- (4) Coin A might show tails and coin B might show heads.

19. Since there are four possible results, the probability of any one result is $\frac{1}{4}$. 20. This probability is the product of the separate probabilities in each case. 21. For instance (например), take the first case.

For coin A to come down heads: $p = \frac{1}{2}$.

For coin B to come down heads: $p = \frac{1}{2}$.

For both coins to show heads: $p = \frac{1}{2} \cdot \frac{1}{2} = \frac{1}{4}$.

22. When two events are independent, the probability that one *as well as the other* will occur is the product of the separate probabilities.

23. Of course, you might not be able to distinguish (различать) between the third and the fourth result; perhaps you could observe only that one coin shows heads and the other tails. 24. Since there are two ways in which this situation can occur, out of four possible results, $p = \frac{2}{4}$.

XXII. *Now answer a few questions in connection with the text.*

1. Slips of paper numbered 1, 2, 3, 4, and 5 are placed face down on the table. The slip is chosen at random (произвольно).

a) What is the probability that the number of the slip is 4?

b) What is the probability that the number of the slip is odd?

c) What is the probability that the number of the slip is even?

2. Suppose you are shown 10 boxes, one of which contains something while others are empty. You are allowed to choose one box. What is your mathematical expectation? 3. Four coins are tossed. What is the probability that all will fall tails?

Homework II

XXIII. *Translate the sentences given below.*

1. I suggest that you should choose the other alternative. 2. It is necessary that the advantages of the procedure suggested be made evident. 3. It looks as if they were not sure of the consequences. 4. It is important that the statement be consistent. 5. I suggest that both operations be designated with the letters A and B accordingly. 6. It is essential that the mutually exclusive events be considered. 7. He insisted that we should exclude the description of the elementary process from the book. 8. He behaved as though he did not know the entire situation. 9. I wish you distinguished between these two facts. 10. However sure of the result you may be, it is desirable that you check the operation. 11. No matter what the order of the addends may be, the sum is always the same. 12. Whatever the disadvantages of this machine may be, it is the only one we have. 13. If Leibnitz had not created the binary system, it would have had to be invented at our time. 14. Unless you were given other instructions you might consider Y, X, or Z as the unknown quantity and solve it in terms of any other letter in the problem. 15. Radicals of the same order may be multiplied or divided, whether real or imaginary. 16. It is essential that you attach greater importance to this event.

XXIV. *Note the various meanings of the words in italics. Translate the sentences below.*

1. All the students *but* one worked independently. 2. *But for* the atmosphere, life on the Earth would be impossible. 3. An electron

seems to be nothing *but* electricity. 4. I have *but* one request. 5. The article is *ready*. He *readily* agreed to write the article. 6. The work is *nearly* over. These points lie *near* each other. 7. It is a *great* discovery. I am *greatly* interested in it. 8. We had a *short* lesson. He came *shortly* before (after) the lesson. 9. Give me *either* of these books. Give me *either* the book or the journal. 10. *Neither* of them was right. I have seen *neither* the film nor the play.

XXV. Read the text 'Dependent, Mutually Exclusive, and Independent Events' and analyse the sentences you will find hard to understand. Pay special attention to sentences 5, 11, 12, 13, 16, 23.

XXVI. Write a short summary of both of the articles of the lesson. Be prepared to give your own example as an illustration while discussing the subject in class.

Laboratory Assignment II

XXVII. Listen to the speaker and repeat the new words of the text (2nd) of the lesson.

exclude, exclusive, mutual, mutually, to draw, slip, reward *n*, *v*, penalty, to affect, (for) instance, to fall (fell, fallen), to distinguish, to attach.

XXVIII. Listen and repeat. Guess the meaning of the words in *italics*.

to depend—*dependent*—*independently*—*independence*—*dependence*—*interdependence*; to exclude—*exclusion*; to observe—*observation*—*observer*; to separate—*separate a*—*separation*—*separable*—*inseparable*—*separability*; success—to succeed—*successful*—*unsuccessfully*; to distinguish—*distinguished*.

XXIX. Change the Infinitive Constructlon into the Subjunctive.

Sp.: I *want* her to write that paper.

St.: I *wish* she wrote that paper.

a) 1. I *want* you to go to the library. 2. I *want* him to see that journal. 3. I *want* you to find a proper answer. 4. I *want* her to give him another chance. 5. I *want* you to speak to your research adviser. 6. I *want* them to hold the meeting. 7. I *want* you to send her the abstract. 8. I *want* them to understand me better.

Sp.: I *expected* them to build the machine.

St.: I *wish* they had built the machine.

b) 1. We *expected* him to come sooner. 2. I *expected* her to draw a right conclusion. 3. I *expected* them to begin the experiment. 4. We *expected* you to deal with the problem. 5. I *expected* them to take their exam in due time. 6. I *expected* him to tell the truth. 7. We *expected* her to make the necessary changes. 8. I *expected* him to do everything possible.

XXX. *Say the same thing in a different way.*

Sp.: *But for him* I should never...

St.: *If it were not for him* I should never...

1. *But for this discussion* we could... 2. *But for this information* they would not... 3. *But for her* he would not come. 4. *But for you* I should not agree to do it.

XXXI. *Contradict the following statements.*

Sp.: He got a penalty.

St.: You are wrong. He did not get a penalty.

1. These events are mutually exclusive. 2. He is dependent on his family. 3. He drew a wrong conclusion. 4. He distinguished between those two approaches. 5. She excluded the second chapter. 6. They got a reward. 7. The coin fell down tails. 8. One event affects the other.

XXXII. *Listen to the speaker as he is reading the second text of the lesson.*

XXXIII. *Change direct questions into indirect ones.*

Sp.: Are these two statements consistent? (I wonder)

St.: I wonder if these two statements are consistent.

1. Is one event sometimes dependent on another? (I wonder).
2. Are some events mutually exclusive? (I should like to know).
3. Might there be a penalty attached to drawing number 13? (I want to know). 4. Can one draw the number 13 and a number divisible by 5 at the same time? (I wonder). 5. Do many events occur without affecting each other in any way? (I wonder) 6. Can the trial result in four ways? (I should like to know). 7. Did both coins come down heads? (I wonder). 8. Can both coins come down tails? (I wonder). 9. Might coin A show heads and tails? (I wonder). 10. Is this probability the product of the separate probabilities in each case (I'd like to know)

Classwork III

XXXIV. *Read the words of ex. XXVII and stress them correctly.*

XXXV. *Read the words of ex. XXVIII and give their Russian equivalents.*

XXXVI. *Translate these sentences.*

1. However great the development of science and technology may have been, we are facing the beginning of another technical revolution. 2. Whichever of these methods you may choose, you are unlikely to obtain a different result. 3. Whatever be the reaction, we ought to clearly express our point of view. 4. It is essential that students should be allowed to carry out independent experiments. 5. He suggests that scientists representing various branches of science be asked to take part in the research. 6. I wish you could draw an appropriate conclusion from the failure. 7. We have arranged the conference so

that the scientists may meet and discuss problems of common interest. 8. The computer should be operated with great care lest it should go out of order. 9. The machine behaved as though something had gone wrong with it. 10. I wish a reference were made to the article concerning the same scientific developments.

XXXVII. Read the text 'Dependent, Mutually Exclusive, and Independent Events' and translate it.

XXXVIII. Say whether the statements you are going to hear are true or false. If you disagree with the statement begin your answer with: 'to my mind'; 'in my opinion'; 'I am afraid you are wrong', 'as far as I know'; 'on the contrary'.

XXXIX. Answer your teacher's questions in connection with the text.

XL. Speak a) on Probability of Occurrence; b) on Dependent Events; c) on Mutually Exclusive Events; d) on Independent Events. In each case think of your own illustrations of various kinds of events.

XLI. a) Read the following text (on the left) and translate it into Russian. Compare your translation with the one on the right; b) Practise back translation.

I should like to consider families with two children. Letting b and g stand for boy and girl, respectively, and the first letter for the older child, we have four possibilities; bb , bg , gb , gg . These are the four sample points and we associate probability with each. Given that a family has a boy (event H), what is the probability that both children are boys (event A)? The event AH means bb , and H means bb , or bg , or gb . Therefore if $p\{A|H\} = \frac{1}{3}$ in about one third of the families with the characteristic H we could expect that A also would occur. It is interesting that most people expect the answer to be $\frac{1}{2}$. This is the correct answer to a different question, namely: A boy is chosen at random and found to come from a family with two children; what is the probabili-

Я бы хотел рассмотреть семьи, в которых по два ребенка. Обозначив через b и g мальчика и девочку соответственно, и обозначив первой буквой старшего ребенка, мы имеем четыре возможности bb , bg , gb , gg . Это четыре исходные модели и с каждой мы соотносим вероятность. Пусть в семье есть мальчик (событие H), какова вероятность того, что в семье оба ребенка — мальчики (событие A)? Событие AH означает bb , а H означает bb , или bg , или gb . Следовательно, если $p\{A|H\} = \frac{1}{3}$, примерно в одной трети семей с характеристикой H мы могли бы ожидать, что A тоже случится. Интересно, что большинство людей считают, что ответ будет $\frac{1}{2}$. Это является правильным ответом на другой вопрос, а именно: мальчик выбран случайно из семей с

ty that the other child is a boy? The difference might be explained empirically. With our original problem we might refer to a card file of families, with the second to a file of males. In the latter, each family with two boys will be represented twice, and this explains the difference between the two results.

двумя детьми; какова вероятность, что другой ребенок тоже мальчик? Отличие можно было бы объяснить эмпирически. При решении нашей первоначальной задачи мы могли бы обратиться к картотеке семей, а при решении второй — к картотеке мужчин. В последнем случае каждая семья с двумя мальчиками будет представлена дважды и это объясняет отличие двух результатов.

Home-reading

What is Calculus of Variations?

The calculus of variations belongs to those parts of mathematics whose details it is difficult to explain to a non-mathematician. It is possible, however, to explain its main problems and to sketch its principal methods for everybody.

The first human being to solve a problem of calculus of variations seems to have been Queen Dido of Carthage. When she was promised as much land as might lie within the boundaries of a bull's hide, she cut the hide into many thin strips, put them together into one long strip, the ends of which she united, and then she tried to secure as extensive a territory as possible within this boundary. History does not describe the form of the territory she chose, but if she was a good mathematician she covered the territory in the form of a circle, for to-day we know: Of all surfaces bounded by curves of a given length, the circle is the one of largest area. The branch of mathematics which establishes a rigorous proof of this statement is the calculus of variations.

Newton was the first mathematician to publish a result in this field. If a body moves in the air, it meets with a certain resistance, which depends on the shape of the body. The problem Newton studied was: what shape of body would guarantee the least possible resistance? Applications of this problem are obvious. The rifle bullet is designed in such a shape as to meet with a minimum resistance in the air. Newton published a correct answer to a special case of this problem, namely, that the surface of the solid considered is obtained by revolving a curve around an axis. But he did not give the proof or the calculations that had led him to the answer. So Newton's solution had no great effect on the development of mathematics.

A new branch of mathematics started with another problem formulated and studied by the brothers Bernoulli in the seventeenth century. If a small body moves under the influence of gravity along a given curve from one point to another, then the time required naturally depends on the form of the curve. Whether the body moves along a straight line (on an inclined plane) or along a circle makes

a difference. Bernoulli's question was: which path takes the shortest time? One might think that the motion along the straight line is the quickest, but already Galileo had noticed that the time required along some curves is less than along a straight line. The brothers Bernoulli determined the form of the curve which takes the shortest possible time. It is a curve which was already well known in geometry for other interesting properties and had been called cycloid.

What is common to all these problems is this: A number is associated with each curve of a certain family of curves. In the first example (that of Queen Dido) the family consists of all closed curves with a given length and the associated number is the area of the inclosed surface. In the second example (that of Newton) the number is the resistance which a body somehow associated with the curve meets in the air. In the third example (that of the brothers Bernoulli) the family of curves consists of all curves joining two given points, and the number associated with each curve is the time it takes a body to fall along this curve. The problem consists in finding the curve for which the associated number attains a maximum or a minimum—this is the largest or the smallest possible value: in Dido's example, the maximum area; in Newton's example, the minimum resistance; in Bernoulli's example, the shortest time.

Some problems concerning maxima and minima are studied in differential calculus, taught in college. They may be formulated in the following way: Given a single curve, where is its lowest and where is the highest point? or given a single surface, where are its peaks and where are its pits? With each point of the curve or the surface, there is associated a certain number, namely, the height of the point above a horizontal axis or a horizontal plane. We are looking for those points at which this height is greatest or least. In differential calculus we deal thus with maxima and minima of so-called functions of points, i. e. (that is) of numbers associated with points; in calculus of variations, however, with maxima and minima of so-called functions of curves, that is, of numbers associated with curves or of numbers associated with still more complicated geometric entities like surfaces.

We frequently find that nature acts in such a way as to minimize certain magnitudes. The soap film will take the shape of a surface of smallest area. Light always follows the shortest path, that is, the straight line, and, even when reflected or broken, follows a path which takes a minimum of time. In mechanical systems we find that the movements actually take place in a form which requires less effort in a certain sense than any other possible movement would use. There was a period, about 150 years ago, when physicists believed that the whole of physics might be deduced from certain minimizing principles, subject to calculus of variations, and these principles were interpreted as tendencies—so to say, economical tendencies of nature. Nature seems to follow the tendency of economizing certain magnitudes, of obtaining maximum effects with given means, or to spend minimal means for given effects.

Oral Practice

Lesson 1

XII. The man's face. The place of the planet. The shape of this bag. The changes of the plan. The bags of these children. The children's tables. The width of the map. The length of the side. The child's pen and the pencil. The man's age. The hands of these men. This side of the page. The man's simple plan. A set of red and black pencils. A set of thin pens. The effect of these data. The change of the ellipse. The children's help. The shape of the child's hand. The children's faces. The size of the man's hand.

XIII. a) The child's name. The planets' sizes. The man's help. These men's ideas. The film's length. The child's face. The name's length. The test's idea.

b) The data of these tests. The width of the page. The size of the black bag. The length of the pencil. The ellipse of the red planet. The shape of this big hand. The effect of these data. The face of the man.

Lesson 2

XV. Take this pen. Find that map. Don't make that cut. Study that method. Don't change this plan. Name that boy. Face this problem. Show me the result. Don't open that note. Come and take this film. Come and show him that page. Give her the test. Don't give him the black pencil.

Lesson 3

XIII. He can't read English well. We can't speak English now. She needn't do her homework today. They could not come to the meeting yesterday. He need not come early today. They can't do this work well. We needn't study another problem now. I can't write this paper at home. You needn't stop the child. I can't help them. You mustn't tell him these facts. He can't read the next word. They couldn't write the test-work yesterday. They needn't show him the method of their work. You needn't work hard at college.

XXIV. They can show the result of their work. (what, who). You must plan your time. (who). I could show him another test yesterday. (what, who, when). They might see the old film yesterday. (what, when, who). She must come in time (who, when). The child

can read and write well now. (who, how). He could tell them about the meeting yesterday. (who, when, what).

Lesson 4

XVII. This is Ann. She is a student. She is at college now. It's a good college. It is in an old house. I am a student of the same college.

I was late for my class today. Some other students were also late for their classes. Our teacher was in the classroom. She was ready to begin the lesson. It was an English lesson.

My work will be over in a week. I shall soon be at home. It will be nice to be at home. It will be good to see my family.

XVIII. 1. The man's method was easy. (what). 2. The paper will be ready in a week. (what, when). 3. They are in the next room. (who, where). 4. We were in the classroom then. (who, where, when). 5. The children were in the house. (who, where). 6. They are ready to study this problem tomorrow. (who, when, what). 7. It will be easy to teach them English. (why). 8. It was nice to see them at home. (what). It is simple to find the result. (what). Those students were late for their class yesterday. (why). 9. I can show you the man's house. (who, what). 10. He can't work in that small room now. (who, when). 11. It must be nice to see them. (what). 12. I cannot speak to her. (why). 13. It might be easy to translate this text. (what). 14. We must begin the lesson early today. (why, when).

XXXIV. Are you at the University or at college? Are you at home or in the classroom? Is the classroom large or small? Is your teacher in the classroom? Where is your teacher? Where are the students? Where are the students' books and note-books? Must you read and speak English at the lesson? Can you write English well? Can you write easy sentences? Who can translate easy texts? Must you try to speak English? Who can help you?

Lesson 5

XIX. There are not any important data in his last paper. There was not any interesting book in his library. There is no hostel at this college. There will not be any large buildings in this square. There was not any conference in our lab last week. There is not any research laboratory here. There were no interesting ideas or facts in this book. There are no outstanding poets among them. There were not any good theatres here last year.

XX. There are eight faculties for sciences. (how many). There was a very important meeting last week. (when). There are a lot of interesting facts in his report. (what kind of). There will be another building for this library next year. (when). There were quite a few postgraduates at the seminar two days ago. (when). There was a beautiful girl at the theatre yesterday. (who). There is a very nice

dining-room in our hostel. (what). There are some new branches in mechanics. (how many).

XXXV. Is Moscow University in Red Square now? What are the two addresses of the University? Is the faculty of Mechanics and Mathematics in Marx Avenue? In what building is it? Is Physics faculty also in the main building? Are there various labs in this building? What can you say about the great conference hall? Where can students go after classes and lectures? Are there many dining-rooms? Can students work in the libraries? Where can students do their homework?

Lesson 6

XVI. They had important data for you. (what kind of). You have a very nice apartment. (what kind of, who). We have a new University in our home town. (where). He has his vacation in the summer. (when). She has rather a young father. (who). His sister has two children. (whose, how many). We have a beautiful concert-hall in our University building. (what kind of). They have French lessons every week. (What). He had half of his scientific paper ready yesterday. (when). They will have a number of games next month. (how many). I shall have only one evening for this work. (how long). She has two little brothers. (how many).

XVII. Have you an amateur concert this evening? Have they a piano at home? Had they another important discussion? Has he rather a big apartment? Will he have much time for his work? Have they a lot of new words in the text? Will you have English classes every day? Had your group-mates a test when you were ill?

XXXIII. What's the boy's name? Is he eighteen or seventeen? Is he at the faculty of Mechanics and Mathematics or at the Physics faculty? Where is he now? Where was he in July? What kind of work had the students in the construction team? What games could they play? Is Peter at home now? How big is his family? Has he got one or two sisters? How old is his grandmother? What is his father? What can you say about his brother? Who is fond of music? What are the names of Peter's sister and brother? How old are they? Can Peter play the piano? Is he good at music? Is he rather lazy about his music lessons? What can you say about their apartment?

Lesson 7

XVIII. There are various exercises in this lesson. (what kind of). Students from different countries took part in the meeting. (who). He usually gets up early in the morning. (when). I like a shower before breakfast. (what). He lives in the Federal Republic of Germany. (where). She usually takes long walks after dinner. (why). We shall go and see that ancient monastery on Sunday. (when). We have two English lessons a week. (how many). I do not like light music. (why). We usually have dinner late in the afternoon. (who).

XIX. Does he do his morning exercises every day? Do they live in the West of our country? Did you get a letter from your boy-friend? Do you have classes in the afternoon? Do you like to rest in this park? Is this a good stadium? Can they do interesting research at their lab? Did the girl make up her mind to go to college? Will you be at home next Saturday? Did they tell you the truth? Does your friend work in the field of atomic physics?

XXXVII. Whom did Alex write a letter to? Why was Alex sorry? Why did he want to see his friend in Smolensk? Does Alex live in the students' hostel or with his family? Is he happy about it? Why? Does he share a room with two or three other boys? What can you say about the room Alex lives in? What can you say about his room-mates? Do students of different nationalities and from different countries take their course at Moscow University. When do students usually have lectures and seminars? What do the boys usually do after classes? What is Alex's idea of a good rest after his classes? When does he go to the centre of Moscow and why? Where will he go on Sunday? With whom will he go there? What can you say about Alex's girl-friend? What does Alex ask Pete to do? When must students take their terminal exams? For how long does the term last? In what case can students take their exams? When are the exams over? Are students free after their exams in January?

Lesson 8

XV. I was awfully busy last week. (when). The past year was very difficult for me. (why). I took my final State examinations in spring. (when). He passed his exams successfully. (how.). She made up her mind to take a postgraduate course in algebra. (who). The entrance exams were very competitive. (what exams). She worked hard at her English and managed to get a good mark. (why). They learned the result of the exams in November. (when). It's a great privilege to belong to this faculty. (what). The postgraduate course runs for three years. (for how long). My science adviser is a gifted mathematician. (who). Besides lectures I must attend seminars. (what). I actually began to learn English in November. (when). I have only eight months at my disposal. (how many). They managed to obtain important results. (what kind of). I have a very comfortable room in the students' hostel. (what kind of). We have all the service facilities in the main building. (what kind of).

XVI. Were the final State examinations in autumn? Did he defend his graduation paper successfully? Did she make up her mind to go to her home town after the graduation? Are you going to do research in this special field of mathematics? Must postgraduate students take exams in two foreign languages? Does the course run three or four years? Did they know all the details of our work? Can you miss this seminar? Does the academic year begin on the first of January? Will they obtain new results by the end of the year? Does he hope to

hear from his sister soon? Did you get this book at the book-stall? Does your room face West? Is your room sunny?

XXXVII. Why couldn't Peter write a letter to Nick for a long time? What examinations did he take in the spring? Did he defend his graduation paper successfully? What did he make up his mind to do? What did he say about the entrance exams? What marks did he get for his exams in October? When did he learn the results of the examinations? For how long does the postgraduate course run? What does Pete think about his science adviser. What does Pete think about his advice? What lectures and seminars must postgraduates attend? Why will he learn English? How much time has Peter at his disposal for his English studies. Must he try to obtain new scientific results? What kind of room has he at the hostel? What service facilities are there in the main building of the University?

Lesson 9

XVII. She was awfully glad to see her friends again. (why). She was lucky to enter the University. (why). They managed to obtain enough information. (how). Students must remember all the new words of the text. (why). They discussed their favourite subject. (with whom). Scientists found the result of the experiment rather disappointing. (why). He got an appointment and left Moscow for Tula. (when). They got married and went to Minsk. (when). My room-mate always rises at 6 o'clock in the morning. (why). My father always turns to one of his favourite writers. (why). My friend came to my place. (when). We talked and laughed and listened to good music. (when). Last Saturday we went to the country for the week-end. (with whom). We had a very good time there. (who). We agreed to go to the exhibition. (when).

XVIII. Have you got enough time for your English? Do you remember all the words of the new lesson? Is English your favourite subject? Is classical music your hobby? Do you always do your homework in due time? Are you familiar with Lobachevsky's works? Do you find some of the academic subjects rather difficult? Do your group-mates work hard enough at their English? Do you sometimes disappoint your parents? Will you leave for your home town in January? Do you know everything about your best friend? Is your father a surgeon? Will you go to a museum or some exhibition next Sunday? Do you often argue with your parents? Did you enjoy the concert of modern music last night? Do you often turn to your friends for help?

XXXVI. Did Olga recognize her old friend? Was she glad to see him? When did Olga take a postgraduate course? Was English Olga's favourite subject? Why does she think that the work of some of the students is rather disappointing? What appointment did Mike get after graduation? Does Mike find his work interesting? Does Mike remember Olga's parents? What kind of man is Olga's husband?

What do Olga and her husband like to do when they are not busy with work? Where do they have a cottage? What is there near the cottage? What idea did Olga have? When are the two friends going to meet?

Lesson 10

XVIII. It is believed that our age is the age of technological revolution. (why). A number of fundamental scientific discoveries were made in the eighteenth century. (by whom). M. V. Lomonosov made a great contribution to Russian and world science. (in what fields of science). Progress of science today is not possible without cooperation among scientists. (why). The knowledge of the laws of heredity is very important for the life of human society. (why). Some fundamental laws of nature were discovered by ancient scientists. (what laws). People all over the world want to preserve peace and security on our planet. (in what way can). P. Alexandrov was among the creators of the Soviet school of topology. (what other mathematicians). They do fruitful research practically in every field of mathematics. (where). They can reproduce life in laboratory conditions. (where). It is not always that we can see distant stars. (why). Communication between these distant towns is complicated in winter. (why). The results of the technological revolution in this sphere of life are being discussed at the conference. (by whom). It is extremely difficult to control such operations. (why). Their reaction to that publication was quite unusual. (what).

XXXVI. What can we say about our present age? How big is the percent of human knowledge obtained in the 20th century? Does the number of scientific publications double every five years? Could you say what fundamental laws were discovered in the 20th century? What do you know about quasars and pulsars? Are successes of quantum mechanics and molecular biology big? In what fields of science is the contribution of Soviet scientists to world science and technology especially great? What do you know about "Tokamak"? What are the names of some of the creators of the Soviet schools of mathematics and mechanics? What outstanding Russian mathematicians do you know? Does science occupy an extremely important place in the life of the human society? Why? What is the main condition of life and development on our planet?

Lesson 11

XXXII. 1. Why can't people live without numerals? 2. What are numerals in a numeration system used for? 3. What are the numbers used in our numeration system called? 4. How many digits do we use in our Hindu-Arabic system of numeration? 5. Could one and the same number be represented in various ways? 6. What is the base of the Hindu-Arabic numeration system? 7. Do we use digits in various combinations? Why? 8. What is an equation? 9. What sign do we use between the two parts of an equation? 10. Can you give an

example of an equation? Do, please. 11. How many basic operations of arithmetic do you know? 12. What are these operations? 13. What is an operation in arithmetic? 14. Could you name all the numerals in the equation $8-5=3$? 15. In the equation $11+12=23$ 23 is the product, isn't it? 16. Which number is the divisor in the expression $8:2=4$? 17. Could you divide 10 by 3 without a remainder? 18. What will you get if you divide $0:3$? 19. Could you divide 7 by 0? 20. What will you get as a result of this operation? 21. What is the inverse operation of addition (of multiplication)? 22. Why do we say that division by 0 is meaningless?

Lesson 12

XXXIII a). 1. When was Leibnitz doing his research? 2. Did he live in Germany or in England? 3. What system did he develop? 4. What is this system called? 5. What did Leibnitz actually build? 6. Was his machine extensively used during the seventeenth and the eighteenth centuries? 7. In what kind of computers is the binary numeration system used? 8. What does the numeral 0 correspond to? 9. What does the numeral 1 correspond to? 10. What groups do base two numerals indicate? 11. In what way can a base ten numeral be changed to a base two numeral? 12. Which system of notation does a high-speed electronic computer use? 13. What accounts for the extensive use of electronic computer? 14. Is the binary system the simplest power-position system of numeration? 15. Why are we using 0 and 1? 16. What are the advantages and the disadvantages of the binary numeration system?

Lesson 13

XXXIV. 1. What do we get as the sum if we add two natural numbers? 2. Why do we say that a set of natural numbers is closed under addition? 3. Can we name the sum in each of the given equation? What does it mean? 4. What is the existence property? 5. What is the uniqueness property? 6. Are both existence and uniqueness implied in the definition of closure? 7. Why do we say that $a+b$ is a natural number? 8. Is the difference in the operation of subtraction $11-11=0$ a natural number? 9. Can we solve the equation $4-7=n$, if we must have a natural number as an answer? 10. Is the set of natural numbers closed under subtraction? 11. What kind of number do we get as the result of multiplication of two natural numbers? 12. In what way can you define the closure property in general? 13. What is the result of multiplication called? 14. What are the numbers to be multiplied called? 15. Could you name factors of 18? What are they? 16. Why do we call 6 and 3 just one pair of factors of 18? 17. What should the product be, if you use 0 as one of the factors? 18. How much is 0 times 5? 19. What is 7 times 0 equal to? 20. Can more than two factors be used in some cases? 21. Is it possible to say that 60 is the product of 3 factors? Why? 22. Why do we agree to omit 1 as a factors when naming a number in factored form?

23. Is the order in which the factors of the same set are written important? 24. What factors are implied in every whole number? 25. Could you give an example of a number that contains only one and itself as factors? 26. In what case is a whole number called a prime? 27. What is a composite number?

Lesson 14

XXXIII. 1. The sentence which contains a sign of non-equality is called an equation. 2. One and the same mathematical sentence can be both true and false. 3. The relation of equality satisfies the transitive axiom. 4. In some branches of mathematics we do not use numbers. 5. If we replace the plus sign with a minus sign we shall not change the meaning. 6. It is impossible to write a false statement in mathematics. 7. Mathematical language is not direct but it is concise. 8. Numerals $3+4$ and 6 name the same number. 9. Numerals 5×2 and 10 name different numbers. 10. Eleven is less than twelve. 11. The signs which express equality or inequality are called relation symbols. 12. These signs indicate how two expressions are related.

XXXIV. 1. What is an equation? 2. What are the two parts of the equation called? 3. What kind of mathematical sentences may there be? 4. Can a false mathematical sentence be closed? 5. In what way can we decide whether a mathematical sentence is true or false? 6. Why do we check both elements of the equation? 7. Which basic axiom does the relation $a=a$ satisfy? 8. Can you give an example of the relation of equality? 9. Which sign is the opposite of $\neq$? 10. What is the important feature about a sentence involving numerals? 11. Is it incorrect to write a false sentence? 12. Why must we have a good understanding of the meaning of each symbol? 13. Does the sign $\neq$ tell which numeral names the greater or the lesser of the two numbers? 14. What do the ordering symbols indicate? 15. Why are all these symbols called relation symbols?

Lesson 15

X. 1. Have you ever studied English? 2. Why have you come to Moscow? 3. Where have you come from? 4. Where has P. come from? 5. Why have you decided to take up mathematics? 6. Have you ever been to Leningrad? 7. Have you been to any museum in Moscow yet? 8. Have you read any books on mathematics in German (French)? 9. Have you seen any new film recently? 10. Has your mother come to see you in Moscow? 11. How many lessons of your English textbook have you studied? 12. Have you learned many words?

XXX. 1. Some fractions have numerators and other fractions have denominators. 2. The denominator tells us how many parts of equal size are taken. 3. The denominator is always greater than the numerator. 4. Fractions like $\frac{2}{3}$ are called proper fractions. 5. Fractions

like $\frac{4}{4}$ are called *mixed fractions*. 6. One and the same fraction can be written in various ways. 7. If we multiply a fraction by a whole number, we shall change it. 8. 1 can be expressed as a fraction. 9. It is impossible to reduce a fraction like $\frac{2}{3}$. 10. In the fraction $\frac{1}{2}$ the denominator and the numerator are relatively prime. 11. When we divide both numbers named in a fraction by 0, we leave the fraction unchanged. 12. Before we reduce a fraction we must first determine the greatest common factor.

XXXI. 1. What shall we deal with in this chapter? 2. What does the numerator show? 3. What does the denominator indicate? 4. What is a proper fraction? 5. What kind of fractions are called improper? 6. Can you give an example of a mixed fraction? 7. Are fractions like $\frac{1}{2}$ and $\frac{4}{8}$ called equivalent? 8. What will you get if you multiply $\frac{1}{2}$ by $\frac{2}{2}$? 9. What will you get if you multiply $\frac{2}{5}$ by 1? 10. By which number will you multiply 2 to get 6? 11. Can you change $\frac{2}{3}$ to lower terms? 12. How can you change $\frac{1}{3}$ to higher terms? 13. Will you change the fraction if you divide it by 0 or 1? 14. What must you determine first when you have to reduce a fraction to lowest terms? 15. What is meant by the simplest fraction for a rational number? 16. Of the fractions $\frac{6}{14}$, $\frac{8}{12}$, $\frac{3}{7}$ and $\frac{5}{10}$, which is the simplest form? Which are equivalent fractions? 17. What is the simplest name for the rational number twelve-fourths? 18. Which numeral do you have to put in place of n to make each of the following a true statement? $\frac{16}{4} = \frac{n}{24}$; $\frac{n}{63} = \frac{4}{n}$; $\frac{72}{9} = \frac{n}{1}$. 19. Which properties of multiplication are the same for both the set of integers and the set of rational numbers?

Lesson 16

XXX. 1. In our numeration system we use 9 digits. 2. It is possible to obtain only two combinations of the digits 1, 2, 3. 3. The position of each digit does not affect its value. 4. Diagrams are never helpful. 5. A comma separates each group or period. 6. All digits to the left of the decimal point represent whole numbers. 7. We obtain a tenth by dividing 10 by 1. 8. Decimals like .333 are called repeating decimals. 9. We cannot express rational numbers as decimal numerals. 10. The digits to the right of the decimal point name the numerator of the fraction. 11. Before they begin performing operations with decimals they must have a common denominator. 12. It is impossible to introduce a procedure that reduces all decimal-division situations to one standard situation. 13. Each step of the addition in

fractional form has a corresponding step in decimal form. 14. Zero is not the identity element of addition.

XXXI. 1. How many digits do we use in our numeration system? 2. How many combinations can be written with the digits 1, 2, 3? 3. Does the position of each digit affect its value? 4. How many place-value positions does the numeral 7864 have? 5. What is a comma used for? 6. What does a point in a numeral like 1.3 mean? 7. What do all digits to the right of the decimal point indicate? 8. What do all digits to the left of the decimal point represent? 9. In what way do you obtain a tenth? 10. Do you read the zeroes in .0081, or do you skip them? 11. What is the name given to a decimal like .2323...? 12. Why is this kind of numeral called a repeating decimal? 13. Can you express rational numbers as decimals? 14. What does the numeral .217 denote? 15. Can rational numbers be named by decimal numerals? 16. Must we define a common numerator or denominator when we perform an operation of addition with fractions? 17. Is division of decimal numbers easier or more difficult than division of fractions? 18. What must we do to reduce a decimal-division operation to a standard situation? 19. Where must all the decimal points lie? 20. Why must we place all the decimal points on the same vertical line? 21. Is it necessary to write .26 as .260? 22. What will help you to obtain the correct answer if you subtract 2.13 from 3.348? 23. Are operations with decimals like operations with integers?

Lesson 17

XII. T.: Ask him (me, her, them, him, etc.)
if he understands the game of chess;
if they knew that legend before;
if the new text seems interesting;
if the game of chess seems popular nowadays;
if she will remain in Moscow during her vacation;
if the production of computers in the Soviet Union is rapidly increasing;
if she must study English or she has some other alternative;
if girls play football;
if there are any kings in India nowadays;
if it is necessary to repeat English words constantly;
if the table is covered with anything;
if he knows the world's average production of wheat;
what the average number of students at these departments is;
why the number of students in the Soviet Union is increasing every year;
by whom the telescope has been invented;
what her (his) greatest desire is;
to read text one;
to answer your questions;
to give you one of his pens;

not to discuss the exercise with her;
not to occupy that place.

XXXII. 1. The game of chess is not popular nowadays. 2. According to an old legend the game was invented in Egypt. 3. It was invented by Sissa Ben Dahir. 4. He was king Shirham's friend. 5. The king did not seem pleased with the present. 6. The king was not going to thank his vizier for the present. 7. Sissa Ben said he did not want anything from the king. 8. The vizier said he wanted a lot of money. 9. His desire seemed easy to fulfil. 10. Sissa Ben wanted 10 grains of wheat to be put on the first square of the chessboard, 20 grains to be put on the second and so on. 11. There are 24 squares on the chessboard. 12. The king agreed to give his vizier what the latter had asked for. 13. The first bag was emptied before the twentieth square was covered with wheat. 14. At that moment the king understood that he would never be able to keep his word. 15. The king thought it best to remain constantly in debt to his vizier.

XXXIII. 1. I wonder if the game of chess is popular nowadays. 2. Where was the game invented? What does the legend say? 3. I should like to know if the game had been invented by the king or by his vizier. 4. By whom was a chessboard with various figures on it presented to the king? 5. I wonder if the king was pleased with his vizier's present. 6. Why do you think that he was pleased? 7. I wonder what the vizier's desire was. 8. How many squares are there on the chessboard? 9. How many of the 64 squares are black? 10. Did the king think that Sissa Ben's desire was easy or difficult to fulfil? 11. Was the king going to fulfil his vizier's desire? 12. Why did it seem that the vizier's desire was quite easy to fulfil? 13. What did the king ask his men to bring? 14. When did the king understand that he would not be able to keep his word? 15. How many grains are there in a bushel of wheat? 16. What is the world average production of wheat? 17. What was the amount of wheat that the king had to give to his vizier? 18. What were the two alternatives? 19. Which one of these alternatives did the king choose?

Lesson 18

XXXV. 1. The theory of universal gravitation was formulated by Galileo. 2. Tycho Brahe, a German astronomer collected a great deal of observed data about the motion of the planets. 3. Kepler had formulated his three famous laws before Galileo invented the telescope. 4. The rate of description of sectorial area is not constant. 5. The cubes of the mean distance of the planets from the sun are proportional to the squares of their time of revolution. 6. Not every planet possesses an acceleration towards the sun. 7. All bodies taken in pairs, induce in each other mutual acceleration. 8. Some of Newton's predecessors had their own view of mass. 9. A body continues its uniform motion in a straight line even if it is compelled to change

its state by impressed force. 10. Action and reaction are always equal and opposite.

XXXVI. 1. What are the two great achievements that made Newton's name famous? 2. Which concepts introduced by Newton is it important for us to examine? 3. By whom was a great deal of observed data about the motions of the planets collected? 4. What did Kepler's first law amount to? (the second, the third). 5. What is the acceleration of each planet towards the sun proportional to? 6. Under what circumstances do bodies induce in each other mutual acceleration? 7. What principle as far as action and reaction are concerned distinguishes between mass and weight? 8. In what book did Newton formulate his laws of motion? 9. How is the first (second, third) law by Newton formulated? 10. What are the names of the scientists who developed the theory of universal gravitation?

Lesson 19

XVIII. 1. Geometry is quite a new subject. 2. Geometry began in Greece. 3. Egyptians applied geometry for measuring land and for defining volumes. 4. It was Euclid who put all the known facts about geometry into a logical sequence. 5. Geometry has not changed since the time of Euclid. 6. Euclid has written other books which are as famous as his Elements. 7. The most fundamental idea in geometry is the idea of a segment. 8. It is impossible to think of a point as an exact location in space. 9. One can see, feel, hold and move a point. 10. Points *D* and *E* of the given segment are referred to as endpoints.

XIX. 1. What does this text deal with? 2. Where did geometry begin? 3. Why did early Egyptians need geometry? 4. What were they mostly concerned with? 5. Where did the knowledge of Egyptians spread to? 6. What did the Greeks think of geometry? 7. What is the name of the man who put all the known facts about geometry into a logical sequence? 8. Which one of his books is one of the most famous books of mathematics? 9. What problems does geometry deal with nowadays? 10. What is the most fundamental idea in the study of geometry? 11. What is a point? 12. Is the dot a point or only a picture of a point? 13. What kind of letters do we use when marking a point? 14. What will you get if you draw a line between two points? 15. What are points *D* and *E* in one of the given figure called? 16. Can you imagine extending a segment indefinitely?

XXXVI. 1. Can you measure the length of a ray? Why? 2. Can you locate a point on a line segment between endpoints? 3. How many points does a line segment contain? 4. Can a ray and a line segment have a common endpoint? 5. Has a line segment definite length? 6. What do we mean when we say that we draw a geometric figure? 7. Is a geometric figure formed by a set of points an abstract concept? 8. Can such a geometric figure be seen? 9. From what do mathematicians develop their ideas? 10. What do we mean

when we use the word line? 11. What can a particle of dust or a dot on a piece of paper represent? 12. What do we usually use the letters of the alphabet for? 13. What do the figures above the letters indicate? 14. Why can you locate another point between two points on a line? 15. What does a line segment consist of? 16. How does a line segment (a ray) differ from a line? 17. What is a vertex?

Lesson 20

XVIII. 1. Every simple closed figure separates a plane into three distinct sets of points: the figure, its interior, its exterior. 2. An angle is formed by two rays having a common endpoint. 3. If two rectangles have the same length the measures of their interiors are the same. 4. If you are going to find the perimeter of any polygon, you must add the measures of its sides and angles. 4. A quadrilateral is a polygon having three sides. 6. An angle greater than the right angle is referred to as an acute angle. 7. A right angle has a measure of 95° . 8. An acute angle has a measure which is greater than 0° but less than 90° . 9. The hypotenuse refers only to the side opposite the right angle in a right triangle. 10. A rectangle in which all four sides have the same linear measure is called a square.

XIX. 1. In what way do we form a ray? 2. Is it possible to deduce that two rays originating from the same endpoint form an angle? 3. What kind of angles do you know? 4. Which is greater, an acute or an obtuse angle? 5. Into how many sets of points does an angle separate a plane? 6. What other polygons (except for triangles) do you know? 7. Which sides of a trapezoid are called the bases? 8. What do all these geometric figures have in common?

XXXVI. 1. How is the so-called parallel postulate usually stated now? 2. What is our definition of the special quadrilateral having pairs of parallel sides based upon? 3. What are the names of those mathematicians who developed non-Euclidean geometries? 4. What was Euclid's assumption concerning a given point and a given line? 5. What did Lobachevsky assume? 6. What was Riemann's idea of the relation between a given point and a given line? 7. Can we say that the conclusions of non-Euclidean geometries are just as valid as those of Euclidean geometry? Why? 8. What are the intuitive images corresponding to the undefined terms *straight line* and *plane* in Euclidean and non-Euclidean geometries?

Lesson 21

XVI. 1. He held the sharp end of a compass fixed on a sheet of paper. 2. Each point of a circle is equidistant from the center. 3. The segment has joined two points of a circle. 4. He has measured the distance between the centers of the two circles. 5. The ratio is designated by a capital letter. 6. The diameter is twice as long as the radius. 7. The diameter passes through the centre of the circle. 8. A part of a circle containing more than one point forms an arc. 9. This

fact was discovered by mathematicians long ago. 10. This part of the plane is curved slightly.

XIX. 1. Do all radii of the same circle have the same measure? 2. Can we speak of a circle as a set of points? 3. What is the difference between a diameter and a radius? 4. What is an arc? 5. What is another name for a circumference? 6. By what formula do you express the ratio of the circumference (C) to a diameter (d)? 7. What is the length of a diameter equal to? 8. Is $\frac{C}{2r}$ the same for all circles? 9. Does a circle contain any segments? Why not? 10. What is the difference between an arc and a chord?

XXXVII. 1. If three parts of one triangle are congruent to three parts of another, the triangles are congruent. 2. If the intersection of two lines in space is an empty set, then the lines are parallel. 3. The formula for the perimeter of a regular polygon may be stated as $p = \pi r^2$. 4. A diameter of a circle is a chord of the same circle. 5. The opposite angles of a trapezoid are congruent. 6. The radius of a circle is twice as long as the diameter. 7. The area of a rectangle is the product of the length of its base and the length of its altitude. 8. We can inscribe as many polygons in a circle as we desire.

XXXVIII. 1. Can we say that a circle and the circumference of a circle are one and the same thing? 2. How shall we define the circumference here? 3. By what formula is the perimeter of a circle symbolized? 4. What concept is it necessary to introduce if we are going to arrive at a more precise definition of a circle? 5. In what way can we inscribe a regular octagon in a circle? 6. Does the area of a polygon approach that of a circle as the number of the sides of the polygon increases? 7. Is π a rational number or not? 8. Are all radii of the same circle congruent? Why? 9. Can the number π be expressed exactly as a fraction or as a decimal? Why not? 10. Which is a more accurate approximation of π : 3.14 or $\frac{22}{7}$?

Lesson 22

XIX. 1. What did ancient Egyptians discover by stretching ropes of lengths 3 units, 4 units and 5 units? 2. What were the ancient Greeks able to tell about triangles? 3. What was their method of telling whether a triangle was a right one? 4. How does the number of small triangular regions in the two smaller squares compare with the number of triangular regions in the largest square? 5. Who noticed this relationship? 6. What is the sum of the areas of the two smaller squares equal to, if each side of a right triangle is used as a side of a square? 7. Is Pythagorean property true for all right triangles? 8. Is it possible to state the Pythagorean property in mathematical language?

XXXVII. 1. When the Pythagorean Property is expressed in the form $c^2 = a^2 + b^2$, we can replace any two of the letters with the measure of two sides of a right triangle. 2. Number 5 when used as a factor twice gives the product of 50. 3. If a number is a product of two equal factors, then either of the equal factors is called a square root of the number. 4. The product of two negative numbers is a negative number. 5. There is an integer whose square root is 20. 6. We could continue the process of squaring some number between 4 and 5 indefinitely and never get the exact value of $\sqrt{20}$.

XXXVIII. 1. How many square roots does every positive integer have? 2. What are the square roots of integers? 3. Do we use the division method in finding the square root of a number? 4. What does the radical sign denote? 5. Can a square root of an integer be an irrational number? 6. Why are numbers such as 4, 9, 16 and 25 called perfect squares? 7. Is 3 a perfect square? Why not? 8. Do you know any method for finding an approximate square root of a number which is not a perfect square? What is it?

Lesson 23

XXXVIII. 1. The statements $0 \times 1 = 0$ and $1 \times 1 = 1$ are true in any numeration system. 2. The set $\{0:1\}$ is closed under both addition and multiplication. 3. The set of natural numbers is closed under all four of the basic operations of arithmetic. 4. Before we begin making replacements for the variable we have to know what set of numbers we are allowed to use. 5. Each element of the solution set makes a statement true. 6. There is always a solution to satisfy a given statement.

XXXIX. 1. What replacement for the blank in the sentence 'there are ... departments at Moscow University' will you give to make this sentence true? 2. What is a solution set? 3. What is each element of the solution set called? 4. Is the sentence 'he is an Olympic champion' true or false? What must you do to make it either true or false? 5. Can you find the solution set of $y + 2 < 6$ if the replacement set is the set of integers? 6. Can you find the solution set of $5 + n = 4$ if the replacement set is the set of natural numbers? 7. Can the solution sets contain only one element or they can contain an unlimited number of elements? 8. Why does a solution set have to be a subset of the replacement set? 9. Why is the solution set also called the truth set? 10. What is the set containing no elements called? 11. Can we say that to solve an equation means to find the solution set? 12. Is an open sentence true or false?

Lesson 24

XXXVIII. 1. Each ordered pair (X, Y) tells you how to locate a point in the coordinate plane, by starting from the origin. 2. We know each of the numbers of a pair to be either positive or negative. 3. The

operation of forming the Cartesian product is commutative. 4. To every ordered pair of real numbers there correspond several points on the plane. 5. We hold the elements of the Cartesian product to be ordered pairs of numbers. 6. There is no one-to-one correspondence between the real numbers and the points on a line.

Lesson 25

XXII a) 1. The most important property of a computer is its many-sidedness. 2. On every occasion a different program is required. 3. The method of performance must not be described in detail. 4. It is quite correct to call an automatic digital computer an electronic brain. 5. The programmer should not foresee all the possible difficulties. 6. The great merit of a computer is its ability to produce instructions. 7. If there is a small mistake in the program, the computer will correct it. 8. The program must specify exactly what must be done under every circumstance that may arise. 9. The precise definition of the problem to be solved forms the major part of the preparatory work. 10. The writing of the program does not demand great attention on the part of the programmer. 11. The computer does not store the program in its memory. 12. If the original program is not correct, it has to be amended.

XXII b) 1. Which property distinguishes a computer from all other kinds of machine? 2. Will you give some examples of the computer's many-sidedness? 3. Under what condition can a computer perform a certain task? 4. Why is it a misnomer to apply the term "electronic brain" to an automatic digital computer? 5. With what kind of instructions can a computer deal? 6. Is it possible for a computer to cope with difficulties which have not been foreseen by the programmer? 7. With what must a computer be supplied? 8. Why is it important to supply the computer both with a detailed set of instructions and with the numerical values? 9. What is a program? 10. What is the great merit of computers? 11. Suppose there is a small mistake in the program. Can we expect the computer to correct it? 12. Why does it sometimes happen that we get results which are obviously absurd? 13. What must be stressed as far as programs are concerned?

Lesson 26

XXXVIII. 1. All events are dependent on one another. 2. If X were successful your chances in the case being described would be increased. 3. Your success or failure depends on the success or failure of X in this particular case. 4. It is quite possible to draw both the number 13 and a number divisible by 5. 5. Drawing the number 13 excludes the other possibility. 6. Many events occur without affecting each other in any way. 7. In tossing two coins the fact that one fell heads would not affect the way the other fell. 8. In the case of tos-

sing two coins the trial may result in six ways. 9. Whatever the events may be, they are all independent.

XXXIX. 1. Are all events dependent on one another? 2. Is it possible for an event to be entirely independent of some other event? 3. What do we mean by speaking about mutually dependent events? 4. Could you give your own example of mutually dependent events? Do, please. 5. Could you give an example of mutually independent events? Do, please. 6. Would you give an example of mutually exclusive events? 7. Have you ever tossed a coin to call heads or tails? 8. In how many ways could your trial result? Why? 9. Were your chances even? How do you account for that? 10. What is the product of separate probabilities?

УРОК I

По смысловому содержанию, синтаксической функции в предложении и морфологическим признакам слова принято делить на разряды, называемые частями речи.

В свою очередь, части речи делятся на самостоятельные (знаменательные), т. е. несущие смысловую нагрузку (имя существительное, имя прилагательное, глагол, наречие, местоимение), и на служебные, которые в отличие от знаменательных частей речи, передавая связи и отношения между словами (предлоги) и предложениями (союзы) или указывая на принадлежность слов к определенной части речи (артиклы), играют лишь вспомогательную роль.

Существительное

Существительное в английском языке имеет два числа — единственное и множественное.

Множественное число существительных образуется путем прибавления окончания *-s* или *-es* к основе слова.

Окончание *-s* (*-es*) произносится глухо — [s] после глухих согласных и звонко — [z] после звонких согласных и гласных.

[s]	[z]	[iz]
fact—facts	hand—hands	place—places
length—lengths	idea—ideas	size—sizes
map—maps	time—times	class—classes
set—sets	boy—boys	lady—ladies

Некоторые существительные образуют форму множественного числа особым образом. Запомните их:

1.	ед. ч.	мн. ч.
человек	man [mæn]	men [men]
женщина	woman ['wʊmən]	women ['wɪmən]
ребенок	child [tʃaɪld]	children [tʃɪdrən]
фут	foot [fu:t]	feet [fi:t]
(мера длины)		

2. Слова латинского и греческого происхождения, например:

ось	axis ['æksɪs]	axes ['æksɪz]
матрица	matrix ['meɪtrɪks]	matrices ['meɪtrɪsɪz]

критерий	<i>criterion</i> [krai'tiəriən]	<i>criteria</i> [krai'tiəriə]
явление	<i>phenomenon</i> [fi'nəmi-nən]	<i>phenomena</i> [fi'nəmi-nə]
спектр	<i>spectrum</i> ['spektrəm]	<i>spectra</i> ['spektrə]
радиус	<i>radius</i> ['reidiəs]	<i>radii</i> ['reidiəi]

Артикли существительного

Существительное в английском языке имеет при себе артикль (определенный или неопределенный). В ряде случаев артикль может и не быть. Наличие или отсутствие артикля связано со значением и употреблением существительного в каждом данном случае.

Одно и то же существительное может сочетаться как с определенным артиклем (*the*), так и с неопределенным (*a, an*).

Неопределенный артикль произошел от числительного *one* «один». Именно поэтому он употребляется только с существительным в единственном числе: *a pen, a map* и свидетельствует о принадлежности предмета к какому-либо классу *однородных* предметов, т. е. выполняет классифицирующую, причисляющую функцию.

A table — стол, какой-то из многих ему подобных столов.

An article — статья, какая-то, относящаяся к классу статей вообще. Статья, а не книга или газета.

Определенный артикль происходит от указательного местоимения *that* и употребляется перед существительным как в единственном, так и во множественном числе. Он выделяет некий предмет или явление из класса *подобных* ему предметов или явлений.

Сравните:

take a pen — возьми ручку (*а не карандаш*)

take the pen — возьми (*эту*) ручку (*ту, которая уже упоминалась*).

Артикль отсутствует:

1. Перед существительными во множественном числе в том случае, если в единственном числе им предшествовал неопределенный артикль:

a simple fact — простой факт

simple facts — простые факты.

2. Перед именами собственными, перед существительными, обозначающими названия дней недели, месяцев, времен года.

Падежи существительного

Существительное в английском языке имеет общий и притяжательный падеж.

В общем падеже существительное имеет нулевое окончание, т. е. падеж специально не оформлен.

Притяжательный падеж существительных в единственном числе характеризуется наличием окончания *-s*, которому предшествует

апостроф ('), или апострофа без -s, если существительное во множественном числе.

the student's pen — ручка студента

the sides' length — длина сторон

Примечание: Правила произношения слов, имеющих окончание -'s, совпадают с произношением окончаний множественного числа существительных.

Оборот с предлогом 'of' также передает отношения принадлежности. Сравните:

the man's help—the help of the man
the sides' length — the length of the sides.

Прилагательное

Прилагательное выполняет функцию определения по отношению к существительному и ставится перед ним. Артикль, если он имеется, всегда предшествует определению, выраженному прилагательным:

a nice place; the thin, red pencil.

Указательные местоимения

ед. ч.

this — этот

that — тот

мн. ч.

these — эти

those — те

Наличие указательного местоимения перед существительным исключает употребление перед ним артикля.

УРОК 2

Личные местоимения

Личные местоимения имеют два падежа: именительный и объектный. В именительном падеже личное местоимение выполняет функцию подлежащего, а в объектном — дополнения.

Число	Именительный падеж	Объектный падеж
Единственное	I — я you — вы (ты) she — она he — он it — он, она, оно (для неодушевленных предметов)	me — меня, мне you — вас, вам (тебя, тебе) her — ее, ей him — его, ему it — переводится в зависимости от рода предмета
Множественное	we — мы you — вы they — они (для одушевленных и неодушевленных предметов)	us — нас, нам you — вас, вам them — их, им

Притяжательные местоимения

Притяжательные местоимения употребляются в качестве определения к существительному и исключают употребление артикля:
 my pen — моя ручка

Личные местоимения	Притяжательные местоимения
I she he it we you they	my — мой her — ее his — его its — ее, его our — наш your — ваш their — их

Глагол

Повелительное наклонение

В английском языке имеется три наклонения: изъявительное, сослагательное и повелительное.

Повелительное наклонение выражает просьбу, приказ, побуждение к действию. Повелительное наклонение для II лица единственного и множественного числа образуется при помощи инфинитива смыслового глагола без частицы *to*. Например:

to go — идти
 to take — брать

go! — иди(те)!
 take the pen! — возьми(те)
 ручку!

Отрицательная форма повелительного наклонения образуется при помощи вспомогательного глагола (*to*) *do* и отрицания *not*.

Вместо *do not* иногда употребляют сокращенную форму *don't* [daunt].

Do not (don't) take the pen!
 Do not (don't) make the line!

Не бери ручку!
 Не проводи линию!

Повелительное наклонение для I и III лица единственного и множественного числа образуется с помощью глагола *let* „позволить“, „разрешить“, „допустить“, например:

Let me go.

Позволь(те) (разрешите) мне
 уйти.

Let her take the bag.

Пусть она (позволь(те) ей)
 возьмет сумку.

Let the student hold that
 table.

Пусть студент подержит тот
 стол.

Let us help them.

Давай(те) поможем им.

Обратите внимание, что в сочетании с глаголом *let* употребляется местоимение в объектном падеже или существительное в общем падеже и смысловой глагола без частицы *to*.

Отрицательная форма образуется при помощи вспомогательного глагола *do* и отрицания *not* (*don't*).

Do not let him do it.
Do not let the boy go.

Пусть он не делает этого.
Пусть мальчик не идет.

УРОК 3

Модальные глаголы

Для выражения отношения к действию, а не самого действия, используются модальные глаголы *must* «долженствовать», *can* «мочь», *may* «иметь возможность, мочь». Само же действие передается инфинитивом смыслового глагола без частицы *to*, следующим непосредственно за модальным глаголом — *must go*, *may take* — независимо от лица, числа и времени.

Умение или способность (физическая или умственная) выполнить действие передается модальным глаголом *can* (*could* — в прошедшем времени).

I can help him.

Я могу (у меня есть возможность) помочь ему.

He could open the bag.

Он смог открыть портфель.

Необходимость, долженствование, обязательность или вероятность свершения действия передается глаголом *must* (он не имеет формы прошедшего времени).

He must study the problem.

Ему надо (он должен) изучить эту задачу.

He must be at home.

Он должно быть дома.

Возможность, позволительность, разрешение совершить действие передается глаголом *may* (*might* — в прошедшем времени).

You may take our data.

Вы можете (можно) взять наши данные.

He may come.

Возможно (может быть) он придет.

Вопросительная форма

Could you find a place?

Смогли ли (сумели ли) вы найти место?

Must she go?

Ей надо идти?

May I take your pen?

Можно мне взять твою ручку?

Специальные вопросы образуются с помощью вопросительных слов *what* «что», *when* «когда», *who* «кто».

Обратите внимание на порядок слов в вопросительных предложениях:

What

Can he study the text now?
Who can study the text now?
can he study now?

Отрицательная форма

He cannot hold the box.
You must not go (need not).

Он не может удерживать ящик.
Ты не должен идти. (Тебе не нужно...)

Краткие ответы на вопросы

Can she open it?

Yes, she can.

No she cannot.

Must he do it?

Yes, he must.

No, he must not.

No, he need not. (Нет, не надо.)

May I take it?

Yes, you may.

No, you must not. (Нет, нельзя.)

Сокращенная форма *mustn't* ['mʌsnt], *needn't* ['ni:dnt], *can't* [kɑ:nt].

УРОК 4

Глагол *to be*

Present, Past, Future Indefinite

Глагол *to be* «быть», «есть», «являться», «представлять (собой)», «заключаться в том, чтобы» спрягается следующим образом:

Лицо, число	Present Tense	Past Tense	Future Tense
I { ед. ч. мн. ч.	I am We are	I was We were	I We } shall be
II { ед. ч. мн. ч.	You are	You were	You will be
III { ед. ч. мн. ч.	She (he, it) is They are	She (he, it) was They were	He (she, it) They } will be

Для образования будущего времени вводятся вспомогательные глаголы *shall* для I лица, *will* для II и III лица, после которых употребляется Infinitive глагола (*to*) *be* без частицы *to*.

Глагол *to be* выполняет различные функции в предложении, в частности, он является смысловым глаголом:

The book is on the table.	Книга (лежит, находится)на столе.
We were in the room.	Мы были в комнате.

В английском языке в настоящем времени глагол не опускается, в то время как в аналогичном русском предложении глагол «быть», как правило, не употребляется.

В качестве глагола связи *to be* входит в состав именного составного сказуемого и предшествует его именной части. Именная часть сказуемого может быть выражена существительным, прилагательным, глаголом и пр.

This is a text.	Это текст.
The text was long.	Текст был длинный.
The problem is to translate the text.	Задача (состоит) в том, чтобы перевести текст.

Вопросительная форма и краткие ответы

Is this a text?	Yes, it is. (It's a text).
	No, it is not. (It isn't.)
Was the text long?	Yes, it was.
	No, it was not.
Will they be in the room?	Yes, they will.
	No, they will not.

Обратите внимание на порядок слов:

	He was in the room.
	Was he in the room?
Where	Who was in the room?
	was he?
	She will be here soon.
	Will she be here soon?
When	Who will be here soon?
	will she be here?

Отрицательная форма образуется при помощи отрицания *not*, которое в настоящем и прошедшем времени следует за глаголом *to be* (в личной форме), а в будущем — предшествует глаголу.

I *am not* a student. They *were not* at the University. He *will not* be at home.

Оборот *there is (there are)*

Оборот *there is (are)* представляет собой единую группу, где слово *there* выполняет служебную роль, полностью утрачивая при этом свое основное значение «там, туда».

Оборот переводится на русский язык словами *есть, существует, бывает, имеется* или совсем не переводится. Оборот *there is* предшествует подлежащему. Далее следует обстоятельство. Перевод предложений, содержащих данный оборот, надо, как правило, начинать с обстоятельства места или времени (если они *есть* в предложении).

There is a book on the table.

На столе (*есть*) книга (а не тетрадь).

There was a seminar last week.

На прошлой неделе был семинар (а не лекция).

There will be a lecture at the University tomorrow.

Завтра в университете будет лекция (а не семинар).

А теперь сравните:

I. The book is on the table.

Книга находится на столе (а не на стуле).

The students are there.

Студенты находятся там.

II. There is a book on the table.

На столе — книга (а не тетрадь).

There are students there.

Там — студенты (а не аспиранты).

Если вы вслушаетесь внимательно в интонацию русского предложения, то неизбежно обратите внимание на то, что в первой группе примеров говорится об определенной книге и определенных студентах и при этом подчеркивается их местонахождение. *Книги на столе* (а не на стуле). *Студенты там* (а не в комнате).

Между тем во втором случае вы убедитесь, что главное в предложении — что (кто), а не где. На столе — книга (а не тетрадь). Там — студенты (а не аспиранты). Причем в этом случае речь идет о какой-то книге, о каких-то студентах, еще неизвестных читателю. Поэтому с оборотом *there is* обычно употребляется неопределенный артикль с существительным в единственном числе. Во множественном числе существительное при наличии оборота *there are* употребляется без артикля.

Для образования отрицательной формы употребляется отрицательное местоимение *no* или *not any* (никакой, нисколько), которые помещаются между оборотом *there is (there are)* и существительным. Артикль при этом, как правило, не употребляется.

There is no (not any) lecture today.

Сегодня нет лекции.

There were no (not any) seminars yesterday.

Вчера не было семинаров.

There will be no (will not be any) changes in the plan. В плане не будет изменений.

В вопросительной форме глагол *to be* ставится перед словом *there*.

Обратите внимание на краткие ответы:

Is there a lecture today?	_____	Yes, there is.
	_____	No, there is not.
Were there seminars yesterday?	_____	Yes, there were.
	_____	No, there were not.
Will there be a lecture tomorrow?	_____	Yes, there will.
	_____	No, there will not.

Обратите внимание на порядок слов:

	There was a seminar yesterday.
What	Was there a seminar yesterday?
	was there yesterday?

Примечание: Кроме глагола *to be* после *there* могут употребляться такие глаголы, как *to live* «жить», *to exist* «существовать», *to appear* «появляться», модальные глаголы.

There live (appeared) students in this room.	В комнате живут (появились) студенты.
There may be students there.	Там могут быть студенты.

Наречия *much, many, few, a few, little, a little*

Наречия *much, little* употребляются с неисчисляемыми существительными, *many, few* — с исчисляемыми существительными.

<i>much</i>	}	<i>time</i>	<i>много</i>	}	<i>времени</i>
<i>little</i>			<i>мало</i>		
<i>many</i>	}	<i>books</i>	<i>много</i>	}	<i>книг</i>
<i>few</i>			<i>мало</i>		

little time «мало времени» (настолько, что я не могу вам его уделить);

a little time «немного времени» (и мы можем поговорить);

few books «мало книг» (настолько, что нечего вам дать);

a few books «немного книг» (можно кое-что выбрать).

УРОК 6

Глагол *to have*

Глагол *to have* переводится на русский язык словами *есть, иметь* или иногда вообще не переводится. В III лице ед. числа

настоящего времени глагол имеет форму *has*, в остальных лицах *have*.

I (you, we, they) <i>have</i> English books.	У меня <i>есть</i> английские книги.
He (she) <i>has</i> many friends.	У него много друзей.
We <i>have</i> reasons to think so.	Мы <i>имеем</i> основания думать так.

В прошедшем времени глагол *to have* имеет форму *had* для всех лиц единственного и множественного числа

We (you, he, they) <i>had</i> a lecture yesterday.	Вчера у нас была лекция.

Будущее время образуется прибавлением вспомогательных глаголов *shall* и *will* к смысловому глаголу

I <i>shall have</i> some time tomorrow.	Завтра у меня будет немного времени.
He <i>will have</i> a research adviser.	У него будет научный руководитель.

Отрицательная форма

I have no (not any) time.	У меня нет времени.
He has no (not any) facts.	Он не имеет фактов.
You had no (not any) seminar last week.	У вас не было семинара на прошлой неделе.
They will have no (will not have any) time.	У них не будет времени.

Вопросительная форма и краткие ответы

Have you a (any) lecture today?	Yes, we have.
	No, we have not.
Has she any English books?	Yes, she has.
	No, she has not.
Shall I have this information?	Yes, you will.
	No, you will not.

Основные способы словообразования

а) Словообразование путем прибавления суффиксов и префиксов (приставок) к основе слова, например:

б) для выражения обычного, изо дня в день совершаемого действия (в настоящем, прошедшем или будущем времени) и

в) логически последовательных действий.

Прочие группы времен, о которых мы будем говорить в дальнейшем — Continuous, Perfect, Perfect Continuous, обозначают действие в развитии, указывают на то, как происходит (происходило, будет происходить) действие во времени, как действия соотносятся друг с другом во временном отношении.

The Present Indefinite Tense

I (you, we, they) read English.

Я (ты, мы, они) читаю по-английски.

He (she, it) reads English.

Он (она) читает по-английски.

Сравните:

The boy speaks English.

The boys speak English.

Как видите, только в III лице ед. числа глагол приобретает характерное для этого лица окончание *-s (-es)*.

Примечание: Окончание глагола *-s (-es)* произносится по известным вам правилам произношения окончания множественного числа существительного: likes [s], stays [z], begs [z], wishes [iz], study—studies [iz] (если букве *y* предшествует согласная).

Отрицательная форма образуется с помощью вспомогательного глагола (*to*) *do (does* в III лице ед. числа), отрицания *not* и смыслового глагола в инфинитиве без частицы *to*.

I (you, we, they) do not study this problem.

He (she, it) does not work.

Окончание *-s*, характерное для III лица ед. числа (*he works*), в отрицательной и вопросительной форме переносится на вспомогательный глагол (*does*).

Вопросительная форма использует тот же вспомогательный глагол *do (does)*.

I——— Yes, I do.

Do you (we, I, they) study this problem?

I——— No, I do not (don't).

I——— Yes, she does.

Does she (he, it) work?

I——— No, she does not (doesn't) [dʌzənt]

Если предложение начинается с вопросительного слова (кроме вопроса к подлежащему и группе слов, определяющих его), то оно ставится перед вспомогательным глаголом (*do, does*).

My teacher goes to the University in the morning.

Who goes to the University...?

Whose teacher goes to the University...?

Does my teacher go to the University?

When does my teacher go to the University?

Where does my teacher go in the morning?

Английский глагол имеет четыре основные формы: I — настоящего времени; II — прошедшего времени; III — причастия прошедшего времени (причастия II); IV — причастия настоящего времени (причастия I).

В зависимости от способа образования форм прошедшего времени и причастия II все глаголы делятся на правильные и неправильные.

Правильные глаголы образуют форму прошедшего времени и причастия II путем добавления окончания *-ed (-d)* к основе глагола

I ask	II asked	III asked
спрашиваю	спросил	спрошенный

Примечание: Окончание прошедшего времени произносится как [d] после гласных и звонких согласных (*begged, stayed*), как [t] после глухих согласных (*asked*) и как [ɪd], если основа слова оканчивается буквами *t* или *d* (*wanted, attended*).

Неправильные глаголы образуют форму прошедшего времени и причастия II иначе, например:

cut — cut — cut — резать
take — took — taken — брать
spend — spent — spent — тратить

The Past Indefinite Tense

I worked there last year.
 He took my book yesterday.

Я работал там в прошлом году.
 Он взял мою книгу вчера.

Отрицательная и вопросительная форма с глаголом в Past Indefinite образуется с помощью вспомогательного глагола *did* (прошедшее от *do*) для всех лиц единственного и множественного числа.

He (we, they, I) did not work last week.

Did you give her your paper? No, I did not (didn't). Yes, I did.

His research adviser spoke at the conference yesterday.

Did his research adviser speak at the conference?

Who spoke at the conference yesterday?

Whose research adviser spoke at the conference yesterday?

Where did his adviser speak yesterday?

When did his adviser speak at the conference?

The Future Indefinite Tense

Для образования этого времени используются вспомогательные глаголы *shall, will*.

I (we) shall show you the room tomorrow (I'll).

He (she, they, you) will do it next week (he'll).

Отрицательная форма

We shall not attend the seminar.

She will not begin the lesson

Вопросительная форма

He will help her next week.

|— Yes, he will.

Will he help her next week?

|— No, he will not.

Who will help her next week?

Whom will he help next week?

When will he help her?

Порядок слов в английском предложении

Для английского языка характерен строго фиксированный порядок слов:

0	I	II	III	IV
Обстоятельства места, времени	Подлежащее	Сказуемое	Дополнение	Обстоятельства места, времени и пр.

Слова, определяющие существительное, как правило, ставятся перед определяемым словом.

Слова, определяющие глагол, ставятся после определяемого слова, например:

I have *much* work.

У меня много работы.

He must work *much*.

Он должен много работать.

Типы вопросов (и краткие ответы)

1. Общий вопрос:

Can you come?	{	Yes, I can.
	{	No, I can't.
Do you like it?	{	Yes, I do.
	{	No, I don't.
Will he do it in time?	{	Yes, he will.
	{	No, he will not.
Was there anybody there?	{	Yes, there was.
	{	No, there was not.

2. Специальный вопрос:

When can you come? — Tomorrow.

What kind of books do you like? — On mathematics.

Who is there in the room? — My brother.

Where will you go to? — To the library.

		Infinitive	Present	Past	Future
Indefinite	Active	to ask	I ask	I asked	I shall
	Passive		I am asked	I was asked	I shall
Continuous	Active	to be asking	I am asking	I was asking	I shall
	Passive		I am being asked	I was being asked	—
Perfect	Active	to have asked	I have asked	I had asked	I shall
	Passive		I have been asked	I had been asked	I shall have
Perfect Continuous		to have been asking	I have been asking	I had been asking	I shall have been

употребления времен

time	Примечания
ask be asked	1. Обычные, регулярно повторяющиеся действия (usually, every day, twice a month). 2. Факты, события, действия, имевшие (имеющие) место (yesterday, 2 days ago, tomorrow, in 3 days, in May, in 1967, last week, next month). 3. Изменение событий в последовательности.
be asking	1. Процесс, происходящий в определенный момент в настоящем, прошедшем или будущем (now, at 3 o'clock, when I saw). 2. Параллельно происходящие процессы (while, when «пока», «тогда, когда»); 3. Процесс, охватывающий период времени от и до (from... till (to)).
have asked been asked	1. Действие, завершённое к определенному моменту, результат которого очевиден. При Present Perfect: а) время часто не указывается (подразумевается момент речи); б) употребляются наречия just, already, never, yet и др., а также today, this week (month, year). При Past и Future Perfect момент выражается предлогом by «к». 2. Past и Future Perfect выражают также действия, завершённые до начала какого-то другого действия (в прошлом или будущем).
asking	Действие, начавшееся в какой-то момент или до какого-то момента и продолжающееся до настоящего момента, включая или исключая его (с непременно указанным длительности совершения действия) since the morning «с утра»; for two hours «в течение двух часов»; since you came «с тех пор как ты пришел».

3. Альтернативный вопрос:

Was there a man or a woman there? — There was a man.
Will you or your brother write this letter? — My brother.

4. Разделительный вопрос:

It's your room, isn't it?	Yes, it is. No, it isn't.
You like this article, don't you?	Yes, I do. No, I don't.
He can't come, can he?	Yes, he can. No, he can't.
They don't know English, do they?	Yes, they do. No, they don't.

УРОК 8

Future Indefinite в придаточных условия и времени

В придаточных условия и времени, вводимых союзами *if* «если», *unless* «если не», *provided* «при условии, если», *when* «когда», *after* «после того как», *before* «до того как», *till, until* «до тех пор пока», *as soon as* «как только», время Future Indefinite заменяется временем Present Indefinite. При этом на русский язык придаточное предложение переводится будущим временем.

Главное предложение	Союз	Придаточное предложение
We shall begin the lesson Мы начнем урок	after после того как as soon as как только if если when когда provided при условии, если before до того как in case в случае, если	everybody comes все придут.
We shall not begin the lesson Мы не начнем урока	until пока (не) unless если (не) till до тех пор, пока (не)	everybody comes все не придут,

или

Союз	Придаточное предложение	Главное предложение
If если As soon as как только When когда Until (пока не) Unless (если не) Пока (если)	you change the method of your experiment вы измените метод эксперимента, you change the method of the experiment, вы не измените метод эксперимента,	you will get different results. вы получите иные результаты. you will not get accurate results. вы не получите точного результата.

Местоимение *it*

В английском языке местоимение *it* соответствует в русском языке местоимениям всех трех родов и переводится на русский язык *он, она, оно*. Оно выполняет четыре функции.

личное	_____ _____	безличное
	<i>it</i>	
указательное	_____ _____	усилительное

а) личное (выполняет функцию подлежащего или дополнения)

Where is your pen?

Где твоя ручка?

It is in the bag.

Она в портфеле (подлежащее).

Your translation is good.

Твой перевод хороший.

I like it.

Мне он нравится (дополнение).

б) указательное (в функции подлежащего)

What is it?

Что это?

It is a computer.

Это вычислительная машина.

в) безличное (в функции подлежащего)

It is early. It is 7 o'clock.

Рано. Семь часов.

It is important to do it.

Важно сделать это.

It rained yesterday.

Вчера шел дождь.

It is known that he is a famous scientist.

Известно, что он знаменитый ученый.

г) усилительное (где оно является частью усилительной конструкции и служит для эмоционального и смыслового выделения того или иного члена предложения). Например, в предложении:

I studied English at the University last year. можно выделить четыре члена предложения:

It was I who (that) studied English at the University.

Как раз я (именно я) и изучал английский в университете.

It was English that I studied at the University.

Именно английский я и изучал в университете.

It was at the University that (where) I studied English last year.

В университете-то я и изучал английский в прошлом году.

It was last year that (when) I studied English at the University.

Как раз (это) в прошлом году я и изучал английский в университете.

It is (was) + выделяемый член предложения + that

Обратите внимание:

It was not until I came here that I learned about it.

Только после того как я пришел сюда, я узнал об этом.

It is two years since the machine has been working.

Вот уже два года, как машина работает.

УРОК 9

Местоимения *some, any, no, every*

Some, any употребляются в качестве определения к существительному, обозначая некое (неопределенное) количество предметов (исчисляемых и неисчисляемых). Иногда эти местоимения заменяют собой артикль и в этом случае они вообще на русский язык не переводятся.

Some употребляется в утвердительных предложениях, *any* — в вопросительных и отрицательных. *Any* употребляется и в утвердительных предложениях в значении: «любой», «какой угодно».

You must find *some* time for this work.

Give me *some* book (a book).

Some of our students will take their exams today.

Here are *some* interesting articles on the problem.

There is *some* water in my glass.

If you have *some* time we shall discuss it.

Are there *any* publications on the subject?

Is there *any* work for him?

You may find this word in *any* dictionary.

Вы должны найти время для этой работы.

Дай мне *какую-нибудь* книгу. *Некоторые* из наших студентов будут сдавать сегодня экзамены.

Вот *несколько* интересных статей по этой проблеме.

В моем стакане *немного* воды.

Если у вас есть время, мы обсудим это.

Существуют ли (какие-нибудь) печатные работы по этому вопросу?

Есть ли для него (какая-нибудь) работа?

Вы можете найти это слово в *любом* словаре.

Any, no употребляются в отрицательных предложениях.

She does *not* attend *any* lectures.

There are *not any* books on mathematics there.

I saw *no* water in his glass.

They had *no* time for *any* discussion.

Она не посещает (никаких) лекций.

Там нет (никаких) книг по математике.

Я не увидел (никакой) воды в его стакане.

У них не было времени для обсуждения.

и

No information was obtained.

Никакой информации не было получено.

No problem can be solved in this way.

Ни одна проблема не может быть решена таким способом.

Сочетания местоимений *some, any, no* и наречия *every* (каждый) со словами: *body, thing, one, where* образуют производные: *something, anywhere, everybody* и пр.

Таблица основных и производных местоимений

	one	body	thing	where
some	someone	somebody	something	somewhere
any	anyone	anybody	anything	anywhere
no	no one	nobody	nothing	nowhere
every	everyone	everybody	everything	everywhere

Если *some, any, no, every* не могут существовать без существительного, определением к которому каждое из них является, то производные от них употребляются в качестве подлежащего, дополнения, обстоятельства, т. е. самостоятельно.

Something must be done.

Что-то надо делать.

Nothing can be changed.

Ничего нельзя изменить.

Do you know *anything* about him?

Вы о нем *что-нибудь* знаете?

There is *someone* (somebody) in the room.

В комнате *кто-то* есть.

Everyone (everybody) here speaks English.

Здесь *каждый* говорит по-английски (все, всякий).

Participle I

Причастие настоящего времени образуется прибавлением окончания *-ing* к основе глагола.

Причастие I может являться определением, и в этом случае оно соответствует русскому причестию: *говорящий, вращающийся, работавший*

The *rotating* axis must...

Вращающаяся ось должна...

The students *working* in the lab yesterday finished the experiment.

Студенты, *работавшие* вчера в лаборатории, закончили этот эксперимент.

Будучи обстоятельством, причастие переводится на русский язык деепричастием или обстоятельственным предложением:

Thinking about it he...	Думая об этом, он...
Being ready the students...	Будучи готовыми, студенты...
(While) — going home the girl...	Идя домой, девушка...
(When) —	Когда девушка шла домой, она...

Кроме того с помощью причастия настоящего времени образуются времена группы Continuous.

УРОК 10

Времена группы Indefinite (Passive Voice)

В английском языке очень часто, гораздо чаще, чем в русском, мы встречаем предложения, в которых действующее лицо отсутствует, не упоминается (оно не существенно). Глагол в такого рода предложениях обозначает действие, направленное на подлежащее предложения. В этих случаях грамматическое подлежащее обозначает не действующее лицо (или предмет), а лицо (или предмет), на которое направлено действие, например: работа сделана, он приглашен. Это есть не что иное, как страдательный залог (Passive).

Passive в английском языке образуется с помощью вспомогательного глагола *to be* (в соответствующем времени, лице и числе) и причастия II (III формы смыслового глагола), которое остается неизменным.

to be + Participle II

The article <i>is written</i> .	Статья <i>написана</i> .
The article <i>was written</i> .	Статья <i>была написана</i> .
The article <i>will be written</i> .	Статья <i>будет написана</i> .

В данном ниже предложении в форме Indefinite Active имеются два дополнения — косвенное и прямое. Обратите внимание на предложения а) и б):

He gave me a book.	
а) I <i>was given</i> a book.	} Мне дали книгу.
б) A book <i>was given</i> to me.	

В Passive любое из дополнений может занять место подлежащего, стать им.

Если есть необходимость упомянуть действующее лицо, то оно вводится предлогом *by*.

I <i>was given</i> a book <i>by him</i> .	Он дал мне книгу.

Как видите, для русского языка предпочтителен действительный залог.

Способы перевода страдательного залога на русский язык разнообразны:

The book <i>was written</i> last year.	Книга <i>была написана</i> в прошлом году.
The problem <i>is studied</i> .	Проблема <i>изучается</i> .
The postgraduate <i>will be given</i> this article.	Аспиранту <i>дадут</i> эту статью.
These problems <i>are dealt with</i> .	Этими проблемами <i>занимаются</i> .
The problem <i>is often spoken about</i> .	Об этой проблеме часто <i>говорят</i> .

Модальные глаголы могут сочетаться с инфинитивом в страдательном залоге.

The paper <i>must be written</i> . (could be written, may be written).	Статья <i>должна быть написана</i> . (Статью <i>нужно написать</i> .)

УРОК II

Времена группы Continuous (Active Voice)

Present, Past, Future

Незаконченные действия, находящиеся в процессе их совершения, в настоящем, прошедшем или будущем, выражаются с помощью времени Continuous и переводятся глаголами несовершенного вида.

В образовании данной формы участвует глагол *to be* в личной форме + причастие I: *working, reading, telling*.

to be + Participle I

am —	was —	shall —	be working
is — working			
are —	were —	will —	

Например: I am reading. He was doing it. You will be translating the text.

Вопросительная форма: Are you working?

Отрицательная форма: He is not working.

Обратите внимание на обстоятельства, которые требуют употребления этой группы времен.

Where are you going?
I am going home.

Куда ты идешь?
Я иду домой. (Из формы глагола очевидно, что речь идет о данном моменте.)

What was he doing	┌—	when you came?	Что он делал, когда ты пришел? (в 6 часов, от 5 до 6 вчера, весь день)
	└┬—	at 6 o'clock?	
	└┬—	from 5 till 6 yesterday?	
I shall be reading	┌—	all day long?	Я буду читать в 6 часов (от 7 до 9, когда ты придешь, весь день завтра).
	└┬—	at 6 o'clock	
	└┬—	from 7 till 9	
		tomorrow	
	┌—	when you come	
	└┬—	all day long	

УРОК 12

Времена группы Continuous (Passive Voice)

Страдательный залог Present и Past Continuous, как и в случае Indefinite Passive, образуется с помощью глагола *to be* в личной форме и причастия прошедшего времени смыслового глагола. Кроме того, необходимой составной частью этой временной формы является глагол *to be* в форме причастия настоящего времени:

to be + being + Participle II.

Сравните:

Students are given various tests.	They are being given a test now.
Студентам дают (обычно) различные тесты.	Им дают тест сейчас.
The problem was discussed at the conference.	The problem was being discussed when you came.
Проблему обсудили на конференции.	Когда вы пришли, проблема обсуждалась (проблему обсуждали).

Сравните с Continuous Active:

Now he is translating the article.	Now the article is being translated (by him).

Вопросительная и отрицательная форма

Is the machine being built?
The machine is not being built.

УРОК 13

Эквиваленты модальных глаголов

Модальные глаголы в английском языке имеют целый ряд эквивалентов, способных передавать различные оттенки модальности. Кроме того, эти эквиваленты в ряде случаев восполняют не-

достающие временные формы модальных глаголов. Эквивалентом глагола *can* является *to be able to*. Глагол *may* имеет эквивалент в страдательном залоге — *to be allowed*. Эквивалентами глагола *must* являются: *to have to*, *to be to*, *ought to*, *should*.

Модальные глаголы и их эквиваленты

	Present	Past	Future
могу	I can go.	I could go.	—
в состоянии	I am able to go.	I was able to go.	I'll be able to go.
должен	I must go.	—	—
вынужден, приходится	I have to go.	I had to go.	I'll have to go.
предстоит, должен (есть договоренность)	I am to go.	I was to go.	—
следует	You ought to go.	—	—
следует	You should go.	—	—
можно	You may go.	You might go.	—
возможно, разрешается	You are allowed to go.	You were allowed to go.	You'll be allowed to go...

Запомните, что для образования вопросительной и отрицательной формы модального глагола *to have (to)* используется вспомогательный глагол *do (does, did)*.

They have to do it. Do they have to do it? They do not have to do it.

УРОК 14

Степени сравнения прилагательных и наречий

В английском языке (так же как и в русском) существует три степени сравнения прилагательных и наречий: положительная, сравнительная и превосходная. Сравнительная и превосходная степени в русском языке образуются двояко: *интересней* — *более интересный* и *интереснейший* — *самый интересный*. Как видно из при-

меров, в каждом случае мы имеем и простую и сложную форму образования прилагательных в пределах одной степени.

В английском языке тоже есть простая и сложная форма. Но деление на группы происходит по принципу односложные и двухсложные — многосложные слова.

Односложные и двухсложные прилагательные образуют сравнительную степень с помощью суффикса *-er*, а превосходную — с помощью суффикса *-est*.

short — shorter — the shortest
big — bigger — the biggest
easy — easier — the easiest

В приведенных примерах обратите внимание на удвоение согласной (*bigger, biggest*) и переход буквы *y* в *i* (*easier, easiest*), если ей предшествует согласная.

Многосложные прилагательные образуют степени сравнения при помощи слов *more* (сравнительная степень) и *the most* (превосходная), например:

difficult — more difficult — the most difficult

Обратите внимание, что перед существительными, имеющими при себе прилагательное в превосходной степени, обязателен определенный артикль.

The easiest text. The most important problem.

Образование степени сравнения некоторых прилагательных и наречий происходит не по общему правилу. Запомните их:

<i>good</i>	}	хороший	<i>better</i>	лучший	<i>best</i>	наилучший, самый лучший,
<i>well</i>		хорошо		лучше		лучше всего
<i>bad</i>	}	плохой	<i>worse</i>	худший	<i>worst</i>	наихудший, самый худший,
<i>badly</i>		плохо		хуже		хуже всего
<i>much</i>	}	много	<i>more</i>	больше	<i>most</i>	наибольшее (количество),
<i>many</i>				больше всего		
<i>little</i>		мало	<i>less</i>	меньше	<i>least</i>	наименьшее (количество),
						меньше всего
<i>far</i>		далекий	<i>further</i> <i>farther</i>	дальше	<i>furthest</i> <i>farthest</i>	самый дальний

Обратите внимание на перевод прилагательных в сочетании с *of all* и предлогом *at*

best	} <i>of all</i>	лучше	} всех (всего)
most		больше	
worst		хуже	
least		меньше	

at least — по крайней мере

at most — самое большое, максимум

Притяжательные местоимения (две формы)

I—my—mine

You—your—yours

She—her—hers

He—his—his

We—our—ours

They—their—theirs

My book. The book is mine.

It's her text. It's hers.

This is your lab. Show me theirs.

Give me his text. I don't like yours.

УРОК 15

Времена группы Perfect (Active Voice)

Времена группы Perfect означают действие, завершённое к определенному моменту в настоящем, прошлом и будущем.

Необходимыми элементами образования Perfect Active является глагол *have* в личной форме + причастие прошедшего времени смыслового глагола:

to have + Participle II

Present — I *have*
 He *has*

Past — They *had*

Future — We *shall have*

done it.

Present Perfect

Present Perfect обозначает действие, происходившее в прошлом, но, так или иначе, связанное с моментом речи, т. е. с настоящим моментом. Эта связь осуществляется двояко: 1) через результат действия: нас интересует не то, когда оно закончилось в прошлом, а то обстоятельство, что оно закончилось и результат его ощущается в настоящее время, например:

They *have built* a new computer.

Они построили новую счетную машину (и теперь на ней можно работать).

2) через время свершения действия (действие уже закончено, но некий отрезок времени — *сегодня*, на *этой неделе*, в *этом месяце*, в *этом году* — еще не истек).

I *have translated* a few articles today (this week, this month).

Я перевел сегодня несколько статей (на этой неделе, в этом месяце).

Часто в роли обстоятельства времени выступают наречия неопределенного времени: *иногда*, *всегда*, *часто*, *редко*, *только что*, *уже*, *никогда*, *еще не*.

He has	just often always already seldom sometimes never (not) yet	done it.	Он	только что часто всегда уже редко иногда никогда не еще не	делал (сделал) это.

Present Perfect всегда переводится на русский язык прошедшим временем.

Запомните, что наречия *yesterday, last week (month, year), ago* и пр. никогда не употребляются с глаголом в *Present Perfect*. В этих случаях всегда употребляется *Past Indefinite*. Сравните:

I have seen him today (this week, this month). I saw him yesterday (last week, last month).

Отрицательная форма

We have not seen him (yet). He has never done it.

Вопросительная форма

Have you seen him? Yes, I have.
No, I have not.
Has he (ever) done it? Yes, he has.
No, he has not.

Past Perfect

Если действие совершено к какому-то моменту в прошлом или ранее какого-то другого действия в прошлом, т. е. предшествовало этому действию, то глагол в этом случае будет иметь форму *Past Perfect*.

I had done it by 5 o'clock, Я сделал это к 5 часам,
before he came. до его прихода.

Future Perfect

Когда речь идет о том, что некое действие закончится к определенному моменту в будущем или до того, как будет произведено следующее за ним действие, то используют время *Future Perfect*. Это редко употребляемая форма.

He will have done it by 5 o'clock Он (уже) проделает это к 5 часам (до твоего прихода).
before you come.

Времена группы Perfect (Passive Voice)

В образовании форм Passive Indefinite и Continuous всегда участвует глагол *to be* + причастие прошедшего времени. Сравните:

The book was written last year.

The book is being written now

При образовании форм Perfect Passive используются те же элементы (глагол *to be* и Past Participle) и глагол *to have*

to have + been + Participle II

The book has been written this year.

He said that the book had been written.

The work will have been done by 5 o'clock.

Отрицательная и вопросительная формы образуются по знакомой вам схеме:

The book has not (yet) been written by them.

Have the articles been translated (yet)?

Времена группы Perfect Continuous

Предположим, мы говорили о действии, которое началось с некоего момента в прошлом (*since* «с тех пор, как») и длится, длилось или будет длиться вплоть до какого-то момента в настоящем, прошедшем или будущем. Или, предположим, нас интересует, сколько времени длилось действие до какого-то момента в настоящем, прошлом или будущем включительно (*for* — в течение).

В обоих упомянутых случаях мы воспользуемся группой времен *Perfect Continuous*.

Perfect Continuous образуется сочетанием формы Perfect и вспомогательного глагола *to be* (в соответствующем лице, числе, времени) с причастием настоящего времени смыслового глагола:

to have + been + Participle I

I have been

He has been

They had been

She will have been

working

Present Perfect Continuous

The computer has been working for two hours (since the morning, since he came).

Компьютер работает в течение двух часов (с утра, с тех пор, как он пришел).

Past Perfect Continuous

We had been discussing the problem for two hours when you came.

Мы (уже) обсуждали эту проблему в течение двух часов до того, как вы пришли.

Future Perfect Continuous — редко употребляемое время.

УРОК 17

Согласование времен

В сложных предложениях выбор временной формы сказуемого в придаточном предложении (дополнительном, а иногда и определенном и обстоятельственном) обусловлен тем, в каком времени употреблено сказуемое (глагол) главного предложения. Сравните:

(1) <i>I know</i>	→	he works there. he is working there.	работает
	→	he worked there. he was working there.	работал
	→	he will work. he will be working.	будет работать

(2) <i>I knew</i>	→	he worked there. he was working there.	работает
	→	he had worked there. had been working there.	работал
	→	he would work. would be working.	будет работать

Во второй группе предложений (первые два примера) сказуемое придаточного предложения выражает действие, одновременное с действием, выраженным глаголом-сказуемым главного предложения, и переводится на русский язык настоящим временем.

Действие, выраженное придаточным предложением в третьем и четвертом примерах второй группы предложениям, предшествует

действию, выраженному сказуемым главного предложения. На русский язык они переводятся прошедшим временем.

Обратите внимание на пятое и шестое предложения второй группы слов. В данном случае действие придаточного предложения относится к будущему. Здесь вместо вспомогательных глаголов *shall* (I лицо) и *will* (II, III лицо) употребляются вспомогательные глаголы *should* и *would* соответственно. В вышеописанных примерах мы опираемся на правило согласования времен.

То же правило действует и при обращении предложения в косвенную речь. Сравните:

My research adviser said to me,
"I wrote this paper yesterday".

He said, "I shall come".

My research adviser told me
(that) he had written that paper
the day before.

He said (that) he would come.

Как видно из первого примера, при обращении прямой речи в косвенную пришлось а) глагол *to say* заменить глаголом *to tell*, Past Indefinite в придаточном предложении заменить на Past Perfect, б) произвести соответствующие изменения в местоимениях и наречиях.

а) Present Indefinite изменяется на Past Indefinite
Present Continuous —
на Past Continuous
Past Indefinite —
на Past Perfect
Future Indefinite —
на Future in the Past

б) <i>this</i>	изменяется на	<i>that</i>
<i>these</i>		<i>those</i>
<i>now</i>		<i>then</i>
<i>today</i>		<i>that day</i>
<i>tomorrow</i>		<i>the next day</i>
		<i>day</i>
<i>yesterday</i>		<i>the day before</i>
<i>here</i>		<i>there</i>

Правила согласования времен

Правила согласования времен следует соблюдать и в том случае, если надо обратить вопросительное предложение в косвенную речь. Порядок слов в косвенном вопросе всегда прямой. Общие вопросы вводятся в этом случае союзами *if* или *whether*.

He said to me, "Have you done the work?"

He asked me if (whether) I had done the work.

Он спросил меня, сделал ли я работу.

Перевод косвенного вопроса следует начинать со сказуемого *знаю ли, пойдет ли, сделал ли*.

В предложениях, содержащих вопросительное слово, оно сохраняется в начале косвенного вопроса.

He said to me, "Where will you go?"

He asked me where I should go.
Он спросил меня, куда я пойду.

При обращении в косвенную речь предложений, содержащих просьбу или приказание, глагол в косвенной речи употребляется в форме инфинитива:

He said to me,
 |——— "Sit down, please".
 |——— "Do not go".

He asked me (He told me)
 |——— to sit down.
 |——— not to go.

Он попросил меня сесть.
 Он попросил меня не ходить.

Бессоюзные придаточные предложения

Определительные и дополнительные придаточные предложения в английском языке могут присоединяться к главному без помощи союзов и союзных слов, если союзное слово не является подлежащим придаточного. Если придаточное определительное заканчивается предлогом, то при переводе на русский язык предлог ставится перед союзным словом, которое в русском языке нельзя опускать.

Определительные предложения

The number (*which, that*) you have found must be doubled.
 The man (*whom*) you saw yesterday was our professor.
 Here is the book (*about which*) I have told you about.

Число, *которое* вы нашли, нужно удвоить.
 Человек, *которого* ты вчера видел, наш профессор.
 Вот книга, *о которой* я тебе говорила.

Дополнительные предложения

He thought (*that*) they would hold the conference.

Он думал, (что) они проведут конференцию.

УРОК 18

Сослагательное наклонение (The Subjunctive Mood)

Условные предложения (Conditional Sentences)

Условные предложения в изъявительном наклонении описывают вполне реальные, выполнимые условия, относящиеся к настоящему, прошлому и будущему. Совершение действия оговаривается определенными, реально осуществимыми условиями. Это I тип условных предложений.

If he is in the lab now, he must be working.
 If I see him tomorrow, I shall ask him about it.

Если он сейчас в лаборатории, он, должно быть, работает.
 Если я увижу его завтра, я спрошу его об этом.

В условных предложениях используются и формы сослагательного наклонения. Сослагательное наклонение — это форма глагола, обозначающая действие как нечто предполагаемое, сомнительное, желательное, проблематичное.

Сослагательное наклонение в условном предложении употребляется для обозначения действия маловероятного или вообще существующего только в предположении нереального (в настоящем, прошедшем и будущем). Сюда относятся предложения II и III типов.

Предложения II типа употребляются для выражения маловероятного или нереального предположения, относящегося к настоящему или будущему времени. При этом главное предложение строится с помощью *should (would, could, might)* + инфинитив глагола без *to*, а в придаточном употребляется форма глагола, совпадающая с Past Indefinite.

I should tell him everything if he came here now.

If she entered the University next year she could learn English.

Если бы он сейчас пришел сюда, я бы все ему рассказал.

Если бы она поступила в университет в будущем году, она могла бы изучать английский.

Глагол *to be* в условных предложениях данного типа имеет форму *were* для всех лиц единственного и множественного числа.

If he were at the lecture tomorrow I should give him the book.

If we were there now we should see her.

He would help you unless he were so busy now.

Если бы он был на лекции завтра, я дал бы ему книгу.

Если бы мы были сейчас там, мы повидали бы ее.

Он бы вам помог, если бы он не был так занят сейчас.

В условных предложениях III типа, относящихся к прошедшему времени, в главном предложении употребляется *should (would)* + Perfect Infinitive, а в придаточном — форма глагола, совпадающая с формой Past Perfect.

1. *If I had seen him yesterday he would have told me about it.*

2. *They could have shown us their results provided they had done the work last week.*

Если бы я видел его вчера, он сказал бы мне об этом (но мы не виделись).

Если бы они сделали работу на прошлой неделе, они показали бы нам свои результаты (но они ее не сделали).

Нереальное условие может быть выражено сочетаниями типа: *but for, if it were not for*, означающими «если бы не»...

*If it were not for him
But for him* } I would go.

*If it had not been for him I
would have gone.*

Если бы не он, я бы ушел.

В нереальных условных предложениях допускается инверсия (нарушение обычного порядка слов в целях придания высказыванию большей эмоциональности), если в состав сказуемого входят глаголы — *should, could, had, were*. В таких предложениях союз *if* опускается, а глаголы *should, could, had, were* ставятся перед подлежащим.

Should he check the operation he would find the mistake (if he checked).

Were they ready we might begin the research (if they were ready).

Had I been given the article I could have translated it by now (provided I had been given the article).

Were it not for him I should not go (if it were not for).

Если бы он проверил это действие, он бы нашел ошибку (проверь он...).

Если бы они были готовы, мы могли бы начать исследование (будь они готовы...).

Если бы мне дали статью, я мог бы уже перевести ее.

Если бы не он, я бы не пошел (не будь его...).

УРОКИ 19 и 20

Неличные формы глагола The Gerund, the Participle, the Infinitive

	Forms of verbs	Active	Passive
Gerund	Indefinite Perfect	asking having asked	being asked having been asked
Participle	Present (I) Past (II) Perfect	asking — having asked	being asked asked having been asked
Infinitive	Indefinite Continuous Perfect	to ask to be asking to have asked	to be asked to have been asked

Отрицание *not* помещают перед герундием, причастием и инфинитивом: *to ask—not to ask, asking—not asking, given—not given* и пр.

Герундий, причастие и инфинитив называются неличными формами глагола потому, что они выражают действие, не указывая при этом на лицо и число. Неличные формы глагола никогда не выступают самостоятельно в роли сказуемого предложения.

Неличные формы глагола выражают относительное время (относительно момента совершения действия, выраженного глаголом-сказуемым).

Indefinite Gerund, Participle, Infinitive выражают действия, одновременные с действием глагола-сказуемого, или будущее относительно действия глагола-сказуемого.

He is interested in going there.

(Indefinite Gerund)

Going home he met a friend.

(Participle I)

I want to go there.

(Indefinite Infinitive)

Он заинтересован в том, чтобы поехать туда (в поездке).

Идя домой, он встретил приятеля.

Я хочу пойти туда.

Perfect Gerund, Perfect Participle, Perfect Infinitive выражают действия, предшествующие действию, выраженному глаголом-сказуемым.

Having done the work they went home. (Perfect Participle)

He insists on having done it. (Perfect Gerund)

I am glad to have seen him. (Perfect Infinitive)

Сделав работу, они пошли домой.

Он настаивает на том, что он сделал это.

Я рад, что повидал его.

Неличные формы глагола определяются наречием и могут иметь после себя прямое дополнение: *to work well, asking questions*.

В предложении герундий и инфинитив выполняют функцию подлежащего, второй части сложного сказуемого, дополнения, определения и обстоятельства.

Причастие может выполнять функцию определения, обстоятельства и части сказуемого.

Герундий (The Gerund)

Герундий, как вы уже знаете, совпадает по форме с Participle I и Perfect Participle

	Active	Passive	
Indefinite	doing	being done	Выражает действие, одновременное с действием глагола-сказуемого.
Perfect	having done	having been done	Выражает действие, предшествующее действию глагола-сказуемого.

По каким же признакам следует различать герундий и причастие?

1) Если перед глагольной формой с окончанием *-ing* стоит предлог, существительное в притяжательном падеже или

притяжательное местоимение, то вы имеете дело с герундием, а не с причастием.

On coming home he...

По приходе (придя) домой, он...

His working there proved...

Его работа там (то, что он работает там) доказала...

The boy's having gone there...

То, что мальчик пошел туда...

2) В отличие от причастия герундий может выполнять функцию подлежащего и дополнения, а не только функцию определения и обстоятельства и второй части сказуемого.

1. Подлежащее	<i>Knowing English is helpful.</i>	Знание (знать) английского полезно.
2. Часть сказуемого	<i>Seeing is believing.</i>	Увидеть — значит поверить.
3. Дополнение	<i>He likes asking questions.</i>	Он любит задавать вопросы.
4. Предложное дополнение	<i>He insisted on her being told about it.</i>	Он настаивал на том, чтобы ей сказали об этом.
5. Определение	<i>I studied the method of solving the problem.</i>	Я изучил этот способ решения проблемы.
6. Обстоятельство	<i>In translating the text he made a lot of mistakes.</i>	При переводе (переводя) текста он сделал массу ошибок.

Наличие предлога перед герундием означает, что герундий выполняет функцию обстоятельства.

in solving...

при решении (решая)...

on (upon, after) coming...

по приходе (придя, после прихода)...

by finding...

путем, посредством нахождения...

without knowing the result...

не зная (без знания) результата...

Как видно из данных примеров, способы перевода герундия на русский язык разнообразны. В соответствии со смыслом герундий можно переводить существительным (1,5), инфинитивом (2,3), придаточным предложением (4), деепричастием (6).

Герундиальные обороты

В сочетании с существительным в притяжательном (или общем) падеже или притяжательным местоимением герундий образует так называемые герундиальные обороты, которые

переводятся на русский язык придаточным предложением, вводным союзом *то, что; в том, что; о том, что; тем, что; чтобы*:

I know of his having come.
I am sure of their having been asked to come.
The student's being given a good mark was unexpected.

Я знаю о том, что он пришел.
Я уверен в том, что их просили прийти.
То, что этому студенту поставили хорошую оценку, было неожиданно.
Она настаивает на том, чтобы вы сделали это.

Запомните значение глаголов с предлогами, после которых характерно употребление герундия:

знать о	<i>to know of</i>	
говорить о	<i>to speak of</i>	
думать о	<i>to think of</i>	(her) going
бояться	<i>to be afraid of</i>	
быть способным	<i>to be capable of</i>	
зависеть от	<i>to depend on</i>	
настаивать на	<i>to insist on</i>	finishing...
полагаться на	<i>to rely on</i>	
возражать против	<i>to object to</i>	
заклучаться в	<i>to consist in</i>	
привести к	<i>to result in</i>	
добиться успеха в	<i>to succeed in</i>	solving...
быть заинтересован- ным в	<i>to be interested in</i>	
мешать	<i>to prevent from</i>	

Глаголы *to avoid* (избегать), *to remember* (помнить), *to mention* (упоминать), *to be worth* (быть достойным) как правило тоже сопровождаются герундием:

He avoided going there.
I remember his mentioning this fact.
The book is worth translating.

Герундий также употребляется после: *instead of* «вместо», *besides* «кроме», *owing to* «благодаря» и пр.

УРОКИ 21 и 22

Причастие (The Participle)

Причастие, будучи неличной формой глагола, имеет признаки как прилагательного, так и глагола. Вместе с относящимися к нему словами причастие образует причастный оборот.

Active		Passive	
Participle I	doing	being done	Выражает действие, одновременное с действием глагола-сказуемого.
Participle II	—	done	Выражает действие, одновременное с действием глагола-сказуемого или предшествующее ему.
Perfect Participle	having done	having been done	Выражает действие, предшествующее действию глагола-сказуемого.

Participle I Active в предложении выполняет функцию: 1) определения, 2) обстоятельства, 3) части сказуемого (времена группы Continuous и Perfect Continuous).

1. The *working* men will be...
The man *standing* at the desk is...
2. *Considering* these properties we noticed...

Работающие люди будут...
Человек, *стоящий* у стола...

Рассматривая (когда мы рассматривали) эти свойства, мы обратили внимание...

While — *solving* a problem you
When — must write down the equation.

Решая (при решении) задачи, вам следует записать уравнение. (Когда вы решаете уравнение, вы должны...)

3. Students *are using* various methods of computation.

Студенты *пользуются* различными методами вычислений.

Participle I Passive — *being constructed* в предложении выполняет функцию: 1) определения, 2) обстоятельства, 3) части сказуемого.

1. The computers *being built* will be extensively used.
2. *Being sent* to the conference he may report on the results of its work
3. The system which is *being tested* seems very complicated.

Строящиеся вычислительные машины будут широко применяться (...которые сейчас строятся...)

Будучи посланным на конференцию, он сможет сделать сообщение о результатах ее работы (Если его пошлют...)

Система, *которую сейчас испытывают*, кажется очень сложной.

Participle II — *done, studied* выполняет функцию: 1) определения, 2) обстоятельства, 3) части сказуемого в страдательном залоге и во временах группы Perfect,

1. The *proposed* program caused much discussion.
The information *obtained* was of great interest.

The law just *referred* to was discovered by Newton.

They demonstrated the *reconstructed* machines.

2. *Translated* from the language of mathematics into everyday language the relation became easier to understand.

As seen from the article this kind of experiments are being carried out in quite a few laboratories.

When (if) given enough time he will write his paper.

Unless properly *adjusted* the computer will not give out reliable information.

3. I *was told* about the advantages of the method accepted.

Perfect Participle — *having given, having been given* выполняет функцию обстоятельства.

Having answered the teacher's questions the student left.

Having been given the program we began to analyse it.

1. *Предложенная* программа вызвала много споров.

Полученная информация представляла большой интерес.

Закон, *на который* только что *сослались*, был открыт Ньютоном.

Они демонстрировали *реконструированные* машины.

2. *Будучи переведенным* с языка математики на обычный язык, это соотношение стало легче для понимания (Когда это соотношение перевели с...)

Как видно из статьи, такого рода эксперименты проводятся во многих лабораториях.

Если ему дадут достаточно времени, он напишет свою статью.

Если вычислительную машину не *отрегулировать* должным образом, она не будет давать надежных результатов.

3. Мне *говорили* о преимуществах принятого метода.

Ответив на вопросы преподавателя, студент ушел.

(*После того, как он ответил...*)
После того, как нам дали программу, мы начали изучать ее.

Независимый (абсолютный) причастный оборот

Обстоятельственные причастные обороты бывают *з а в и с и м ы м и* и *н е з а в и с и м ы м и*. В первом случае обстоятельственный причастный оборот относится к подлежащему всего предложения, выражает его действие, т. е. зависит от подлежащего.

В независимом причастном обороте действие, выражаемое причастием, входящим в состав данного оборота, не относится к подлежащему всего предложения. Оно выражает действие существительного (или местоимения), стоящего непосредственно перед причастием, и не зависит от подлежащего всего предложения.

Признаки, по которым можно определить независимый причастный оборот:

- а) независимый причастный оборот всегда отделен запятой;
- б) перед причастием здесь стоит либо существительное без предлога, либо местоимение в именительном падеже.

1. Если независимый причастный оборот стоит в начале предложения, то он переводится на русский язык придаточным обстоятельственным предложением времени или причины, вводимым союзами *когда, после того как, так как, поскольку, если* и пр.

The advantages of the new machine *being* obvious, we decided to make use of it.

Everybody *having come*, they proceeded with the experiment. All the preparations *completed*, we could start.

Поскольку преимущества новой машины были очевидны, мы решили воспользоваться ею.

После того как все пришли, они продолжили эксперимент. Так как все приготовления были завершены, мы могли отправиться.

2. Если независимый причастный оборот стоит в конце предложения, то он, как правило, переводится либо самостоятельным бессоюзным предложением, либо используются союзы *а, и, но, причем*.

They finished the experiment, the result *being* quite satisfactory.

Они завершили эксперимент, причем (и) результат оказался вполне удовлетворительным.

УРОКИ 23, 24 и 25

Инфинитив (The Infinitive)

Инфинитив — неопределенная форма глагола. Признаком инфинитива является частица *to* — *to speak*.

Active		Passive	
Indefinite	to do	to be done	Выражают действия, одновременные с действием глагола-сказуемого. Выражают действия, предшествующие действию глагола-сказуемого. Переводятся прошедшим временем.
Continuous	to be doing		
Perfect	to have done	to have been done	

Примечание: Форма Perfect Continuous Infinitive — *to have been doing* редко встречается в научной литературе.

Инфинитив вместе с относящимися к нему словами образует инфинитивный оборот.

В предложении инфинитив может быть: 1) подлежащим, 2) частью сказуемого, 3) дополнением, 4) определением, 5) обстоятельством.

1. *To know* English is helpful. Знать английский (знание) полезно.

В этом случае инфинитив всегда стоит перед сказуемым.

2. а) *The article is to be written* in time. Статья должна быть написана вовремя.
 To do this means to change the whole system. Сделать это — значит изменить всю систему.
 б) *Our task is to adjust* the program to the computer. Наша задача — приспособить программу к этой вычислительной машине (...цель состоит в том, чтобы; заключается в том, чтобы).

В данном случае (б) инфинитив является именной частью сказуемого, следующего за подлежащим, обычно выраженным словами: *task, method, plan, problem, aim, purpose, function*.

3. *I expect to be given* complete information. Я рассчитываю, что мне дадут (получить) полную информацию.
4. *The problem to be discussed* is interesting. Проблема, которая будет обсуждена (нужно, предстоит обсудить), интересна.
 He was the first to agree. Он первым согласился.
 The idea to use these results seemed wrong to me. Мысль о том, чтобы воспользоваться этими результатами, казалась мне неправильной (мысль об использовании...).

Инфинитив в функции определения всегда расположен после определяемого им существительного.

5. *To understand* the situation one must know the details. Чтобы понять положение, надо знать подробности.
 To check (in order to) the result of addition you have to subtract this number from the sum obtained. Чтобы проверить результат сложения, вы должны вычесть это число из полученной суммы.
 I have come here to (in order to, so as to) speak to you. Я пришел сюда (чтобы) поговорить с тобой.

Сравните:

a) *To operate* this computer is easy.

Работать (работа) на этой вычислительной машине легко (*подлежащее* — работать).

b) To operate this computer *you* must do the following.

Для того, чтобы работать на этой машине, вы должны сделать следующее (*подлежащее* — вы).

Модальные глаголы в сочетании с перфектным инфинитивом (Perfect Infinitive)

Модальные глаголы *must* и *may* в сочетании с перфектным инфинитивом выражают предположение, относящееся к прошедшему времени.

This book *must have been written* many years ago.

Эта книга, *должно быть*, была написана много лет назад (...вероятно, была...).

The program *may have been fulfilled*

Программа, *возможно*, осуществлена.

Для выражения действия, которое могло бы произойти, но не произошло, употребляется перфектный инфинитив в сочетании с глаголами *could, might, ought, should*.

You *could have told* them about it.

Вы *могли бы* сказать им об этом (но вы этого не сделали).

They *ought to have given* the necessary explanation.

Им *следовало бы* дать необходимые объяснения (а они этого не сделали).

Инфинитив в составе сложного дополнения (Complex Object)

Сложное дополнение состоит из существительного в общем падеже или местоимения в объектном (*him, us, me...*) и инфинитива смыслового глагола.

Сложное дополнение употребляется после глаголов, выражающих:

1) предположение, мнение — *to expect, to believe, to think, to understand, to consider, to assume, to know, to suppose*.

We know *them to have made* the computations.

Мы знаем, что они произвели вычисления.

I expect the *students to be working* in the lab.

Я рассчитываю, что (сейчас) студенты работают в лаборатории.

2) просьбу, желание — *to wish, to like, to require, to want*.

Professor wanted *me to read* my paper at the conference.

Профессор хотел, чтобы я сделал доклад на конференции.

3) чувственное восприятие — *to see, to feel, to hear, to watch*. После этих глаголов частица *to* перед инфинитивом опускается.

I saw him enter the University building.

Я видел, что он входил в здание университета.

После глаголов *to see, to feel, to hear, to watch* в сложном дополнении вместо инфинитива может употребляться *Participle I*.

I saw him entering the University building.

Я видел, как он входил в здание университета.

Предложный инфинитивный оборот *for* + существительное (местоимение в объектном падеже) + инфинитив может выполнять функцию дополнения, части сказуемого, обстоятельства и пр. и переводится придаточным предложением с союзами *что, чтобы*. При этом инфинитив оказывается сказуемым предложением, а существительное или местоимение, стоящее перед инфинитивом — подлежащим.

It is important for you to understand all the details.

Важно, чтобы вы поняли все детали (вам важно...).

For the experiment to be finished in time, we must begin to work immediately.

Для того, чтобы эксперимент был закончен вовремя, мы должны начать работать немедленно.

Here is a book for you to read.

Вот книга, которую тебе надо прочитать.

Инфинитив в составе сложного подлежащего (Complex Subject)

Сложное подлежащее состоит из существительного в общем падеже (или местоимения в именительном падеже) и инфинитива, занимающего место после сказуемого предложения.

Сложное подлежащее употребляется: 1) после сказуемого в страдательном залоге, выраженного следующими глаголами: *to say, to know, to consider, to believe, to report, to expect, to suppose, to assume, to know*.

The temperature is expected to rise.

Ожидают, что температура поднимется.

He is known to be working in this field of mechanics.

Известно, что он работает в этой области механики (он, как известно, работает).

2) после сказуемого в действительном залоге, выраженного следующими глаголами: *to seem, to appear* «казаться», *to prove, to happen, to turn out* «оказываться».

The student appears to know the subject well enough.

Кажется, этот студент знает предмет достаточно хорошо (по-видимому, этот студент...).

Перевод предложений, содержащих сложное подлежащее, лучше начинать со сказуемого инфинитивной конструкции: «говорят, что»; «полагают, что».

3) иногда сказуемое образовано сочетанием глагола *to be* (в личной форме) с прилагательными *likely* «вероятный», *unlikely* «сомнительный», «маловероятный», *sure* «уверенный», *certain* «определенный».

The situation is unlikely to remain unchanged in future.

Маловероятно, что в будущем положение останется неизменным.

The seminar is certain (sure) to have been held.

Разумеется, (конечно) семинар состоялся.

С р а в н и т е:

The discusion is believed to be helpful.

It is believed that the discussion is helpful.

Полагают, что дискуссия полезна (Дискуссия, как полагают...).

The statement appeared to be false.

It appeared that the statement was false.

Оказалось, утверждение было ложным (Утверждение, как оказалось...).

They are likely to apply the new method.

It is likely that they will apply the new method.

Возможно, что они воспользуются новым методом.

У Р О К 26

Сослагательное наклонение (The Subjunctive Mood)

Сослагательное наклонение употребляется в условных предложениях II и III типа:

Кроме того оно употребляется:

1) в простых предложениях, выражающих пожелание или предложение:

I should (he would) like you to observe these rules.

Я бы (он бы) хотел, чтобы вы соблюдали эти правила.

It would be interesting to attend their seminar.

Было бы интересно присутствовать на их семинаре.

The new computer might be used for the purpose.

Для этой цели можно было бы использовать новую вычислительную машину.

2) в сложноподчиненных предложениях, где независимо от лица сослагательное наклонение передается с помощью глагола *should* и инфинитива смыслового глагола без частицы *to* (иногда *should* опускается):

а) в придаточных-подлежащих после безличных оборотов типа: *it is important, it is necessary, it is desirable, it is required*:

It is important that the information (should) be properly used.

Важно, чтобы данные были использованы должным образом.

б) в дополнительных придаточных предложениях со значением требования после глаголов: *to insist* «настаивать», *to order* «приказывать», *to demand* «требовать», *to suggest, to propose* «предлагать».

They demand (suggest, insist) that an appropriate solution (should) be found.

Они требуют (предлагают, настаивают), чтобы было найдено соответствующее решение.

в) в обстоятельственных придаточных предложениях цели после союзов *so that, in order, that* «чтобы», «для того, чтобы» и *lest* «чтобы не».

В данном случае кроме *should* употребляются глаголы *could, might*, сохраняющие свое лексическое значение.

Эти глаголы в отличие от *should* переводятся на русский язык.

I left home early lest I (should) be late for the lecture.

Я ушел из дома рано, чтобы не опоздать на лекцию.

I showed them the article so that they might read it (in order that).

Я показал им статью, чтобы они могли прочесть ее.

Обратите внимание, что отсутствие глагола *should* не меняет смысла предложения.

г) в сложноподчиненных предложениях — дополнительных, после глагола *to wish* «желать»:

I wish you came.

Мне бы хотелось, чтобы вы пришли.

I wish the experiment had been completed.

Как жаль, что опыт не закончен.

д) в обстоятельственных придаточных предложениях, после союзов *as if* «как если бы», *as though* «как будто бы».

He behaved as though he had never seen a telescope before.

Он вел себя так, как будто бы никогда раньше не видел телескоп.

It looks as if the apparatus were out of order.

Кажется, будто прибор не в порядке (похоже на то, что...).

Таблица словообразовательных суффиксов

Типы суффиксов		Суффиксы	Примеры
Суффиксы существительного, указывающие на	абстрактные понятия, процесс или результат действия	-ion -tion -sion -ance -ence -ure -ship -ty -ment -ness -th	companion construction mission distance dependence culture pressure measure relationship unity measurement usefulness length
	действующее лицо	-er -or -ant -ent -ist -ian	lecturer operator assistant student physicist mathematician
Суффиксы прилагательного, указывающие на	наличие свойства или качества	-able -ible -al -ic -ful -ous -ive -tuple -y	variable divisible mathematical harmonic helpful previous active n-tuple sunny
	отсутст- вие ка- чества	-less	shapeless
Суффиксы глагола		-ate -ize (-ise) -en -ify	illustrate generalize shorten simplify
Суффиксы наречий		-ly -ward(s)	easily forward(s)

Таблица словообразовательных префиксов

Общее значение префикса	Префиксы	Примеры
выражение отрицания	de- dis- in- il- ir- un- mis-	decode disprove indirect illogical irrational undefined misunderstand
повторность действия	re- bi- co-	reappear binomial cooperation
дву- ко- противо- контр- само- равно- гипер- интер- полу- сверх- супер- одно-	counter- auto- equi- hyper- inter- semi- super- uni-	counteraction autocode equilateral hyperbolic interaction semicircle supercomplex unidirectional

Таблица нестандартных глаголов

Infinitive	Past Indefinite	Past Participle	Перевод
arise	arose	arisen	возникать
be	was, were	been	быть
bear	bore	borne	носить, выносить
become	became	become	становиться
begin	began	begun	начинать (ся)
bend	bent	bent	гнуть (ся)
bind	bound	bound	связывать
break	broke	broken	ломать
build	built	built	строить
choose	chose	chosen	выбирать
come	came	come	приходить
cost	cost	cost	стоять
cut	cut	cut	пересекать, резать
deal	dealt	dealt	иметь дело (с)
do	did	done	делать
draw	drew	drawn	чертить, тащить
fall	fell	fallen	падать
feel	felt	felt	чувствовать
find	found	found	находить
fight	fought	fought	бороться
fly	flew	flown	летать
foresee	foresaw	foreseen	предвидеть
forget	forgot	forgotten	забывать
get	got	got	получать, становиться
give	gave	given	давать
grow	grew	grown	расти, выращивать

Infinitive	Past Indefinite	Past Participle	Перевод
have	had	had	иметь
hear	heard	heard	слышать
hold	held	held	иметь силу, держать
keep	kept	kept	держать, хранить
know	knew	known	знать
lay	laid	laid	класть
lead	led	led	вести
learn	learnt (learned)	learnt (learned)	узнавать, учиться
leave	left	left	оставлять
let	let	let	позволять
lose	lost	lost	терять
make	made	made	делать, заставлять
mean	meant	meant	значить, подразумевать
meet	met	met	встречать
put	put	put	класть
read	read	read	читать
run	ran	run	приводить в движение, бежать
say	said	said	говорить, сказать
see	saw	seen	видеть
send	sent	sent	посылать
set	set	set	помещать, ставить
show	showed	shown	показывать
sit	sat	sat	сидеть
speak	spoke	spoken	говорить, разговаривать
spend	spent	spent	тратить
spread	spread	spread	распространять(ся)
stand	stood	stood	стоять
strike	struck	struck(stricken)	ударять, бастовать
swing	swung	swung	качать(ся)
tear	tore	torn	разрывать
tell	told	told	рассказывать, сказать
think	thought	thought	думать
throw	threw	thrown	бросать
understand	understood	understood	понимать
wear	wore	worn	носить
win	won	won	выигрывать
write	wrote	written	писать

Список принятых сокращений

a (adjective) — имя прилагательное
adv (adverb) — наречие
conj (conjunction) — союз
n (noun) — имя существительное
num (numeral) — числительное

pl (plural) — множественное число
prep (preposition) — предлог
pron (pronoun) — местоимение
v (verb) — глагол
sing (singular) — единственное число

А

abbreviate [ə'brɪ:vɪeɪt] *v* сокращать;
n ~ion сокращение
able [eɪbl] *a* способный; *n* ability спо-
собность
about [ə'baʊt] *adv* почти, приближи-
тельно; *prep* о, об, относительно
above [ə'baʊv] *adv* наверху, сверху;
prep над, выше
abstract ['æbstrækt] *n* 1. абстракция;
2. конспект, реферат; *a* абстракт-
ный
absurd [əb'sɜ:d] *a* абсурдный, неле-
пый
academy [ə'kædəmɪ] *n* академия;
a ~ic академический
acceleration [æk'selə'reɪʃən] *n* уско-
рение
accept [ək'sept] *v* принимать, допу-
ска́ть; *a* ~able допустимый
accompany [ə'kʌmpəni] *v* сопровож-
дать
accomplish [ə'kʌmplɪʃ] *v* осуществ-
лять
according (to) [ə'kɔ:dɪŋ] *prep* со-
гласно; *adv* ~ly соответственно
account [ə'kaʊnt] *v* считать; ~for
объяснять
accuracy ['ækjʊrəsi] *n* тщательность;
~ate тщательный
achievement [ə'tʃi:vmənt] *n* достиже-
ние
across [ə'krɒs] *prep* сквозь, через
action ['ækʃn] *n* действие; *a* ~ive
активный
actually ['æktʃʊəli] *adv* фактически,
по существу

acute [ə'kju:t] *a* острый
add [æd] *v* складывать, прибавлять
addend [ə'dend] *n* слагаемое
addition [ə'dɪʃən] *n* сложение
additive ['ædɪtɪv] *a* аддитивный
adequate ['ædɪkwɪt] *a* адекватный
adjacent [ə'dʒeɪsənt] *a* примыкаю-
щий, смежный
adjust [ə'dʒʌst] *v* 1. приспособить;
2. регулировать
administrative [əd'mɪnɪstrətɪv] *a* ад-
министративный
admit [əd'mɪt] *v* принимать, допу-
ска́ть
advance [əd'vɑ:ns] *n* продвижение,
услех; *v* передвигаться; *in* ~ за-
ранее
advantage [əd'vɑ:ntɪdʒ] *n* преимуще-
ство
advice [əd'vaɪs] *n* совет
adviser [əd'vaɪzə] *n* советник
aerodynamics [æə'reɪdai'næmɪks] *n*
аэродинамика
(aero)plane [æə'reɪpleɪn] *n* самолет
affect [ə'fekt] *v* воздействовать
(be) afraid [ə'freɪd] *v* бояться
after ['ɑ:ftə] *prep* после, за; *conj* пос-
ле того, как
again [ə'geɪn] *adv* снова, опять
against [ə'geɪnst] *prep* против, с, к
ago [ə'ɡəʊ] *adv* тому назад; not
long ~ недавно
agree [ə'ɡri:] *v* соглашаться; *n* ~ment
соглашение
aid [eɪd] *n* помощь

aim [eɪm] *n* цель; *v* ~ at иметь целью
 air [ɛə] *n* воздух
 algebra ['ældʒɪbrə] *n* алгебра
 algorism ['ælgərɪzəm] = algorithm
 [ɒəm] *n* алгоритм
 align [ə'laɪn] *v* ставить в ряд
 alike [ə'laɪk] *a* подобные, похожие
 all [ɔ:l] *pron* весь, вся, всё, все
 allow [ə'laʊ] *v* позволять, разрешать
 almost ['ɔ:lmoʊst] *adv* почти
 alone [ə'ləʊn] *adv* лишь, только, один
 along [ə'lɒŋ] *prep* вдоль по
 alphabet ['ælfəbɪt] *n* алфавит
 already [ɔ:l'redɪ] *adv* уже
 also [ɔ:lsəʊ] *adv* тоже, также
 alter ['ɔ:lteɪ] *v* изменять, переделывать
 alternative [ɔ:l'teɪnə'tɪv] *n* альтернатива, выбор
 although ['ɔ:lðəʊ] *conj* хотя
 altitude ['æltɪtju:d] *n* высота
 always ['ɔ:lwəz] *adv* всегда
 ambiguity [ˌæmbɪ'ɡju:ɪti] *n* неясность, двусмысленность; *a* ~ous двусмысленный
 amend [ə'mend] *v* изменять; *n* ~ment изменение
 among [ə'mʌŋ] *prep* среди, между
 amount [ə'maʊnt] *n* количество, сумма; *v* доходить до, составлять сумму; ~ to сводиться к, равняться
 analyse ['ænəlaɪz] *v* анализировать, исследовать
 analysis [ə'næləsɪs] *n* (pl analyses) анализ
 anatomy [ə'nætəmi] *n* анатомия
 ancient ['eɪnfənt] *a* древний
 and [ænd] *conj* и, а, но
 angle ['æŋɡl] *n* угол
 angular ['æŋɡjʊlə] *a* угловой
 another [ə'nʌðə] *pron* другой, еще один
 answer ['ɑ:nsə] *n* ответ; *v* отвечать
 any ['eni] *a, pron* какой-нибудь, сколько-нибудь (в отриц., вопр. предл.); всякий, любой (в утвердит., предл.)
 anybody ['eni,bɒdi] *n, pron* кто-нибудь (в отриц. форме и вопр. предл.); любой, всякий (в утвердит.)
 anyone ['eniw ʌn] *см.* anybody
 anything ['eniθɪŋ] *n, pron* что-нибудь (в вопр. и отриц. предл.); что угодно, все (в утвердит.)
 anywhere ['eniwəz] *adv* 1. где-нибудь, куда-нибудь; 2. повсюду
 apart [ə'pa:t] *adv* отдельно; ~ from кроме, помимо

apartment [ə'pɑ:tment] *n* квартира
 appear [ə'piə] *v* 1. появляться, показываться; 2. казаться, оказываться
 applicant [æ'plɪkənt] *n* претендент, кандидат
 application *n* применение
 apply [ə'plai] *v* применять, прикладывать;
 appointment [ə'pɔɪntmənt] *n* назначение
 appreciate [ə'pri:ʃieɪt] *v* ценить (по достоинству)
 approach [ə'prəʊtʃ] *v* приближаться, подходить; *n* подход
 appropriate [ə'prəʊpriɪt] *a* соответствующий, подходящий, надлежащий; *adv* ~ly должным образом
 approximate [ə'prɒksɪmeɪt] *v* приближать(ся), аппроксимировать; [ə'prɒksɪmɪt] *a* приближенный; *adv* ~ly приблизительно
 approximation [ə'prɒksɪ'meɪʃən] *n* приближение
 April ['eɪprɪl] *n* апрель
 arbitrary [ə'bitrəri] *a* произвольный
 arc [ɑ:k] *n* дуга, арка
 architecture ['ɑ:kɪtektʃə] *n* архитектура
 area ['ɛəriə] *n* площадь
 argue ['ɑ:gju:] *v* спорить (with); аргументировать
 arise [ə'raɪz] (arose, arisen [ə'rouz], [ə'rizən]) возникать, появляться; ~ from явиться результатом
 arithmetic [ə'riθmətɪk] *n* арифметика
 around [ə'raʊnd] *adv* 1. кругом, поблизости; 2. примерно
 arrange [ə'reɪndʒ] *v* размещать; расставлять, упорядочить
 array [ə'rei] *n* расположение, таблица
 arrive (at) [ə'raɪv] *v* 1. прибывать; 2. приходить (к решению)
 arrow ['ærou] *n* стрела; ~-head стрелка, наконечник
 article ['ɑ:tɪkl] *n* статья
 artificially [ˌɑ:tɪ'fɪʃəli] *adv* искусственным образом
 artist ['ɑ:tɪst] *n* художник
 as [æz] *adv, conj* как, в качестве, так как, по мере того, как; as if = as though как-будто бы; as for что касается; as soon as как только; as well также; as well as а также
 ascend [ə'send] *v* подниматься
 ascent [ə'sent] *n* подъем
 ask [ɑ:sk] *v* спрашивать; просить
 aspect ['æspekt] *n* 1. вид, аспект; 2. точка зрения

assert [ə'sə:t] *v* утверждать; *n* ~ion утверждение
 assign [ə'sain] *v* приписывать; при-
 давать; *n* ~ment задание
 assist [ə'sist] *v* содействовать, по-
 морать; *n* ~ance помощь
 associate [ə'sou'fiət] *v* связывать, ас-
 социнировать; *a* сопряженный
 associative [ə'sou'fiətiv] *a* ассоциа-
 тивный
 assume [ə'sju:m] *v* предполагать, до-
 пускать
 assumption [ə'sʌmpʃən] *n* предпо-
 ложение, допущение
 asterisk ['æstərɪsk] *n* звездочка (*a*
обозначения)
 astronomer [ə'strɒnəmə] *n* астроном
 astrophysics [æ'strɒfɪziks] астрофизи-
 ка
 at [æt] *prep* за, при, на, в
 atmosphere ['ætməsfɪə] *n* атмосфера
 atomic [ə'tɒmɪk] *a* атомный
 attach [ə'tætʃ] *v* присоединять, при-
 писывать

attempt [ə'tempt] *n* попытка; *v* пы-
 таться
 attend [ə'tend] *v* посещать, присутст-
 вовать
 attention [ə'tenʃən] *n* внимание
 attraction [ə'trækʃən] *n* притяжение
 attractive [ə'træktɪv] *a* притягатель-
 ный
 August ['ɔ:gəst] *n* август
 author ['ɔ:θə] *n* автор, писатель
 automatic [ɔ:tə'mætɪk] *a* автоматиче-
 ский
 autumn ['ɔ:təm] *n* осень
 average ['ævərɪdʒ] *a* средний; *n*
 средняя величина; *v* в среднем
 равняться
 avoid [ə'vɔɪd] *v* избегать
 away [ə'wei] 1. отсутствующий;
 2. находиться на расстоянии
 awful ['ɔ:ful] *a* ужасный; ~ly ужас-
 но
 axiom ['æksɪəm] *n* аксиома
 axis ['æksɪs] *n* (*pl* axes ['æksɪ:z])
 ось

В

back [bæk] *adv* назад, обратно; *v*
 поддерживать; *a* обратный
 bad [bæd] *a* плохой; *adv* ~ly плохо
 bag [bæg] *n* портфель, сумка
 balance ['bæləns] *n* весы, равнове-
 сие; *v* уравнивать
 base [beɪs] *n* основание, база, базис
 basic ['beɪsɪk] *a* основной, базисный
 be (was, were, been) [bi:] ([wɒz],
 [wə:], [bi:n]) *v* существовать,
 находиться, быть
 bear (bore, borne) [beə] ([bɔ:],
 [bɔ:n]) *v* носить; ~in mind пом-
 нить, учитывать
 beautiful ['bjʊ:tɪfʊl] *a* прекрасный,
 красивый
 because [bi'kɔ:z] *conj* так как, пото-
 му что; ~of из-за, вследствие
 become (became, become) [bi'kʌm],
 [bi'keɪm] становиться
 bed [bed] *n* кровать; go to ~ ло-
 житься спать
 before [bɪ'fɔ:] *prep* вперед, до; *conj*
 прежде чем; *adv* впереди, ранее;
 long~зadолго до
 begin (began, begun) [bɪ'ɡɪn]
 ([bɪ'ɡæn], [bɪ'ɡʌn]) *v* начинать;
 to ~with для начала
 behave [bi'heɪv] *v* вести себя
 behaviour [bi'heɪvjə] *n* поведение, ре-
 жим
 being ['bi:ɪŋ] *n* существо; living~
 живое существо

belief [bi'li:f] *n* вера
 believe [bi'li:v] *v* верить, полагать
 belong [bi'lɒŋ] *v* принадлежать
 below [bi'ləʊ] *adv* ниже, под
 bend [bend] (bent) [bent] *v* сги-
 бать
 besides [bi'saɪdɪz] *prep* кроме, в до-
 полнение
 best [best] *a* наилучший
 better ['betə] *adv* лучше
 between [bi'twi:n] *prep* между
 big [bɪg] *a* большой
 billion ['bɪljən] *n* в Англии 10¹², в
 США 10⁹
 binary ['baɪnəri] *a* двоичный, бинар-
 ный
 binomial [baɪ'nəʊmɪəl] *n* двучлен
 biology [baɪ'ɒlədʒɪ] *n* биология
 bisect [baɪ'sekt] *v* делить пополам
 black [blæk] *a* черный, темный
 blank [blæŋk] *n* пробел, пустое ме-
 сто
 blow [bləʊ] *n* 1. удар; 2. дуновение,
 в дуть
 board [bɔ:d] *n* 1. доска; 2. пульт
 body ['bɒdi] *n* 1. тело; 2. масса;
 3. совокупность
 book [buk] *n* книга
 book-stall *n* книжный киоск
 boredom ['bɔ:dəm] *n* скука
 botany ['bɒtəni], *n* ботаника

both [bəʊθ] *pron* оба; both... and как..., так и
 bottom ['bɒtəm] *n* дно, низ
 boundary ['baʊndəri] *n* граница;
 bound *n* граница; *v* ограничивать
 box [bɒks] *n* ящик, коробка
 boy [bɔɪ] *n* юноша, мальчик
 brace [breɪs] *n* фигурная скобка
 bracket ['brækit] *n* скобка, квадратная скобка
 brain [breɪn] *n* мозг
 branch [brɑːntʃ] *n* ответвление, область, направление
 breakfast ['brekfəst] *n* завтрак
 briefly ['briːfli] *adv* кратко; *in brief* кратко

calculat[e] ['kælkjuleɪt] *v* вычислять;
n ~ ion подсчет, вычисление; *n*
 calculus исчисление, счисление
 call [kɔːl] *v* звать, называть; *so* ~ ed
 так называемый
 camp [kæmp] *n* лагерь
 can [kɒd] [kæn], [kud] *v* мочь
 cancel ['kænsəl] *v* отменять, сокра-
 щать
 candidate ['kændɪdət] *n* кандидат
 capable ['keɪpəbl] *a* способный
 capacity [kə'pæsɪti] *n* 1. мощность;
 2. емкость; 3. способность
 capital ['kæpɪtəl] *n* столица; *a* ~ let-
 ter заглавная буква
 capture ['kæptʃə] *n* захват, обузда-
 ние; *v* обуздывать
 card [kɑːd] *n* 1. карта; 2. перфокар-
 та
 care [keə] *n* забота, уход, внимание;
a ~ ful осторожный; *adv* ~ fully
 осторожно, тщательно; *to take* ~
 заботиться, предусмотреть
 carry ['kæri] *v* нести, переносить;
 ~ on проводить, продолжать;
 ~ out осуществлять, выполнять
 Cartesian [kɑː'tɪzjən] *a* декартов
 case [keɪs] *n* 1. случай, обстоятель-
 ство; 2. дело; *prep* *in* ~ of в
 случае; *conj* *in* ~ в случае; *this*
is not the case это не так
 category ['kætɪgəri] *n* категория
 cause [kɔːz] *n* причина, повод; *v* вы-
 зывать, заставлять
 center (амер.), centre (англ.) ['sen-
 tə] *n* центр, середина
 centimeter ['sentɪmɪtə] *n* сантиметр
 century ['sentʃəri] *n* век, столетие
 certain ['seɪtən] *a* некий, определен-
 ный; *adv* ~ ly разумеется, ко-
 нечно; *n* ~ ty определенность;
 несомненность

О

bright [braɪt] *a* 1. яркий; 2. умный
 bring (brought) [brɪŋ], [brɔːt] *v*
 приносить, приводить; ~ about
 вызывать, приводить к
 brother ['brʌðə] *n* брат
 build (built) [bɪld], [bɪlt] *v* стро-
 ить; *a* built-in вмонтированный
 building ['bɪldɪŋ] *n* здание
 bushel ['buʃl] *n* бушель
 busy ['bɪzi] *a* занятой
 but [bʌt] *adv* только, лишь; *prep* за
 исключением
 buy [baɪ] (bought) [bɔːt] покупать
 by *prep* 1. при, около; 2. через, по-
 средством; 3. к (какому-то сро-
 ку)
 chain [tʃeɪn] *n* цепь
 chamber ['tʃeɪmbə] *n* камера
 chance [tʃɑːns] *n* шанс, случай, ве-
 вероятностность
 change [tʃeɪndʒ] *n* замена, переме-
 на; *v* изменять(ся), менять(ся)
 chapter ['tʃæptə] *n* глава
 character ['kærɪktə] *n* 1. цифра, знак;
 2. характер; *v* ~ ize характери-
 зовать; *a* characteristic of харак-
 терный
 check [tʃek] *n* контроль, проверка;
v проверять, сверять
 chemical ['kemɪkəl] *a* химический
 chemistry ['kemɪstri] *n* химия
 chess [tʃes] *n* шахматы ~ board
 шахматная доска
 child (pl children) [tʃaɪld], [tʃɪld-
 rən] *n* ребенок
 choice [tʃɔɪs] *n* выбор
 choose (chose, chosen) [tʃuːz]
 ([tʃəʊz], [tʃəʊzən]) *v* выби-
 рать
 chord [kɔːd] *n* хорда
 cinema ['sɪnəmə] *n* кинотеатр
 circle ['sɜːkl] *n* круг, окружность
 circumference [sə'klɪmfərəns] *n* ок-
 ружность круга
 circumstance [sə'kəmstəns] *n* обстоя-
 тельство
 clarify ['klærɪfaɪ] *v* уточнять, внести
 ясность
 class [klaːs] *n* 1. урок, занятие;
 2. класс; *v* ~ify классифициро-
 вать
 class-mate ['klaːsmeɪt] *n* соученик
 clear [kleə] *a* понятный, ясный;
adv ~ ly очевидно
 close [klaʊs] *a* близкий, точный; *v*
 замыкать, закрывать; *adv* ~ ly
 близко; *a* ~ d замкнутый

closure ['klouʒə] *н* замкнутость
 code [koud] *н* код, сигнал; *υ* кодировать
 coefficient [kou'i'fɪənt] *н* коэффициент
 coin [kɔɪn] *н* монета
 coincide [kɔɪn'saɪd] *υ* совпадать
 cold [kould] *а* холодный
 collect [kə'lekt] *υ* собирать; *п* ~ ion совокупность, система
 college ['kɒlɪdʒ] *н* колледж
 combination [kəm'bi'neɪʃən] *н* сочетание, соединение
 combine [kəm'baɪn] *υ* объединять(ся), соединять(ся)
 come (same, come) [kʌm], [keɪm] *υ* приходить, ~ to сводиться к; ~ to know познакомиться
 comet ['kɒmɪt] *н* комета
 comfortable ['kʌmfətəbl] *а* удобный
 comma ['kɒmə] *н* запятая
 comment [kə'ment] *υ* комментировать
 common [kə'mən] *а* 1. общий, обычный; 2. простой
 commonplace ['kɒmənpleɪs] *а* банальный
 communication [kə'mjuːni'keɪʃən] *н* сообщение, связь
 communist [kəm'juːnɪst] *а* коммунистический
 commutative [kə'mjuːtətɪv] *а* коммутативный
 comparable ['kɒmpərəbl] *а* сравнимый
 compare [kəm'peə] *υ* сравнивать
 compass ['kʌmpəs] *н* циркуль
 compatible [kəm'pæɪtəbl] *а* совместимый
 compel [kəm'pel] *υ* принуждать, заставлять
 competitive [kəm'petɪtɪv] *а* конкурсный
 complement ['kɒmplɪmənt] *н* дополнение
 complete [kəm'pli:t] *υ* завершать; заканчивать; *а* полный
 complex ['kɒmpleks] *а* сложный, комплексный, составной; ~ fraction четырехэтажная дробь
 complicated ['kɒmplɪkeɪtɪd] *а* сложный
 composite ['kɒmpəzɪt] *а* составной, сложный
 compute [kəm'pjʊ:t] *υ* вычислять, подсчитывать; computer *н* вычислительная машина
 concentrate ['kɒnsəntreɪt] *υ* сосредоточиться
 concept ['kɒnsept] *н* понятие, идея;

adv ~ ually мысленно, в воображении
 concern [kən'sə:n] *н* дело, отношение; *υ* касаться, иметь отношение к; be concerned with касаться, иметь отношение
 concert ['kɒnsət] *н* концерт
 concise [kən'saɪs] *а* сжатый
 conclude [kən'kluːd] *υ* делать вывод, заключать
 conclusion [kən'kluːʒən] *н* вывод; arrive at *а* ~ прийти к выводу; draw *а* ~ сделать вывод
 concreteness [kən'kri:tɪnis] *н* конкретность
 condition [kən'dɪʃən] *н* условие; *υ* налагать условия; *а* ~ al условный
 conference ['kɒnfərəns] *н* конференция
 confine [kən'faɪn] *υ* ограничить(ся), заключать (в)
 congratulate [kən'grætʃuleɪt] *υ* поздравлять
 congregate ['kɒngrɪgeɪt] *υ* собираться
 congruent ['kɒŋgruənt] *а* конгруэнтный
 connect [kə'nekt] *υ* связывать, соединять; *п* ~ ion связь
 consequence ['kɒnsɪkwəns] *н* (по)следствие
 conservative [kən'sə:vətɪv] *а* консервативный
 consider [kən'sɪdə] *υ* рассматривать; *п* ~ ation рассмотрение, изображение; *а* ~ able значительный
 consist (of) [kən'sɪst] *υ* состоять из; ~ in заключаться в; *а* ~ ent состоятельный; последовательный
 constant ['kɒnstənt] *н* постоянная величина; *adv* ~ ly постоянно
 construct [kən'strʌkt] *υ* строить
 consult [kən'sʌlt] *υ* консультироваться, советоваться
 contain [kən'teɪn] *υ* содержать
 (be) content [kən'tent] *υ* быть довольным
 contents (pl) ['kɒntənts] *н* содержимое, содержание
 context ['kɒntekst] *н* контекст
 continue [kən'tɪnjuː] *υ* продолжать
 continuous [kən'tɪnjuəs] *а* непрерывный, постоянный
 continuum [kən'tɪnjuəm] *н* континуум
 contrary ['kɒntrəri] *а* противоположный; on the ~ наоборот
 contribute [kən'trɪbjʊt] *υ* 1. содействовать; 2. делать вклад (в науку)

control [kən'trəʊl] *n* управление; *υ* контролировать, управлять
 convenience [kən'vi:njəns] *n* удобство; *a ~ ent* удобный
 convention [kən'venʃən] *n* собрание, сбор
 conventional [kən'venʃənl] *a* обычный, общепринятый
 conversation [kən'veɪ'seɪʃən] *n* беседа
 conversely [kən'vɜ:sli] *adv* напротив, наоборот
 convey [kən'vei] *υ* передавать
 conviction [kən'vɪkʃən] *n* 1. убеждение; 2. уверенность, убежденность
 cooperate [kou'əpəreit] *υ* сотрудничать
 coordinate [kou'ɔ:dɪnɪt] *n* координата; *υ* [kou'ɔ:dɪneɪt] согласовывать
 cope (with) [koup] *υ* справляться (с)
 corollary [kə'rɒləri] *n* следствие
 correct [kə'rekt] *a* правильный; *υ* исправлять; *adv ~ ly* верно
 correlate ['kɒrɪleɪt] *υ* соотносить(ся)
 correspond [kə'rɪs'pɒnd] *υ* соответствовать; *n ~ ence* соответствие
 cosmic ['kɒzmɪk] *a* космический
 cottage ['kɒtɪdʒ] *n* коттедж

count [kaunt] *υ* считать, *a ~ able* исчисляемый
 couple ['kʌpl] *n* пара; *υ* сочетать
 courage ['kʌrɪdʒ] *n* смелость
 course [kɔ:s] *n* ход, течение
 cover ['kʌvə] *υ* покрывать, охватывать
 create [kri:'eɪt] *υ* создавать, творить
 creation [kri:'eɪʃən] *n* создание, творение
 credit ['kredit] *n* заслуга; *υ* приписывать (заслугу)
 criterion [*pl* criteria] [kraɪ'tɪərɪən] *n* критерий
 critical ['krɪtɪkəl] *a* критический
 cross [krɒs] *υ* пересекать
 cuble [kju:b] *n* куб; *a ~ ic* кубический
 culmination [kʌl'mɪ'neɪʃən] *n* кульминация
 curl [kɜ:l] *n* 1. вихрь; 2. ротор
 curve [kɜ:v] *n* кривая (линия); *a ~ d* искривленный
 cut (cut) [kʌt] *υ* разрезать, пересекать
 cybernetics [saɪbə'netɪks] *n* кибернетика

D

Danish ['deɪnɪʃ] *a* датский
 dash [dæʃ] *n* черточка, штрих
 data (*sing* datum) ['deɪtə] *n* данные
 dead [ded] *a* мертвый, покойный
 deal (dealt) [di:l] *n* ~ with иметь дело с, касаться, заниматься; *a great ~* много
 death [deθ] *n* смерть
 debt [det] *n* долг
 decade ['dekeɪd] *n* десятилетие, десяток
 December [di'sembə] *n* декабрь
 decide [di'saɪd] *υ* решать
 decimal ['desɪməl] *a* десятичный
 decode [di:kəʊd] *υ* декодировать, расшифровывать
 decrease ['di:kri:s] *n* уменьшение; *υ* [di:kri:s] уменьшаться
 deduce [di'dju:s] *υ* делать вывод
 deduction [di'dʌkʃən] *n* 1. вывод, дедукция; 2. вычитание
 deductive [di'dʌktɪv] *a* дедуктивный
 deep [di:p] *a* глубокий
 defend [di'fend] *υ* защищать
 define [di'faɪn] *υ* определять
 definite ['defɪnɪt] *a* определенный
 definition [defɪ'nɪʃən] *n* определение
 degree [di'ɡri:] *n* 1. степень, порядок; 2. градус

demand [di'ma:nd] *n* требование, потребность; *υ* требовать
 democratic [demə'krætɪk] *a* демократичный
 demonstrate ['demənstreɪt] *υ* демонстрировать
 denominator [di'nɒmɪneɪtə] *n* знаменатель дроби
 denote [di'notɪt] *υ* определять
 density ['densɪti] *n* плотность
 department [di'pɑ:tment] *n* отделение, факультет
 depend (on) [di'pend] *υ* зависеть; *a ~ ent* зависимый
 depth [depθ] *n* глубина
 derivation [derɪ'veɪʃən] 1. взятие производного; 2. деривация
 derivative [dɪ'rɪvətɪv] *a* производная
 descend [di'send] *υ* убывать, спускаться; *n* снижение
 describe [dis'kraɪb] *υ* описывать; *n* description описание
 deserve [di'zɜ:v] *υ* заслуживать
 design [di'zeɪn] *n* дизайн, проект; *υ* конструировать
 desk [desk] *n* письменный стол
 designate [de'zeɪgnɪt] *υ* обозначать
 desire [di'zaɪə] *υ* желать
 desirable [di'zaɪərəbl] *a* желательный

detail [di'teɪl] *n* деталь; *in* ~ подробно; *a* ~ ed подробный
 detect [di'tekt] *v* обнаружить
 determine [di'tə:mi:n] *v* определить
 develop [di'veləp] *v* развивать; *n* ~ ment развитие, событие
 deviate [di'veiə't] *v* отклоняться; *n* ~ ion отклонение
 device [di'vaɪs] *n* прибор, устройство
 devise [di'vaɪz] *v* проектировать, конструировать
 diagonal [daɪ'æɡənəl] *n* диагональ; *a* диагональное сечение
 diagram [daɪə'ɡrəm] *n* диаграмма
 diameter [daɪ'æmɪtə] *n* диаметр
 dictionary [di'kɪʃənəri] *n* словарь
 differ ['dɪfə] *v* отличаться, различаться; *n* ~ ence разность, различие *a* ~ ent различный
 differential [di'fərə'nʃəl] *a* дифференциальный
 difficult ['dɪfɪkəlt] *a* трудный; *n* ~ y трудность
 digit ['dɪdʒɪt] *n* цифра; *a* ~ al цифровой
 dimension [di'menʃən] *n* измерение; *pl* размеры
 dining-room ['daɪnɪŋru:m] *n* столовая
 dinner ['dɪnə] *n* обед
 direct [di'rekt] *v* направлять; *a* прямой; *adv* ~ ly прямо, непосредственно; *n* ~ ion направление
 disadvantage [disəd'va:ntɪdʒ] *n* недостаток
 disagree [disə'ɡri:] *v* возражать; быть несогласным
 disappoint [disə'pɔɪnt] *v* разочаровывать
 discover [dis'kʌvə] *v* обнаружить; открывать

discuss [dis'kʌs] *v* обсуждать; *n* ~ ion обсуждение
 disk [disk] *n* круг, диск
 display [dis'pleɪ] *n* демонстрация; *v* показывать
 disposal [dis'pəʊzəl] *n* расположение
 at one's ~ в чем-либо распоряжении
 dissertation [disə'teɪʃən] *n* диссертация
 distance ['dɪstəns] *n* расстояние
 distant ['dɪstənt] *a* отдаленный
 distinction [dis'tɪŋkʃən] *n* разграничение
 distinguish [dis'tɪŋɡwɪʃ] *v* различать(ся)
 distribution [dɪstri'bju:ʃən] *n* распределение
 divide [di'vaɪd] *v* делить
 dividend ['dɪvɪdənd] *n* делимое
 divisible [di'vɪzəbl] *a* делимый
 division [di'vɪʒən] *n* деление
 divisor [di'vaɪzə] *n* делитель
 do (did, done) [du:] ([dɪd], [dʌn]) *v* делать
 doctor ['dɒktə] *n* доктор
 domain [də'meɪn] *n* область
 dot [dɒt] *n* точка
 double ['dʌbl] *a* двойной
 doubt [daʊt] *n* сомнение; *v* сомневаться
 down [daʊn] *adv* до, вплоть, вниз
 draw (drew, drawn) [drɔ:] ([dru:], [drɔ:n]) *v* 1. тянуть; притягивать; 2. чертить, рисовать
 due [dju:] *a* надлежащий; ~ to благодаря, вследствие
 during ['dʒuərɪŋ] *prep* в течение, во время
 dwell [dwel] *v* задерживаться на (on, upon)
 dynamics [daɪ'næmɪks] *n* динамика

Е

each [i:tʃ] *pron* каждый; each other друг друга
 early ['ɜ:li] *adv* рано; *a* ранний
 earth [ɜ:θ] *n* земля
 ease [i:z] *n* легкость
 east [i:st] *n* восток
 easy ['i:zi] *a* легкий
 economical [i:kə'nɒmɪkəl] *a* экономичный
 edge [edʒ] *n* край, грань
 editor ['edɪtə] *n* редактор
 effect [i'fekt] *n* следствие, результат

e. g. например
 Egypt ['ɪdʒɪpt] *n* Египет
 eight [eɪt] *num* восемь
 either ['aɪðə] *a* любой (из двух), оба; ~ ... от или ... или
 electric [ɪ'lektrɪk] *a* электрический
 electromagnetic [ɪ'lektromæɡ'netɪk] *a* электромагнитный
 electronic [ɪlek'trɒnɪk] *a* электронный
 element ['elɪmənt] *n* элемент; *a* ~ ary элементарный
 eleven [ɪ'levn] *num* одиннадцать

ellipse ['i:lip] *n* эллипс; *a* ~ tic
 эллиптический
 ellipsoidal [ilip'soidl] *n* эллипсоид
 else [els] *adv* еще, кроме
 emerge [i'mæ:dʒ] *v* возникать
 emigrate ['emigreit] *v* эмигрировать
 emphasize ['emfəsaiz] *v* подчерки-
 вать, делать ударение
 empirical [em'pirikəl] *a* эмпирический
 empty ['empti] *a* пустой
 enable [i'neibl] *v* давать возмож-
 ность
 enclose [in'klouz] *v* вкладывать, за-
 ключать
 encounter [in'kaunta] *v* встречать
 end [end] *n* конец; *v* заканчивать
 endpoint ['endpoint] *n* конечная точ-
 ка
 energy [enədʒi] *n* энергия
 engine [endʒin] *n* машина, мотор
 England ['ɪŋɡlənd] *n* Англия
 English ['ɪŋɡlɪʃ] *a* английский
 enjoy [in'dʒɔi] *v* 1. получать удо-
 вольствие; 2. пользоваться (пра-
 вами)
 enough [i'nʌf] *a* достаточный; *adv*
 достаточно
 ensure [in'sʊə] *v* обеспечивать
 enter ['entə] *v* входить, поступать
 entire [in'taɪə] *a* целый, весь
 entitle [in'taɪtl] *v* озаглавливать
 entity ['entiti] *n* сущность, вещь
 entrance ['entrəns] *n* вход, вхожде-
 ние; *a* вступительный
 equal ['i:kwəl] *a* равный; *n* ~ ity
 равенство
 equation [i'kweɪʃən] *n* уравнение
 equidistant [i:kwɪ'dɪstənt] *a* равно-
 удаленный
 equilateral [i:kwɪ'lætərəl] *a* равно-
 сторонний
 equipment [i'kwɪpmənt] *n* оборудо-
 вание
 equivalent [i'kwɪvələnt] *a* эквива-
 лентный
 error ['erə] *n* ошибка, погрешность
 especially [is'peʃəli] *adv* особенно
 essential [i'senʃəl] *a* существенный,
 основной; *adv* ~ ly существен-
 ным образом
 establish [is'tæblɪʃ] *v* устанавливать
 estimate ['estimeɪt] *v* оценивать
 etc. (et cetera, and so on) *n* так да-
 лее
 Euclid ['ju:klɪd] Евклид; *a* ~ ean
 евклидов
 Europe ['juərəp] *n* Европа
 evaluate [i'vælju:ei] *v* 1. вычислять;
 2. оценивать

even [i:vən] *a* четный; *adv* даже
 evening ['i:vnɪŋ] *n* вечер; in the ~
 вечером
 event [i'vent] *n* событие, исход
 ever [evə] *adv* всегда, когда-либо
 every ['evri] *pron* каждый, всякий
 everyday ['evri'dei] *a* повседневный
 everyone ['evriwʌn] *pron* всякий,
 каждый
 everything ['evriθɪŋ] *pron* все
 everywhere ['evriweə] *adv* повсюду,
 везде
 evident ['evidənt] *a* очевидный
 exact [ig'zækt] *a* точный; *adv* ~ ly
 точно
 exam [ig'zæm] *n* экзамен
 examination [ig,zæmi'neiʃn] *n* 1. эк-
 амен; 2. обследование, рассмот-
 рение
 example [ig'zɑ:mpl] *n* пример; for ~
 например
 exceed [ik'si:d] *v* превышать
 excellent ['eksələnt] *a* отличный, пре-
 восходный
 except [ik'sept] *prep* кроме, за ис-
 ключением; *n* ~ ion исключение
 exclude [iks'klu:d] *v* исключать
 exclusive [iks'klu:sɪv] *a* исключитель-
 ный; *adv* ~ ly только
 excuse [iks'kju:z] *v* извинять; *n* от-
 говорка, предлог
 exercise ['eksəsaɪz] *n* упражнение
 exhibit [ig'zɪbɪt] *n* экспонат; *v* вы-
 ставлять для показа
 exist [ig'zɪst] *v* существовать; *n*
 ~ ence существование
 expansion [iks'pænfən] *n* растяже-
 ние, протяженность
 expect [iks'pekt] *v* ожидать, рассчи-
 тывать; *n* ~ ation ожидание
 experience [iks'pɪəriəns] *n* опыт; *v*
 испытывать
 experiment [iks'perɪmənt] *n* опыт; *v*
 экспериментировать
 explain [iks'pleɪn] *v* объяснять
 explainable [iks'pleɪnəbl] *a* объясни-
 мый
 explanation [ekspləneɪʃən] *n* объяс-
 нение
 explicit [iks'plɪsɪt] *a* явный, четкий
 exponent [eks'pəʊnənt] *n* экспонента,
 показатель степени
 express [iks'pres] *v* выражать;
n ~ ion выражение
 extend [iks'tend] *v* простирается;
a ~ ed расширенный
 extension [iks'tenʃən] *n* протяжен-
 ность; расширение
 extensive [iks'tensɪv] *a* обширный
 exterior [eks'tɪəriə] *a* внешний

extraordinary [ˌɛkstrəˈɔːdɪnəri] а необычный

extreme [ɪksˈtriːm] а крайний; экстремальный; *adv* ~ ly чрезвычай-но

F

face [feɪs] *n* 1. грань; 2. лицо, лицевая сторона

facilitate [fəˈsɪlɪteɪt] *v* способствовать

fact [fækt] *n* результат, факт; *in* ~ действительно

factor [ˈfæktə] *n* сомножитель, множитель; *v* разлагать на множители

factory [ˈfæktəri] *n* фабрика, завод

faculty [ˈfækəlti] *n* факультет

fail [feɪl] *v* потерпеть неудачу

failure [ˈfeɪljə] *n* неудача

fall [fɛl, ˈfɛlən] [fɔːl] ([fɛl], [ˈfɔːlən]) *v* падать

false [ˈfɔːls] а ложный

familiar [fəˈmɪljə] а знакомый

family [ˈfæmɪli] *n* 1. семейство, совокупность; 2. семья

famous [ˈfeɪməs] а знаменитый

far [faː] а далекий; *so* ~ до сих пор

farm [fɑːm] *n* ферма

farther [ˈfɑːðə] далее, дальше

father [ˈfɑːðə] отец

favour [ˈfeɪvə] *n* польза; благосклонность; а ~ able благоприятный; *in* ~ of в пользу

favourite [ˈfeɪvərɪt] а любимый

feature [ˈfi:tʃə] *n* черта, свойство

February [ˈfebruəri] *n* февраль

feel [fiːl] *v* чувствовать

few [fjuː] *pron* немногие, мало

field [fiːld] *n* поле, область

figure [ˈfɪɡə] *n* 1. цифра; 2. рисунок

file [faɪl] *n* картотека

film [fɪlm] *n* 1. пленка; 2. фильм

final [ˈfaɪnəl] а конечный; *adv* ~ ly наконец

find (found) [faɪnd, ˈfaʊnd] *v* находить; ~ out выяснять

fine [faɪn] а тонкий, прекрасный

finger [ˈfɪŋɡə] *n* палец

finish [ˈfɪnɪʃ] *n* конец; *v* заканчивать

finite [ˈfaɪnaɪt] а конечный

first [fɜːst] *num* первый; *at* ~ сначала

fit [fɪt] а пригодный, подходящий, *v* соответствовать, годиться

five [faɪv] *num* пять

fix [fɪks] *v* фиксировать; а ~ ed фиксированный

flat [flæt] а плоский

fluently [ˈfluːəntli] *adv* гладко, бегло

focus (*pl* foci) [ˈfoukəs, ˈfousaɪ] *n* фокус

follow [ˈfɒləʊ] *v* сопровождать, следовать за; а ~ ing следующий; *as follows* следующим образом

fond [fɒnd] а любящий; *to be* ~ of любить

foot (*pl* feet) [fuːt, ˈfiːt] (*сокр.* ft) 1. ступня; 2. фут.=30,48 см.

for [fɔː] *prep* 1. для, за; 2. в течение, из-за, *conj* так как

force [fɔːs] *n* сила; *v* заставлять

foreign [ˈfɔːrɪn] а 1. иностранный; 2. чуждый

foresee (foresaw, foreseen) [fɔːˈsiː] ([fɔːˈsɔː], [fɔːˈsiːn]) *v* предвидеть

forest [ˈfɒrɪst] *n* лес

forever [fɔːˈrevə] *adv* навсегда

form [fɔːm] *n* форма; *v* создавать, формировать

former [ˈfɔːmə] а первый (из упомянутых, перечисленных)

formula (*pl* formulae) [ˈfɔːmjulə] *n* формула

forth [fɔːθ] *adv* вперед; *back and* ~ туда-сюда

fortunately [ˈfɔːtʃənətli] *adv* к счастью

found [faʊnd] *v* основывать

foundation [faʊnˈdeɪʃən] *n* основа, фундамент

four [fɔː] *num* четыре

fraction [ˈfrækʃən] *n* дробь; а ~ а дробный

frame [freɪm] *n* система, система координат

free [friː] *v* освобождать; а свободный *to be* ~ быть свободным

French [ˈfrentʃ] а французский

frequent [ˈfriːkwənt] а частый

Friday [ˈfraɪdi] *n* пятница

friend [frend] *n* приятель

from [frɒm] *prep* от, из

front [frʌnt] а передний; *in* ~ of перед

fruitful [ˈfruːtful] а 1. полезный; 2. плодотворный

fulfil [fulˈfɪl] *v* выполнять, осуществлять

full [fʊl] а полный; *adv* ~ у полностью

fun [fʌn] *н* развлечение; забава
 function ['fʌŋkʃən] *н* функция
 fundamental [ˌfʌndə'menti] *а* основ-
 ной

further ['fɑːðə] *а* более отдаленный
 furthermore ['fɑːðə'mɔː] *adv* далее
 future ['fjuːtʃə] *н* будущее

G

gain [geɪn] *υ* выигрывать, приобре-
 тать; *н* усилие
 game [geɪm] *н* игра, партия
 gas [gæs] *н* газ
 gather ['gæðə] *υ* собирать
 general ['dʒenərəl] *а* 1. общий;
 2. главный; *υ* ~ ize обобщать;
adv ~ ly вообще
 generate ['dʒenəreɪt] *υ* генерировать,
 порождать
 generation [ˌdʒenə'reɪʃən] *н* 1. ге-
 нерация, образование; 2. поколе-
 ние
 genius ['dʒiːnjəs] *н* гений
 geochemistry [dʒiə'kemɪstri] *н* гео-
 химия
 geology [dʒi'ɒlədʒi] *н* геология
 geometry [dʒi'ɒmɪtri] *н* геометрия
 German ['dʒɜːmən] *а* немецкий; *н* ~ у
 Германия
 get (got) [get], [gɒt] *υ* получать;
 достигать; ~ up вставать
 gift [ɡɪft] *н* подарок
 gifted ['ɡɪftɪd] *а* одаренный, способ-
 ный
 girl [ɡɜːl] *н* девушка, девочка
 give (gave, given) [ɡɪv] ([geɪv],
 [ɡɪvn]) *υ* давать; ~ rise to по-
 рождать
 (be) glad [glæd] радоваться

glass [glɑːs] *н* стекло
 go (went, gone) [ɡoʊ] ([went],
 [ɡɒn]) *υ* идти, уходить; to be
 going (to) намереваться, соби-
 раться
 good [ɡʊd] *а* хороший
 gradient ['ɡreɪdɪənt] *н* градиент
 graduate ['ɡrædʒueɪt] *υ* оканчивать
 вуз; *н* ['ɡrædʒuɪt] выпускник ву-
 за
 graduation [ˌɡrædʒu'eɪʃən] *н* окон-
 чание
 grain [ɡreɪn] *н* зерно
 grandmother ['ɡræn,mʌðə] *н* ба-
 бушка
 graph [ɡrɑːf] *н* график, *υ* состав-
 лять график
 gravitation [ˌɡrævɪ'teɪʃən] *н* тяготе-
 ние; *а* ~ al гравитационный
 gravity ['ɡrævɪti] *н* сила тяжести
 great [ɡreɪt] *а* великий, большой
 greatly [ɡreɪtli] *adv* очень
 Greece [ɡriːs] *н* Греция
 Greek [ɡriːk] *а* греческий
 green [ɡriːn] *а* зеленый
 group [ɡruːp] *н* группа; *υ* группиро-
 вать
 grow (grew, grown) [ɡrəʊ] ([ɡruː],
 [ɡrəʊn]) *υ* расти, становиться
 guess [ɡes] *υ* угадывать, предпола-
 гать; *н* догадка, приблизительная
 оценка

H

habit ['hæbɪt] *н* привычка
 habitually [hə'bɪtʃuəli] *adv* обычно
 half [haːf] *н* половина
 hand [hænd] *н* рука; *υ* вручать, пе-
 редавать
 handle ['hændl] *υ* управлять, обра-
 тываться; to ~ data обрабаты-
 вать данные
 happen ['hæpən] *υ* происходить, слу-
 чаться
 happy ['hæpi] *а* счастливый
 hard [hɑːd] *а* твердый, трудный; *adv*
 усиленно
 hardly ['hɑːdli] *adv* едва ли
 have (had) *υ* иметь
 head [hed] *н* 1. голова; 2. глава, на-
 чальник (напр. лаборатории)
 heads (эд.) орел (на монете)

hear (heard) [hiə], [hɜːd] *υ* слышать
 heavenly ['hevnli] *а* небесный
 heavy ['hevi] *а* тяжелый; *adv* ~ ly
 тяжело, очень сильно
 height [haɪt] *н* высота
 help [help] *н* помощь; *υ* помогать;
а ~ ful полезный
 hence [hens] *adv* следовательно
 here [hiə] *adv* здесь, вот
 heredity [hi'redɪti] *н* наследствен-
 ность
 high [haɪ] *а* высокий
 highly ['haɪli] *adv* чрезвычайно,
 очень
 hint [hɪnt] *н* подсказка; *υ* подсказы-
 вать
 history ['hɪstəri] *н* история
 hold [həʊld] (held) *υ* держать,

удерживать; *to* ~ true быть справедливым для
 home [həʊm] *n* дом; *adv* домой
 hope [həʊp] *n* надежда; *v* надеяться
 horizontal [ˌhɒrɪˈzɒntl] *a* горизонтальный
 hospital [ˈhɒspɪtl] *n* больница
 hostel [ˈhəʊstl] *n* общежитие
 hour [ˈaʊə] *n* час
 house [ˈhaʊs] *n* дом; *v* помещать
 how [haʊ] *adv* как, каким образом
 however [haʊˈevə] *adv* однако

I

idea [aɪˈdɪə] *n* мысль, идея
 identically [aɪˈdentɪkəli] *adv* аналогично
 identity [aɪˈdentɪti] *n* тождество
 i. e. (id est, that is) то есть
 if [ɪf] *conj* если (бы); if any, if at all если вообще
 ignorant [ˈɪɡnərənt] *a* 1. неосведомленный; 2. невежественный
 ignore [ɪɡˈnɔː] *v* игнорировать
 ill [ɪl] больной; to be ~ быть больным
 illustrate [ˈɪləstreɪt] *v* иллюстрировать; *n* ~ ion иллюстрация
 image [ˈɪmɪdʒ] *n* образ, отражение
 imagine [ɪˈmædʒɪn] *v* воображать, представлять себе
 imitate [ˈɪmɪteɪt] *v* 1. подражать; 2. имитировать
 immediate [ɪˈmɪdɪət] *a* непосредственный, прямой; *adv* ~ ly непосредственно, сразу же
 implicit [ɪmˈplɪsɪt] *a* неявный, подразумеваемый
 imply [ɪmˈplaɪ] *v* 1. заключать в себе, означать; 2. подразумевать
 importance [ɪmˈpɔːtəns] *n* значение, важность; be of ~ иметь значение; *a* important важный, значительный
 impose [ɪmˈpəʊz] *v* налагать, накладывать
 impossible [ɪmˈpɒsəbl] *a* невозможный
 impress [ɪmˈpres] *v* производить впечатление; *n* ~ ion впечатление
 improper [ɪmˈprɒpə] *a* неправильный; ~ fraction неправильная дробь
 improve [ɪmˈpruːv] *v* улучшать(ся); *a* ~ d измененный, улучшенный
 improvise [ˈɪmprəvaɪz] *v* импровизировать
 in [ɪn] *prep* в; *adv* внутрь, внутри
 inadequate [ɪnˈædɪkwɪt] *a* неподходящий

human [ˈhjuːmən] *a* человеческий
 humanities (pl) [hjuːˈmænɪtɪz] *n* гуманитарные науки
 hundred [ˈhʌndrɪd] *num* сто
 husband [ˈhʌzbənd] *n* муж
 hydraulics [haɪˈdrɒlɪks] *n* гидравлика
 hypotenuse [haɪˈpɒtɪnʊːz] *n* гипотенуза
 hypothesis (pl hypotheses) [haɪˈpɒθɪsɪs] гипотеза
 include [ɪnˈkluːd] *v* заключать в себе, включать
 inconsistent [ˌɪnkənˈsɪstənt] *a* непоследовательный, несовместимый
 incorrect [ˌɪnkəˈrekt] *a* ошибочный
 increase [ɪnˈkriːs] *v* увеличивать; *n* [ˈɪnkriːs] рост, увеличение
 indeed [ɪnˈdiːd] *adv* в самом деле
 indefinitely [ɪnˈdefɪnɪtli] *adv* неопределенно; *a* indefinite неопределенный
 independent [ˌɪndɪˈpendənt] *a* независимый; *adv* ~ ly независимо
 India [ˈɪndiə] Индия
 indicate [ˈɪndɪkeɪt] *v* указывать
 individual [ˌɪndɪˈvɪdʒuəl] *a* индивидуальный; *n* индивидуум
 induce [ɪnˈdjuːs] *v* побуждать, индуцировать
 induction [ɪnˈdʌkʃən] *n* индукция
 industrial [ɪnˈdʌstriəl] *a* промышленный
 inequality [ˌɪniːkwəlɪti] *n* неравенство
 infinite [ɪnˈfɪnɪt] *a* бесконечный; *n* infinity бесконечность; infinite-simal *a* бесконечно малая
 information [ˌɪnfəˈmeɪʃən] *n* информация
 ingredient [ɪnˈɡriːdɪənt] *n* составная часть
 ingenuity [ˌɪndʒɪˈnjuːɪti] *n* изобретательность
 inherent [ɪnˈhɪərənt] *a* присущий, неотъемлемый
 initial [ɪˈnɪʃəl] *a* начальный, исходный
 inner [ˈɪnə] *a* внутренний
 input [ˈɪnpʊt] ввод, вход, входной сигнал
 inscribe [ɪnˈskraɪb] *v* надписывать, вписывать
 insert [ɪnˈsɜːt] *v* вставлять
 inside [ɪnˈsaɪd] *adv* внутрь, внутри
 insist (on) [ɪnˈsɪst] *v* настаивать

instance ['instəns] пример; for ~
например
instead (of) [in'sted] *adv* вместо,
взамен
institute ['ɪnstɪtju:t] *n* организация,
институт; *v* устанавливать
instruction [in'strʌkʃən] *n* инструк-
ция
integer ['ɪntədʒə] *n* целое число
integral ['ɪntɪgrəl] *n* интеграл, це-
лое число
integration [ɪn'tɪ'greɪʃən] *n* интегри-
рование, интеграция
intellectual [ɪn'telɪktʃuəl] *n* мысля-
щий человек; *a* 1. интеллекту-
альный; 2. мыслительный
intelligent [ɪn'telɪdʒənt] *a* умный
intense [ɪn'tens] *a* интенсивный, силь-
ный; *n* ~ ity интенсивность
interest ['ɪntrɪst] *n* интерес; *a* ~ ed
заинтересованный; *a* ~ ing ин-
тересный
interior [ɪn'tɪəriə] *n* внутренняя
часть
internally [ɪn'tə:nəli] *adv* внутренне
interpose [ɪntə'pəʊz] *v* вставлять,
вводить
interpret [ɪn'tə:prɪt] *v* интерпретиро-
вать; *n* ~ ation интерпретация

interrogative [ɪntə'rɒɡetɪv] *a* вопро-
сительный
intersect [ɪntə'sekt] *v* пересекать(ся)
interval ['ɪntəvəl] *n* интервал, отре-
зок, промежуток
into ['ɪntu] *prep* внутрь
intriguing [ɪn'trɪ:ɡɪŋ] *a* заниматель-
ный, интригуемый
introduce [ɪn'trə'dju:s] *v* вводить,
представлять
intuitive [ɪn'tju:ɪtɪv] *a* интуитивный
invariable [ɪn'veəriəbəl] *a* постоянный
invent [ɪn'vent] *v* изобретать
inverse [ɪn've:s] *a* обратный; *adv*
~ ly наоборот, обратно
investigate [ɪn'vestɪgeɪt] *v* исследо-
вать
involve [ɪn'vɒlv] *v* 1. влечь за собой,
вызывать; 2. возводить в сте-
пень
irrational [ɪ'ræʃənəl] *a* иррациональное
число
isosceles [aɪ'sɒsɪlɪz] *n* равнобедрен-
ный треугольник
it [ɪt] *pron* оно, это
italics ['ɪtəlɪks] *n pl* курсив(ный
шрифт)
item ['aɪtəm] *n* 1. пункт, вопрос;
2. статья
itself [ɪt'self] *prep* сам, само, сама,
себя

J

January ['dʒænjuəri] *n* январь
job [dʒɒb] *n* работа
Join [dʒɔɪn] *v* соединять(ся), при-
соединять(ся); *n* объединение
Journal ['dʒɔ:nl] *n* журнал (тол-
стый)
July [dʒu:'laɪ] *n* июль

Junction ['dʒʌŋkʃən] *n* соединение;
point of ~ точка соединения
June [dʒu:n] *n* июнь
Jupiter ['dʒʊpɪtə] *n* Юпитер
just [dʒʌst] *a* справедливый, вер-
ный; *adv* как раз, только что

K

keep (kept) [ki:p], [kept] *v* хранить,
держат(ся)
kind [kaɪnd] *n* тип, вид, разряд
king [kɪŋ] *n* король

know (knew, known) [nou] ([nɜ:]),
[noun]) *v* знать
knowledge ['nɒlɪdʒ] *n* знание

L

label ['leɪbl] *n* этикетка, надпись; *v*
надписывать
labor (англ. labour) ['leɪbə] *n* труд;
~ saving для экономии труда
laboratory (сокр. lab) [lə'bɒrətəri] *n*
лаборатория
lack [læk] *n* нехватка, недостаток,
отсутствие

lamp [læmp] *n* лампа
land [lænd] *n* земля
language ['læŋgwɪdʒ] *n* язык
large [la:dʒ] *a* большой
largely ['la:dʒli] *adv* главным обра-
зом, в основном

last [la:st] *a* последний, прошлый;
υ длиться
 late [leit] *a* поздний; *υ* to be ~
 опаздывать
 latter ['lætə] *a* последний (*из* *упо-*
мянутых)
 laugh [lɑ:] *n* смех; *υ* смеяться
 law [lɔ:] *n* закон
 lazy ['leɪzi] *a* ленивый
 lead (led) [li:d], [led] *υ* вести, ру-
 ководить
 learn (learnt) [lɜ:n] *υ* узнавать, вы-
 учивать
 least [li:st] *a* наименьший; at ~ по
 крайней мере
 leave (left) [li:v] [left] *υ* уходить,
 оставлять
 lecture ['lektʃə] *n* лекция; *υ* читать
 лекции
 left [left] *a* левый; *adv* налево
 leg [leg] *n* 1. сторона, катет; 2. нож-
 ка циркуля
 legend ['ledʒənd] *n* легенда
 length [lenθ] *n* длина
 less [les] *a* меньший; *υ* ~ *en* умень-
 шать
 lesson ['lesn] *n* урок, занятие
 let (let) [let] *υ* позволять, допус-
 кать
 letter ['letə] *n* 1. буква, символ;
 2. письмо
 library ['laɪbrəri] *n* библиотека
 lie (lay, lain) [lai] ([lei], [lein]) *υ*
 лежать, находиться
 life [laɪf] *n* жизнь
 light [laɪt] *a* легкий, слабый; *n* свет

like [laɪk] *υ* любить, нравиться
 like *a* похожий, подобный; *adv* по-
 добно
 likely ['laɪkli] *adv* вероятно
 likewise ['laɪkwaɪz] *adv* аналогично,
 также
 limit ['lɪmɪt] *n* предел; *υ* ограничи-
 вать; *a* ~ *ed* ограниченный
 line [laɪn] *n* линия, прямая строчка
 linear ['liːniə] *a* линейный
 link [lɪŋk] *n* звено; *υ* соединять
 list [lɪst] *n* список; *υ* перечислять
 listen ['lɪsn] *υ* слушать
 little (less, the least) [lɪtl] *a* малый,
 небольшой; *adv* мало
 live [lɪv] *υ* жить
 locate [lou'keɪt] *υ* определять место-
 нахождение; *n* ~ *ion* определе-
 ние места, место
 locus (*pl* loci) ['loukəs], ['ləusai] *n*
 геометрическое место точки
 logarithm ['lɒɡərɪðəm] *n* логарифм
 (сокр. log)
 logical ['lɒdʒɪkəl] *a* логический
 long [lɒŋ] *a* длинный; *adv* давно
 look [lʊk] *υ* смотреть; *n* взгляд; to
 ~ *for* искать
 lose ['lu:z] (lost) *υ* терять, проиг-
 рывать; *n* loss потеря
 lot [lɒt] *n* доля, масса; *a* ~ *of* мно-
 го
 love [lʌv] *n* любовь; *υ* любить
 low [ləu] *adv* низко; *υ* ~ *er* опу-
 скать
 lucky ['lʌki] *a* удачливый

М

machine [mə'ʃi:n] *n* машина
 magazine [ˌmæɡə'zi:n] *n* журнал
 magnetism ['mæɡnɪtɪzəm] *n* магне-
 тизм; притяжение
 magnitude ['mæɡnɪtju:d] *n* величина
 male [meɪl] *n* мужчина
 main [meɪn] *a* главный
 maintain [meɪn'teɪn] *υ* сохранять,
 поддерживать
 major ['meɪdʒə] *a* главный, боль-
 шой
 make (made) [meɪk], [meɪd] *υ*
 1. делать; 2. заставлять; ~ *up*
 составлять
 man (*pl* men) [mæn], [men] 1. че-
 ловек; 2. мужчина
 manifold ['mænɪfəʊld] *n* многообра-
 зие, множество
 manage ['mænɪdʒ] *υ* 1. управлять,
 руководить; 2. справляться

manipulate [mə'nɪpjuleɪt] *υ* манипу-
 лировать, управлять
 manner ['mænə] *n* способ, манера
 many (more, the most) ['meni]
 ([mɔ:], ['moust]) *a* многие;
adv много
 map [mæp] *n* карта, отображение
 March [mɑ:tʃ] *n* март
 mark [mɑ:k] *n* отметка, знак; *υ* от-
 мечать
 marry ['mæri] *υ* жениться, выходить
 замуж
 mass [mæs] *n* масса
 match-box ['mætʃ/bɒks] *n* спичечная
 коробка
 material [mə'tɪəriəl] *n* материал; *a*
 материальный
 mathematical [ˌmæθɪ'mætɪkəl] *a* ма-
 тематический
 mathematician [ˌmæθɪmə'tɪfən] *n* ма-
 тематик

mathematics [ˌmæθi'mætiks] *n* математика
matter ['mætə] *n* 1. материя, сущность; 2. дело
maximize ['mæksimaiz] *v* увеличить до максимума
maximum (*pl* maxima) ['mæksiməm], ['mæksimə] *n* максимум
may (might) [mei], [maɪ] *v* могу, может, иметь возможность
May [mei] *n* май
mean (meant) [mi:n], [ment] *v* означать, иметь в виду; *n* ~ing значение; *a* meaningless бессмысленный
mean [mi:n] *n* среднее значение
means (*pl*) [mi:nz] *n* средство; *by means of* посредством
measure ['meʒə] *n* мера; *v* измерять
mechanics [mi'kæniks] *n* механика
medical ['medikəl] *a* медицинский
medicine ['medsin] *n* медицина
meet (met) [mi:t], [met] *v* встречать(ся), пересекать(ся)
member ['membə] *n* член, элемент; *n* ~ ship членство
memorize ['meməraɪz] *v* запоминать
memory ['meməri] *n* память
mental ['mentl] *a* мысленный, умственный; *adv* ~ ly мысленно
mention ['menʃən] *v* упоминать
mere ['miə] *a* сущий, явный; *adv* ~ ly просто, только
merit ['merit] *n* достоинство, заслуга
method ['meθəd] *n* способ, метод
middle [midl] *n* середина
million ['miljən] *num* миллион, 10⁶
mind [maɪnd] *n* 1. ум, рассудок; 2. память; *v* 1. возражать; 2. помнить
minimize ['minimaɪz] *v* доводить до минимума
minimum (*pl* minima) ['miniməm], ['minimə] *n* минимум
minuend ['miniʊənd] *a* уменьшаемое
minus ['mainəs] *n* минус
minute ['minit] *n* минута (времени, угла)

misnomer [mis'noʊmə] *n* неправильное название
miss [mis] *v* 1. пропускать; 2. скучать; *a* ~ ing недостающий
mistake [mis'teɪk] *n* ошибка
misunderstanding ['misʌndə'stændɪŋ] *n* недоразумение
mixed [mɪksɪd] *a* смешанный; *n* ~ ture смесь
model ['mɒdl] *n* модель; *v* моделировать
modern ['mɔ:dən] *a* современный
modification [ˌmɒdifi'keɪʃən] *n* преобразование
molecule ['mɒlikju:l] *n* молекула
moment ['moʊmənt] *n* момент
momentum (*pl* momenta) ['moʊməntəm] *n* количество движения
monastery ['mɒnəstəri] *n* монастырь
Monday ['mʌndi] *n* понедельник
monomial [mɒ'noʊmiəl] *n* одночлен
monotonous [mə'nɒtənəs] *n* однообразный
month [mʌnθ] *n* месяц
moon [mu:n] *n* луна
more [mɔ:] *adv* больше
moreover [mɔ:'ru:və] *adv* более того
morning ['mɔ:nɪŋ] *n* утро; *in the* ~ утром
most [moʊst] *a* наибольший; *adv* больше всего; *n* большинство
mother ['mʌðə] *n* мать
motion ['moʊʃən] *n* движение
move [mu:v] *v* двигать(ся)
much (more, the most) [mʌtʃ] ([mɔ:], [moʊst]) *a* много; *adv* очень
multiplicand [ˌmʌltipli'kænd] *n* множимое
multiplication [ˌmʌltipli'keɪʃən] *n* умножение; *multiply* ['mʌltiplai] *v* умножать
music ['mju:zɪk] *n* музыка
must [mʌst] *v* должен
mutual ['mju:tʃuəl] *a* взаимный; *adv* ~ ly взаимно
mysterious [mis'tɪəriəs] *a* таинственный

N

name [neɪm] *n* имя, название; *v* называть
namely ['neɪmli] *adv* именно
nation ['neɪʃən] *n* народ, нация
nationality [ˌnæʃə'nælɪti] *n* национальность
natural ['nætʃrəl] *a* естественный
near [niə] *adv* подле, близко
nearly ['niəli] *adv* почти

necessar[y] ['nesɪsəri] *a* необходимый; *adv* ~ ily обязательно; *n* ~ ity необходимость
necessitate [nə'sesiteɪt] *v* вызывать, делать необходимым
need [ni:d] *n* нужда, потребность; *v* нуждаться
negative ['negətɪv] *a* отрицательный

neighbourhood ['neibəhʊd] *n* соседство, близость
 negligible ['neglɪdʒɪbl] *a* пренебрежимо малая величина
 never ['nevə] *adv* никогда
 neither ['naiðə] *pron* никто; neither ... nor ни ... ни
 nevertheless ['nevəðə'les] *adv* тем не менее
 new [nju:] *a* новый
 news [nju:z] *n* известия, новости
 newspaper ['nju:s,peɪpə] *n* газета
 next [nekst] *a* 1. соседний; 2. следующий, будущий
 nice [naɪs] *a* хороший, приятный
 night [naɪt] *n* ночь; to ~ сегодня вечером
 nine [naɪn] *num* девять
 no [nəʊ] *pron* никакой
 none [nʌn] *pron* никто, ничто; ~ of никто из
 nonsense ['nɒnsəns] *n* вздор, чепуха
 normal ['nɔ:məl] *a* нормальный; *adv* ~ ly обычно; *n* перпендикуляр
 north [nɔ:θ] *n* север

notation [nou'teɪfən] *n* система обозначений
 note [nəʊt] *n* записка, записка; *v* делать заметки
 nothing ['nʌθɪŋ] *pron* ничто
 notice ['nəʊtɪs] *n* заметка; *v* замечать
 notion ['nəʊʃən] *n* понятие, идея
 November [nə'vembə] *n* ноябрь
 now [naʊ] *adv* теперь, сейчас
 nowadays ['naʊədeɪz] *adv* в наше время
 nuclear ['nju:kliə] *a* ядерный; *n* nucleus (*pl* nuclei) ядро
 null [nʌl] *a* несуществующий, пустой
 number ['nʌmbə] *n* число, количество, номер; *v* перечислять; *a* ~ of целый ряд
 numerable ['nju:mərəbl] *a* исчисляемый, счетный
 numeral ['nju:mərəl] *n* цифра, символ числа
 numeration [nju:'meɪfən] *n* счет, счисление
 numerator ['nju:məreɪtə] *n* числитель
 numerical [nju:'merɪkəl] *a* числовой, численный, цифровой

O

obey [ə'bei] *v* подчиняться
 object ['ɒbdʒɪkt] *n* объект, цель, предмет
 object ['ɒb'dʒekt] *v* возражать
 obscure ['əb'skjuə] *a* неясный, смутный, непонятный
 observ[e] ['əb'zə:v] *v* соблюдать, наблюдать; *n* ~ ation наблюдение, наблюдательность
 obtain [əb'teɪn] *v* получать
 obtuse [əb'tju:s] *a* тупой (угол)
 obvious ['ɒbvɪəs] *a* очевидный; *adv* ~ ly очевидно
 occasion [ə'keɪʒən] *n* случай
 occupy ['ɒkjupaɪ] *v* 1. завладеть, оккупировать; 2. занимать (помещение, время)
 occur [ə'kɜ:] *v* случаться, иметь место; *n* ~ ence событие, случай
 o'clock [ə'klɒk] *n* время на часах
 octagon ['ɒktəɡən] *n* восьмиугольник
 October [ɒk'təʊbə] *n* октябрь
 odd [ɒd] *a* нечетный
 odds [ɒdz] *n* разница, преимущество, шансы
 of [ɒv] *prep* указывает на принадлежность
 of course [əf'kɜ:s] конечно

off [ɔ:f] *adv* указывает на удаление, отдаление
 often [ɔ:fən] *adv* часто
 old [əʊld] *a* старый
 omit [əu'mɪt] *v* 1. упускать; 2. опускать
 on [ɒn] *prep* на; and so on и т. д.
 once [wʌns] *adv* однажды, коль скоро, раз; ~ more еще раз
 one [wʌn] *n* единица; *a* единственный; one-one взаимно-однозначный
 only ['əʊnli] *adv* только; the ~ единственный
 onto ['ɒntu] *prep* на
 open ['əʊpən] *v* открывать; *a* открытый
 operation [ɔ,pə'reɪʃən] *n* действие, операция
 opinion [ə'pɪnjən] *n* мнение
 opposite ['ɒpəzɪt] *a* противоположный
 optimism [ɒptɪmɪzəm] *n* оптимизм
 or [ɔ:] *conj* или; or else или же
 orbit [ɔ:'bɪt] *n* орбита; *a* ~ al орбитальный
 order ['ɔ:də] *n* порядок; *a* ~ ed упорядоченный; in ~ to чтобы
 ordinal [ɔ:'dɪnəl] *a* порядковый

organize ['ɔ:gənaɪz] *υ* организовать
 origin ['ɔrɪdʒɪn] *п* источник, начало;
а ~ al первоначальный; *υ* ~ ate
 брать начало
 oscillate ['ɔsɪleɪt] *υ* колебаться
 other ['ʌðə] *а* другой, иной; *pron*
 другой
 otherwise ['ʌðəwaɪz] *adv* в против-
 ном случае
 ought [ɔ:t] *υ* должен, следует
 outline ['aʊtlaɪn] *п* 1. очертание; 2.
 набросок; *υ* обрисовать
 outset ['aʊtset] *п* начало

Р

page [peɪdʒ] *п* страница
 pair [peə] *п* пара
 pan [pæn] *п* чаша весов
 paper ['peɪpə] *п* 1. газета; 2. бумага;
 3. статья, научный доклад
 paradox ['pærədɒks] *п* парадокс;
а ~ ical парадоксальный
 paragraph ['pærəgrɑ:f] *п* абзац
 parallel ['pærəlel] *а* параллельный
 parallelogram ['pærə'leləgrəm] парал-
 лелограмм
 parent ['peərənt] *п* родитель
 parenthesis (*pl* parentheses) [pə'renθi-
 sis], [pə'renθɪsi:z] *п* круглая
 скобка
 park [pɑ:k] *п* парк
 part [pɑ:t] *п* часть
 partially ['pɑ:fəli] *adv* частично
 particle ['pɑ:tɪkl] *п* частица
 particular [pə'tɪkjələ] *а* конкретный;
adv ~ ly особенно
 party ['pɑ:ti] *п* партия, отряд
 pass [pɑ:s] *υ* проходить; ~ *а* test
 сдать зачет
 passive ['pæsɪv] *а* пассивный
 past [pɑ:st] *prep* после; *а* прошлый
 path [pɑ:θ] *п* путь, траектория
 pattern ['pætən] *п* схема, модель, об-
 разец
 pay [peɪ] *υ* платить; to ~ attention
 обращать внимание
 peace [pi:s] *п* мир
 pen [pen] *п* ручка
 penalty ['penlti] *п* штраф
 pencil ['pensɪl] *п* карандаш
 pendulum ['pendjələm] *п* маятник
 people ['pi:pl] *п* люди
 per [pə:] *prep* в, на, за; per hour *в*
 час
 percent [pə'sent] *п* процент
 perception [pə'sepʃən] *п* восприятие,
 ощущение

our [aʊə] *pron* наш; ~ selves сами
 out [aʊt] *а* внешний; ~ er внешний
 outside [aʊt'saɪd] *а* внешний; *adv*
 снаружи
 outstanding [aʊt'stændɪŋ] *а* выдаю-
 щийся
 over ['oʊvə] *prep* над, выше; *adv* че-
 рез; to be ~ оканчиваться
 overcome ['oʊvə'kʌm] *υ* преодолеть
 overestimate ['oʊvə'estimeɪt] *υ* пере-
 оценивать
 owing (to) ['oʊɪŋ] *prep* вследствие
 own [aʊn] *а* собственный; on one's
 own самостоятельно

perfect ['pə:fɪkt] *а* совершенный
 perform [pə'fɔ:m] *υ* осуществлять,
 исполнять; *п* ~ ance действие,
 работа
 perhaps [pə'hæps] *adv* возможно
 perimeter [pə'rɪmɪtə] *п* периметр
 period ['piəriəd] *п* период; *а* ~ ic
 (al) периодический
 permit [pə'mɪt] *υ* разрешать, позво-
 лять
 permutation [pə'mju'teɪʃən] *п* под-
 становка
 perpendicular [pə:pən'dɪkjulə] *а* пер-
 пендикулярный
 person [pə:sn] *п* личность
 phenomenon (*pl* phenomena) [fɪ'nɒ-
 mɪnən] *п* явление
 philosopher [fɪ'lɒsəfə] *п* философ;
 ~ у философия
 photoelectric [fəʊtə'lektrɪk] *а* фото-
 электрический
 physics ['fɪzɪks] *п* физика; *п* ~ ist
 физик
 piano ['piænəʊ] *п* фортепиано
 picture ['pɪktʃə] *п* картинка, изобра-
 жение
 piece [pi:s] *п* кусок, отрезок
 pity ['pɪti] *п* жалость; *υ* жалеть
 place [pleɪs] *п* место; *υ* помещать;
п ~ ment размещение
 plan [plæn] *п* план; *υ* планировать
 plane [pleɪn] *п* 1. плоскость; 2. само-
 лет
 planet ['plænit] *п* планета; *а* ~ ary
 планетарный
 plant [plɑ:nt] *п* 1. завод; 2. растение
 plausible ['plɔ:zəbl] *а* вероятный,
 правдоподобный
 play [pleɪ] *п* игра; *υ* играть; *п* ~ er
 игрок
 please [pli:z] *υ* доставлять удоволь-
 ствие, угождать
 plot [plɒt] *п* график, набросок; *υ*
 чертить, наносить

plus [plʌs] *н* плюс
 point [pɔɪnt] *н* точка; to ~ to указывать; to ~ out отмечать; ~ of view точка зрения
 political [pə'litikəl] *а* политический
 polygon [ˈpɒlɪɡən] *н* многоугольник, полигон
 polynomial [ˌpɒlɪˈnɒmɪəl] *н* многочлен
 popular [ˈpɒpjələ] *а* популярный; *adv* ~ ly обычно
 portion [ˈpɔːʃən] *н* часть, доля
 position [pə'zɪʃən] *н* положение
 positive [ˈpɒzɪtɪv] *а* положительный
 possess [pə'zes] *υ* обладать
 possible [ˈpɒsɪbl] *а* возможный; *н* possibility возможность
 postgraduate [ˈpəʊst'ɡrædʒuɪt] *н* аспирант
 post-office [ˈpəʊst,ɒfɪs] *н* почтовое отделение
 postulate [ˈpɒstjuleɪt] *н* постулат; [ˈpɒstjuleɪt] *υ* постулировать
 potential [pə'tenʃəl] *н* потенциал, силовая функция
 power [ˈpaʊə] *н* 1. сила; 2. показатель степени; raise to *а* ~ возводить в степень; to the fourth ~ в четвертой степени
 power-station [ˈpaʊə,steɪʃən] *н* электростанция
 practical [ˈpræktɪkəl] *а* целесообразный
 practise [ˈpræktɪs] *υ* упражнять, применять
 precede [pri:'si:d] *υ* предшествовать
 precise [pri:'saɪs] *а* точный
 precision [pri:'sɪʒən] *н* точность
 predecessor [ˈpriːdisəsə] *н* предшественник
 predicate [ˈpredɪkɪt] *н* предикат
 prediction [pri'dɪkʃən] *н* предсказание
 prefer [pri'fə:] *υ* предпочитать
 prepare [pri'pə:] *υ* готовить; *н* ~ ation подготовка; *а* ~ atory подготовительный
 present [pri'zent] *υ* предъявлять, давать; [ˈpreznt] *н* подарок; *а* данный, настоящий
 preserve [pri'zə:v] *υ* сохранять
 president [ˈprezɪdnt] *н* президент, председатель
 pressure [ˈpreʃə] *н* давление
 prevent (from) [pri'vent] *υ* предотвращать

previous [ˈpri:vjəs] *а* предыдущий
 prime [praɪm] *а* первичный, простой
 principal [ˈprɪnsəpəl] *а* главный
 principle [ˈprɪnsəpl] *н* принцип
 print [prɪnt] *υ* печатать; *н* печать; reprint оттиск
 probability [ˌprɒbə'bɪlɪti] *н* вероятность
 probably [ˈprɒbəbli] *adv* вероятно
 problem [ˈprɒbləm] *н* задача, проблема
 procedure [prə'si:dʒə] *н* процедура
 proceed [prə'si:d] *υ* продолжать
 process [ˈprəʊses] *н* процесс; *υ* обрабатывать; *н* ~ ing обработка
 produce [prə'dju:s] *υ* производить
 product [ˈprɒdʌkt] *н* произведение; *н* ~ ion производство
 program (англ.), programme (амер.) [ˈprəʊɡræm] *н* программа ~ мер программист
 progress [ˈprəʊɡres] *н* прогресс; [prə'gres] *υ* развиваться, прогрессировать
 progression [prə'ɡresən] *н* прогрессия
 pronounce [prə'naʊns] *υ* произносить
 pronunciation [prə'nʌnsi'eɪʃən] произношение
 proof [pru:f] *н* доказательство
 proper [ˈprɒpə] *а* 1. собственный; 2. истинный, правильный; *adv* ~ ly должным образом; ~ fraction правильная дробь
 property [ˈprɒpəti] *н* свойство
 proportional [prə'pɔːʃənəl] *а* пропорциональный; *н* ~ ity пропорциональность
 proposition [ˌprɒpə'zɪʃən] *н* 1. предположение, суждение; 2. теорема
 proud [praʊd] *а* гордый
 prove [pru:v] *υ* доказывать
 provide [prə'vaɪd] *υ* предоставлять, давать
 provided [prə'vaɪdɪd] *conj* при условии, если
 pseudospherical [ˌpsjuːdou'sferɪkəl] *а* псевдосферический
 publication [ˌpʌbli'keɪʃn] *н* публикация
 publish [ˈpʌblɪʃ] *υ* издавать
 pull [pʊl] *н* тяготение; *υ* тянуть
 pulsar [ˈpʌlsə] *н* пульсар
 pupil [ˈpiːpl] *н* ученик
 purpose [ˈpɜːpəs] *н* цель; *а* ~ less бессмысленный
 put (put) [pʊt] *υ* класть, положить
 pyramid [ˈpɪrəmid] *н* пирамида

quadratic [kwə'drætɪk] *a* квадратичный
 quadrilateral [ˌkwɒdrɪ'lætərəl] *n* четырехугольник
 quantity [ˈkwɒntəti] *n* количество

quantum ['kwɒntəm] *n* (*pl* quanta)
 1. количество, сумма; 2. квант
 quasar ['kweɪsə] *n* квазар
 question ['kwɛstʃən] *n* вопрос
 quite [kwaɪt] *adv* вполне, совсем
 quotient ['kwɒʃənt] *n* частное

radical ['rædɪkəl] *n* корень
 radicand ['rædɪkənd] *n* подкоренное выражение
 radius (*pl* radii) ['reɪdɪəs], ['reɪdiəl] *n* радиус; *a* radial радиальный
 raise [reɪz] *v* возводить в степень, повышать
 random ['rændəm] *a* беспорядочный
 range [reɪndʒ] *n* 1. диапазон; 2. область; *v* простираться
 rapidly ['ræpɪdli] *adv* быстро
 rate [reɪt] *n* 1. степень, скорость; 2. коэффициент
 rather ['rɑːðə] *adv* вернее, до некоторой степени; ~ than *a* не; скорее, чем
 ratio ['reɪʃiə] *n* соотношение
 rational ['ræʃənəl] *a* 1. рациональный; 2. целесообразный
 ray [reɪ] *n* луч, полупрямая
 reach [riːtʃ] *v* достигать
 reaction [riː'ækʃən] *n* реакция
 read (read) [riːd], [red] *v* читать
 readily ['redɪli] *adv* легко
 ready ['redi] *a* готовый; to be ~ быть готовым
 real ['riəl] *a* реальный, действительный; *adv* ~ ly в самом деле; *v* ~ ize 1. осуществлять; 2. понимать; *n* ~ ization осуществление
 reason ['riːzn] *n* 1. причина; 2. разум; *n* ~ ing рассуждение; *adv* ~ able разумный, приемлемый
 recent ['riːsnt] *a* недавний, современный
 recently ['riːsəntli] *adv* недавно
 recognize ['rekəɡnaɪz] *v* 1. признавать; 2. узнавать
 recommend [rekə'mend] *v* рекомендовать, советовать
 reconcile ['rekənsaɪl] *v* примирять(ся)
 record ['rekɔːd] *n* запись, регистрация; *v* [riˈkɔːd] записывать
 rectangle ['rek,tæŋɡl] *n* прямоугольник
 rectify ['rektɪfaɪ] *v* выпрямлять, straighten

red [red] *a* красный
 reduce [riˈdjuːs] *v* 1. уменьшать; 2. сокращать (до)
 refer (to) [riˈfəː] *v* 1. ссылаться (на); 2. иметь отношение; *n* ~ ence ссылка, упоминание; to be referred to *as* называться
 reflect [riˈflekt] *v* отражать
 regard [riˈɡɑːd] *v* рассматривать; regardless *of* независимо от; with regard *to* относительно
 region ['riːdʒən] *n* область, сфера
 regular ['regjʊlə] *a* 1. правильный; 2. регулярный
 relate [riˈleɪt] *v* относить(ся)
 relation [riˈleɪʃən] *n* отношение; *n* ~ ship соотношение
 relative ['relatɪv] *a* 1. относительный; 2. взаимный; *adv* ~ ly относительно
 reliable [riˈlaɪəbl] *a* надежный, достоверный
 rely (on, upon) [riˈlai] *v* полагаться на
 remain [riˈmeɪn] *v* оставаться; *n* ~ der остаток
 remarkable [riˈmɑːkəbl] *a* замечательный, выдающийся
 remember [riˈmembə] *v* помнить
 remove [riˈmuːv] *v* удалять; to ~ parentheses раскрывать скобки
 repeat [riˈpiːt] *v* повторять; repeating decimal периодическая десятичная дробь
 replace [riˈpleɪs] *v* заменять, заменять; *n* ~ ment замещение
 represent [ˌreprɪˈzent] *v* представлять
 reproduce [ˌriːprəˈdjuːs] *v* воспроизводить
 request [riˈkwest] *n* просьба
 require [riˈkwaɪə] *v* требовать(ся), нуждаться; *a* ~ d искомый
 research [riˈsɜːtʃ] *n* исследование, изучение
 resolve [riˈzɒlv] *v* разлагать
 respect [riˈspekt] *n* отношение, касательство; with ~ to относительно; *adv* ~ ively соответственно

rest [rest] *n* 1. покой, отдых; 2. the ~ остаток; at ~ в состоянии покоя; *v* отдыхать
 restrict [ris'trikt] *v* ограничивать; *a* ~ed ограниченный
 result [ri'zʌlt] *n* результат; *v* прорисовать; *to* ~ in приводить к; *a* ~ing результирующий; as a result of в результате
 return [ri'tʌ:n] *v* возвращать(ся), двигаться обратно
 reverse [ri'vɜ:s] *a* обратный
 review [ri'vju:] *n* обзор, рецензия
 revolution [ˌrevə'lu:ʃən] *n* 1. вращение; 2. революция
 reward [ri'wɔ:d] *n* награда; *v* награждать
 rhombus ['rɒmbəs] *n* ромб
 right [raɪt] *a* 1. правильный, правый; 2. прямой
 rigorous ['rɪgərəs] *a* строгий, точный
 ring [rɪŋ] *n* кольцо

S

saddle ['sædl] *n* седло
 saddleshaped ['sædlʃeɪpt] *a* седлообразный
 same [seɪm] *a* тот же самый
 sample ['sɑ:pl] *n* выборка, образец
 sand [sænd] *n* песок
 satisfy ['sætɪsfaɪ] *v* удовлетворять
 Saturday ['sætədi] *n* суббота
 save [seɪv] *v* спасать, оберегать
 say (said) [seɪ] *v* сказать
 scalar ['skeɪlə] *n* скалярная величина
 scatter ['skætə] *v* рассеивать
 school [sku:l] *n* школа
 science ['saɪəns] *n* наука
 scientific [,saɪən'tɪfɪk] *a* научный
 scientist ['saɪəntɪst] *n* ученый
 scream [skri:m] *v* кричать; ~ for (эд.) проситься
 scrupulous ['skru:pjələs] *a* тщательный
 search [sɜ:tʃ] *n* поиски; *v* 1. искать; 2. исследовать
 second ['sekənd] *n* секунда; *a* второй
 section ['sekʃən] *n* 1. сечение, разрез; 2. раздел
 security [si'kjʊərɪti] *n* 1. безопасность; 2. уверенность
 see (saw, seen) [si:] ([sɔ:], [si:n]) *v* видеть
 seem [si:m] *v* казаться
 segment ['segmənt] *n* отрезок линии
 seldom ['seldəm] *adv* редко
 select [si'lekt] *v* выбирать
 self [self] *n* сам

rise (rose, risen) [raɪz] ([rouz], [ri:zn]) *v* подниматься; *n* подъем; to give ~ to вызывать, порождать
 river ['rɪvə] *n* река
 roll [roul] *n* вращение; *v* вращать(ся), вертеть(ся)
 room [ru:m] *n* 1. комната; 2. место, пространство
 room-mate ['rummeɪt] *n* сосед по комнате
 root [ru:t] *n* корень
 rope [roup] *n* веревка
 rotation [rou'teɪʃən] *n* вращение
 round [raʊnd] *a* круглый
 rule [ru:l] *n* правило
 ruler ['ru:lə] *n* линейка
 run (ran, run) [rʌn], [gʌn] *v* 1. пробегать; 2. длиться; *n* бег, ход, течение, интервал измерения; 3. приводить в движение

semicircle ['semi,sə:kl] *n* полукруг
 seminar ['seminɑ:] *n* семинар
 send (sent) [send], [sent] *v* посылать
 sense [sens] *n* 1. смысл, значение; 2. направление; 3. ощущение
 sensible ['sensəbl] *a* разумный
 sentence ['sentəns] *n* предложение, выражение
 separate ['sepəreɪt] *v* отделять; *a* ['sepɪt] отдельный
 September [sep'tembə] *n* сентябрь
 sequence ['si:kwəns] *n* последовательность
 series (pl series) ['siəri:z] *n* ряд
 serve [sɜ:v] *v* служить
 service ['sɜ:vɪs] *n* 1. служба; 2. услуга
 set [set] *n* множество, набор; *v* ставить, учреждать
 settle ['setl] *v* 1. урегулировать; 2. договориться, решить
 seven ['sevn] *num* семь
 several ['sevrəl] *a* несколько
 shade [ʃeɪd] *n* 1. тень; 2. оттенок; *v* заслонять
 shape [ʃeɪp] *n* форма
 share [ʃeə] *n* доля; *v* 1. делить; 2. владеть совместно
 sharp [ʃɑ:p] *a* острый
 she [ʃi:] *pron* она
 sheet [ʃi:t] *n* лист
 short [ʃɔ:t] *a* короткий
 should [ʃud] *v* должен, следует
 show (p. p. shown) [ʃou], [ʃoun] *v* показывать

shower ['ʃaʊə] *п* душ
 side [saɪd] *п* сторона
 sign [saɪn] *п* знак, символ
 significance [sɪɡ'nɪfɪkəns] *п* значение
 significant [sɪɡ'nɪfɪkənt] *а* значительный
 signify ['sɪgnɪfaɪ] *υ* обозначать
 silently ['saɪləntli] *adv* молча, про себя
 similar ['sɪmɪlə] *а* подобный; *adv* ~ly подобно
 simple ['sɪmpl] *а* простой
 simplicity [sɪm'plɪsɪti] *п* простота
 since [sɪns] *adv* с тех пор как
 since *conj* так как, поскольку
 single ['sɪŋɡl] *а* единственный, один
 sister ['sɪstə] *п* сестра
 sit [sɪt] [sɪt], [sæt] *υ* сидеть
 site [saɪt] *п* место, участок, площадка
 situation [ˌsɪtʃu'eɪʃən] *п* положение
 six [sɪks] *num* шесть
 size [saɪz] *п* размер
 sketch [sketʃ] *п* набросок, эскиз
 skip [skɪp] *υ* пропускать
 sky [skaɪ] *п* небо
 slight [slaɪt] *а* незначительный, слабый; *adv* ~ly слегка
 slip [slɪp] *п* обрывок
 slope [sləʊp] *п* наклон
 slow [sləʊ] *а* медленный
 small [smɔ:l] *а* маленький; *п* малая величина
 smooth [smu:θ] *а* гладкий
 snowball ['snəʊbɔ:l] *п* снежный ком
 so [səʊ] *adv* так, таким образом; *so that* так, чтобы
 social ['səʊʃəl] *а* 1. общественный, социальный; 2. социалистический
 society [sə'saɪəti] *п* общество
 solar ['səʊlə] *а* солнечный
 solid ['sɒlɪd] *п* твердое тело; *а* 1. твердый; 2. пространственный
 solution [sə'lju:ʃən] *п* решение
 solve [sɒlv] *υ* решать, разрешать
 some [sʌm] *pron* 1. некоторый, какой-нибудь; 2. несколько; ~body кто-то; ~one кто-то; ~thing что-то, кое-что; ~where где-нибудь, куда-нибудь; ~how как-то
 sometimes ['sʌmtaɪmz] *adv* иногда
 soon [su:n] *adv* скоро
 sorry ['sɒri] *а* сожалеющий, *to be sorry* сожалеть
 sort [sɔ:t] *п* сорт, род
 sound [saʊnd] *п* звук
 source [sɔ:s] *п* источник
 south [saʊθ] *п* юг
 Soviet ['səʊvjət] *а* советский

space [speɪs] *п* 1. пространство; 2. космос
 speak [spi:k] (spoke, spoken) [spi:k] ([sprouk], ['sproukn]) *υ* говорить, разговаривать
 special ['speʃəl] *а* особенный, особый
 specific [spi'sɪfɪkəl] *а* характерный
 specify ['spesɪfaɪ] *υ* уточнять
 speech [spi:tʃ] *п* речь
 speed [spi:d] *п* скорость
 spell [spel] (spelt) *υ* называть слова по буквам
 spelling ['speliŋ] *п* правописание, орфография
 sphere [sfɪə] *п* сфера, шар
 spread (spread) [spred] *υ* распространяться
 spring [sprɪŋ] *п* 1. пружина; 2. весна
 square [skweə] *п* 1. квадрат; 2. вторая степень; *а* квадратный; *а* ~d в квадрате
 stadium ['steɪdɪəm] *п* стадион
 stage [steɪdʒ] *п* стадия, этап
 stamp [stæmp] *п* марка
 stand (stood) [stænd], [stud] *υ* 1. стоять; 2. помещать
 standard ['stændəd] *а* образцовый
 start [stɑ:t] *υ* начинать, отправляться
 state [steɪt] *υ* утверждать; *а* ~d изложенный; *п* состояние, положение; *п* ~ment утверждение, формулировка
 state [steɪt] *п* 1. государство; 2. штат
 stay [steɪ] *п* пребывание
 stay *υ* 1. оставаться, пребывать; 2. гостить, останавливаться (у кого-либо)
 station ['steɪʃən] *п* 1. место; 2. станция
 step [step] *п* шаг
 still [stɪl] *adv* однако, все еще
 stimulate ['stɪmjuleɪt] *υ* стимулировать
 stop [stɒp] *п* остановка; *υ* останавливать(ся)
 store [stɔ:] *υ* накапливать, хранить
 story ['stɔ:ri] *п* рассказ
 straight [streɪt] *а* прямой, прямолинейный
 stress [stres] *п* напряжение, усилие; *υ* подчеркивать
 stretch [stretʃ] *υ* растягивать(ся), простирать(ся)
 strict [strikt] *а* строгий, точный; *adv* ~ly строго
 strong [strɒŋ] *а* сильный
 structure ['strʌktʃə] *п* структура
 student ['stju:dənt] *п* учащийся, студент

study ['stʌdi] *υ* учиться, изучать
 subconsciously [səb'kɒnfɪəsli] *adv*
 подсознательно
 subject ['sʌbdʒɪkt] *п* предмет, тема
 subject [səb'dʒekt] *υ* подвергать
 subordinate {sə'bɔ:dineɪt} *υ* подчинять; *а* {sə'bɔ:dɪnɪt} подчиненный
 subset ['sʌb.set] *п* подмножество
 substitute ['sʌbstɪtju:t] *υ* замещать, заменять
 subtend [səb'tend] *υ* стягивать (угол)
 subtract [səb'trækt] *υ* вычитать; *п*
 subtraction вычитание
 subtrahend ['sʌbrəhend] *п* вычитаемое
 succeed (in) [sək'si:d] *υ* достигать цели, преуспевать, суметь
 success [sək'ses] *п* успех; *а* ~ful успешный; *adv* ~fully успешно
 succession [sək'sesən] *п* последовательность; *а* ~ive следующий, последующий
 such [sʌtʃ] *а* такой; ~as как например
 sufficient {sə'fɪsənt} *а* достаточный, удовлетворятельный; *adv* ~ly достаточно
 suggest [sə'dʒest] *υ* предполагать, предлагать
 suitable ['sju:təbl] *а* подходящий, годный

Т

table ['teɪbl] *п* 1. таблица; 2. стол
 tail [teɪl] *п* хвост, хвостовое оперение
 take (took, taken) [teɪk] ({tʊk}, {teɪkn}) *υ* брать, взять; to ~ place происходить
 talent ['tælənt] *п* талант *а* ~ed одаренный
 talk [tɔ:k] *п* беседа, разговор; *υ* беседовать, разговаривать
 tangent ['tændʒənt] *п* 1. касательная; 2. тангенс
 tank [tæŋk] *п* резервуар, емкость
 tape [teɪp] *п* лента
 task [tɑ:sk] *п* задача, задание
 teach (taught) [ti:tʃ]. [tɔ:t] *υ* обучать, учить; *п* ~er преподаватель
 team [ti:m] *п* группа, бригада, команда
 technology [tek'nɒlədʒi] *п* техника
 telescope ['telɪskəʊp] *п* телескоп
 tell (told) [tel], [tould] *υ* рассказывать, сказать
 temperature [ˈtemprɪtʃə] *п* температура

sum [sʌm] *п* сумма, итог; *υ* складывать
 summand ['sʌmænd] *а* слагаемое
 summarize ['sʌməraɪz] *υ* подводить итог, резюмировать
 summary ['sʌməri] *п* резюме, обзор
 summer ['sʌmə] *п* лето
 sun [sʌn] *п* солнце
 Sunday ['sʌndi] *п* воскресенье
 supersat [ˈsju:pəsət] *п* сверхнасыщение
 supply [sə'plai] *υ* снабжать, предоставлять
 support [sə'pɔ:t] *п* поддержка; *υ* поддерживать
 suppose [sə'pəʊz] *υ* предполагать
 suppress [sə'pres] *υ* подавлять, сокращать
 sure [ʃʊə] *а* верный, уверенный; to be ~ быть уверенным
 surface ['sɜ:fɪs] *п* поверхность
 switch [swɪtʃ] *п* выключатель; to ~ on включать; to ~ off выключать
 symbol ['sɪmbəl] *п* символ, обозначение; *υ* ~ize символизировать, означать
 symmetric [sɪ'metrik] *а* симметричный
 system ['sɪstɪm] *п* система; *а* ~atic систематический

ten [ten] *num* десять
 tend [tend] *υ* стремиться, приближаться
 tendency ['tendənsi] *п* тенденция, склонность
 tennis ['tenɪs] *п* теннис
 term [tɜ:m] *п* 1. член, терм; 2. термин; 3. семестр; in terms of с точки зрения
 terminal ['tɜ:mɪnəl] *п* 1. конечный пункт; 2. экзамен в конце семестра; *а* 1. конечный; 2. семестровый
 terminology [ˌtɜ:mɪ'nɒlədʒi] *п* терминология
 territory ['terɪtəri] *п* территория
 test [test] *п* тест, проверка; *υ* подвергать проверке
 text [tekst] *п* текст
 textbook *п* учебник
 than [ðæn] *conj* чем; rather ~ а не, скорее... чем
 thank [θæŋk] *υ* благодарить; thanks to благодаря
 that (pl those) [ðæt], [ðəʊz] *pron* тот, то, те; ~ is то есть

theatre ['θiətə] *n* театр
 their [ðeə] *pron* их, свой
 themselves [ðəm'selvz] *pron* сами
 then [ðen] *adv* тогда, затем
 theorem ['θiərəm] *n* теорема
 theory ['θiəri] *n* теория; *a* ~ etical
 теоретический
 there [ðeə] *adv* там, туда
 thereby ['ðeəbaɪ] *adv* тем самым
 therefore ['ðeəfɔ:] *adv* поэтому
 thermonuclear ['θə:mou'nju:klɪə] *a*
 термоядерный
 these [ði:z] *pron* эти
 thesis (*pl* theses) ['θi:sis], [θi:si:z] *n*
 тезис, диссертация
 they [ðei] *pron* они
 thick [θɪk] *a* толстый; *n* ~ness тол-
 щина
 thin [θɪn] *a* тонкий
 thing [θɪŋ] *n* вещь, предмет; the ~ is
 дело в том, что
 think (thought) [θɪŋk], [θɔ:t] *v* ду-
 мать
 this (*pl* these) [ðɪs], [ði:z] *pron*
 этот, это
 those [ðəʊz] *pron* те
 though [ðəʊ] *conj* хотя; as ~ как
 будто бы
 thought [θɔ:t] *n* мысль, идея
 thousand ['θaʊzənd] *num* тысяча
 three [θri:] *num* три
 through [θru:] *prep* сквозь, через
 Thursday ['θɜ:zdi] *n* четверг
 thus [ðʌs] *adv* так, таким образом
 ticket ['tɪkɪt] *n* билет
 till [tɪl] *prep* до; *conj* до тех пор пока
 time [taɪm] *n* 1. время; 2. раз
 today [tə'deɪ] *adv* сегодня
 together [tə'geðə] *adv* вместе
 tomorrow [tə'mɔ:rou] *adv* завтра
 to [tu] *prep* указывает направление
 или предел времени
 too [tu:] *adv* 1. также; 2. слишком
 tool [tu:l] *n* инструмент, орудие
 top [tɒp] *n* верх, верхушка, крышка
 topic ['tɒpɪk] *n* тема

topology [tə'pɒlədʒi] *n* топология
 loss [lɒs] *v* подбрасывать
 total ['təʊtl] *n* сумма, целое; *a* об-
 щий, целый
 toward [tə'wɔ:d] *prep* по направле-
 нию к
 town [taʊn] *n* город
 traditional [trə'dɪʃənəl] *a* традицион-
 ный
 transcendental [,trænsen'dentl] *a*
 трансцендентный
 transcribe [træns'kraɪb] *v* расшифро-
 вать (зд.)
 transfer ['trænsfɜ:] *n* перенос; *v*
 [træns'fɜ:] переносить, переда-
 вать
 transitive ['trænsɪtɪv] *a* транзитивный
 translate [træns'leɪt] *v* 1. переносить;
 2. переводить, толковать
 transport ['trænsɜ:t] *n* транспорт
 travel ['trævl] *v* перемещаться, пере-
 двигаться
 treat ['tri:t] *v* обращаться (с)
 trial ['traɪəl] *n* попытка, опыт, проба
 triangle ['traɪæŋgl] *n* треугольник
 trinomial [traɪ'nəʊmɪəl] *n* трехчлен
 true [tru:] *a* истинный, верный; to
 hold ~ быть справедливым
 truth [tru:θ] *n* истина, правда
 try [traɪ] *v* 1. пытаться; 2. испыты-
 вать
 Tuesday ['tju:zdi] *n* вторник
 -tuple [tʌpl] *suф* кратное; *n*-tuple *n*-
 ка; *n*-строка
 turbine ['tɜ:bin] *n* турбина
 turn [tɜ:n] *v* поворачивать(ся); to
 ~ to обращаться к; to ~ out
 оказываться; *in* ~ в свою оче-
 редь
 tutor ['tju:tə] *n* руководитель группы
 студентов (в университете, кол-
 ледже)
 twice [twais] *adv* дважды; ~ as much
 вдвое больше
 twelve [twelv] *num* двенадцать
 twenty ['twenti] *num* двадцать
 two [tu:] *num* два
 type [taɪp] *n* тип, вид; *v* печатать на
 машинке
 typewritten ['taɪp,rɪtn] *a* напечатан-
 ный

U

undefined [,ʌndɪ'faɪnd] *a* неопреде-
 ленный
 under ['ʌndə] *prep* 1. под; 2. при;
 3. в процессе
 underline ['ʌndəleɪn] *v* подчеркивать
 understand (understood) [,ʌndə'-

stænd], [,ʌndə'stʌd] *v* понимать,
 ~ing понимание
 unfortunately [ʌn'fɔ:tʃənətli] *adv* к
 сожалению
 unidirectional ['ju:nɪdɪ'rekʃənəl] *adv*
 однонаправленный

unified ['ju:nifaid] *a* единый, объединенный
 uniform ['ju:nifo:rm] *a* однородный, равномерный
 unify ['ju:nifai] *v* объединять
 union ['ju:njən] *n* объединение, союз
 unique [ju:'ni:k] *a* единственный, односторонний *n* ~less единственность
 unit ['ju:nit] *n* 1. единица; 2. единица измерения; 3. блок, узел
 universal [ju:'ni:və:səl] *a* всеобщий, всемирный
 university [ju:'ni:və:siti] *n* университет
 unknown ['ʌn'noʊn] *a* неизвестный

V

vacation [və'keifən] *n* каникулы, отпуск
 valid ['vælid] *a* справедливый, имеющий силу; *n* ~ity справедливость
 value ['vælju:] *n* величина, значение
 vanish ['væniʃ] *v* исчезать
 variable ['væriəbl] *a* переменная
 variation [və'ri:eiʃən] *n* изменение
 variety [və'raɪəti] *n* разнообразие
 various ['væəriəs] *a* различный
 vary ['væəri] *v* различаться, отличаться
 vector ['vektə] *n* вектор
 velocity ['vi:ləsiti] *n* скорость (векторная)
 verify ['verifai] *v* 1. проверять, уточнять; 2. подтверждать
 vertex (pl verteces) ['və:teks], ['və:ti:si:] *n* вершина

unless [ʌn'les] *conj* если не, разве что
 unlike [ʌn'laɪk] *adv* в отличие от
 ~ly маловероятно
 unlimited [ʌn'limitid] *a* неограниченный
 until [ʌn'til] *prep* до
 up [ʌp] *adv* вверх, по; *a* ~per верхний
 use [ju:z] *n* употребление, применение; *v* [ju:z] применять, использовать; *a* ~ful полезный
 usual ['ju:ʒuəl] *a* обычный; *adv* ~ly обычно
 utilize ['ju:tilaɪz] *v* использовать

W

walk [wɔ:k] *n* прогулка; *v* идти, ходить (пешком)
 want [wɒnt] *v* хотеть
 waste [weɪst] *v* тратить, расточать
 watch [wɒtʃ] *v* наблюдать
 wave [weɪv] *n* волна
 way [wei] *n* путь, способ, средство
 we [wi:] *pron* мы
 weak [wi:k] *a* слабый
 Wednesday ['wenzdi] *n* среда
 week [wi:k] *n* неделя
 week-end ['wi:k'end] *n* время отдыха с субботы до понедельника
 weigh [wei] *v* весить, взвешивать
 weight [weit] *n* вес
 well [wel] *adv* хорошо
 west [west] *n* запад
 what [wɒt] *pron* что, какой

wheat [wi:t] *n* пшеница
 when [wen] *conj* когда; *adv* тогда как; *conj* ~ever всякий раз когда
 where [weə] *adv* *conj* где, куда
 whereas [weə'æz] *conj* тогда как
 whereby [weə'baɪ] *adv* тем самым
 whether ['wəðe] *conj* ли
 which [wɪtʃ] *pron* какой, который, что
 while [waɪl] *conj* в то время как
 white [waɪt] *a* белый
 who [hu:] *pron* который
 whole [həʊl] *adv* целый, весь
 whose [hu:z] *pron* чей
 why [waɪ] *adv* почему
 wide [waɪd] *a* широкий
 width [wɪð] *n* ширина
 wife [waɪf] *n* жена

wing [wiŋ] *п* крыло
 winter ['wintə] *п* зима
 wish [wiʃ] *в* хотеть
 with [wið] *prep* с, со
 without [wi'ðaɪn] *adv* в пределах
 without [wi'ðaʊt] *prep* без
 woman (*pl* women) ['wʊmən], ['wi-
 min] *п* женщина
 wonder ['wʌndə] *в* интересоваться
 wood [wʊd] *п* дерево

word [wɜ:d] *п* слово
 work [wɜ:k] *п* работа; *в* работать
 world [wɜ:ld] *п* мир
 worse [wɜ:s] *а* хуже
 worst [wɜ:st] *а* наихудший
 worth [wɜ:θ] *а* стоящий, заслужива-
 ющий
 write (wrote, written) [raɪt] ([raʊt],
 [ritn]) *в* писать
 wrong [rɒŋ] *а* ошибочный

X

x-rays ['eks'reiz] *п* рентгеновские лу-
 чн

Y

year [jɜ:] *п* год
 yes [jes] да
 yesterday ['jestadi] *adv* вчера
 yet [jet] *adv* еще, все еще; *conj* од-
 нако

yield [ji:ld] *в* давать
 you [ju:] *pron* ты, вы
 young [jʌŋ] *а* молодой
 your [jɜ:] *pron* ваш

Z

zero ['ziərəʊ] *п* ноль

A

abbreviate — abbreviated
 able — ability, disability, unable
 abstract *n, a* — abstraction
 absurd — absurdity
 academic — academy, academician
 accelerate — acceleration, accelerator
 accept — acceptable, acceptance, inacceptable
 accomplish — accomplishment
 according — accord, accordance
 accuracy — accurate, accurately, inaccuracy, inaccurate
 actual — act, activity, active, activation, activate, actually, inactive, interact, actor
 acute — acutely, acuteness
 adjust — adjustable, adjustment
 administrative — administration, administer, administrator
 advanced — advance *n, v* advancement
 adviser — advise, advisable
 aim — aimless
 air *n, v* — airdrome, air-line, air-man, air-port, air-way

alphabet — alphabetic(al)
 alter — alteration
 alternative — alternation
 analogous — analogy, analog
 analyse — analytic(al)
 appear — appearance, disappear, disappearance, reappear
 application — applied, applicable, applicability, inapplicable
 appointment — appoint
 approximation — approximate, approximately
 arrange — arrangement, rearrange
 assistance — assistant, assist
 associate — associated, association
 astronomer — astronomy, astronomical
 atmosphere, atmospheric
 attend — attendance
 attraction — attract, attractive
 automatic — automatically, automation, automobile
 axiom — axiomatic
 axis — axial

B

bad — badly, badness
 base — basal, baseless, basically, basis
 bisect — bisection

black — blacken
 brain — brainless
 busy — busily, business

C

capable — capability
 care — careless, carelessly, carelessness
 certain — uncertain, uncertainty

change — changeless, unchanged, changeable, interchange
 chemical — chemistry, chemist
 child — childless, childlike

circle — circular, encircle, circulate, circulation
 class — classic, classical
 clarify — clarification
 code *n, v* — codify, decode
 coincide — coincidence
 collect — collective, collector
 communist — communism, community
 combination — combinatorial
 compare — comparable, comparability, incomparably
 compatible — incompatible
 complicated — complication
 complete — completely, completeness
 complex *n, a* — complexity
 compose — composer, composition, discompose, decomposition
 computer — computation, computable
 commutative — commutant, commutation
 concentrate — concentration, concentric

death — deathless
 decide — decidedly, decision, decisive
 decimal — decimeter
 deep — deeply, depth
 democratic — democracy
 demonstrate — demonstration, demonstrator
 density — dense, densely
 depend — interdependent, interdependence
 derivation — to derive
 describe — descriptive
 design — designate, designation
 desire — desirable
 detect — detector, detective

earth — earthly
 easy — easily, easiness
 economical — economist, economize, economy
 effect — effective, effectively
 Egypt — Egyptian
 electric — electrician, electricity, electrify, electrification, electron
 element — elemental
 empty — emptiness
 end *n, v* — endless, endlessly, unending
 energy — energetic
 English — Englishman
 entire — entirely
 equal — equalize, equalization, equally, equator, equilibrium, equivalent

conclude — conclusive
 consistent — consistence, consistency, inconsistency
 construct — constructive, constructively, reconstruct, reconstruction
 contain — container
 continue — continuation, continual, continually, continuity, discontinue, discontinuity, equicontinuous
 cooperate — cooperation, cooperative
 correct *a, v* — correction, correctly, corrective, correctness, incorrect
 correlate — correlative, correlation
 correspond — correspondence, correspondent, corresponding, correspondingly
 count *n, v* — countability, uncountable
 cover *n, v* — discover, uncover
 critical — criticism, criticize
 cross *n, v* — crosspoint, cross product, cross ratio

D

determine — determination
 develop — underdeveloped
 differ — indifferent, indifferently
 differential — differentiate, differentiation
 dimension — dimensional
 direct *a, v* — indirect, indirectly, unidirectional
 distinct — distinctive, distinction, distinctly, indistinctly, distinguishable
 discover — discovery
 distributive — distribute; distribution
 doubt — doubtless, undoubtedly
 draw *n, v* — drawing

E

error — erroneous
 essential — essence
 establish — establishment
 evaluate — evaluation
 even — evenly
 evident — evidence, evidently
 exact — exactness
 exceed — exceedingly
 exclude — exclusion
 experience — experienced, unexperienced
 explanation — to explain
 explicit — explicitly
 exponent — exponential
 express — expressive, expressionless
 extreme — extremity

F

false — falsification, falsify, falsifier
 familiar — familiarity
 favour *n, v* — favourable, favourably,
 favourite
 feel — feeling
 flat — flatly
 follow — follower
 foreign — foreigner
 form *n, v* — formal, formality, forma-

tion, formless, to deform, deformation,
 to reform, reformation, reformer
 formula — formulate, formulation
 fortunately — fortunate, unfortunately
 French — Frenchman
 frequent — frequency, frequently
 friend — friendly, friendless, friend-
 liness, friendship
 fulfill — fulfillment

G

general — generality, generalization
 generate — degenerate
 geometry — geometrician

graduate — graduation, undergra-
 duate

H

help *n, v* — helpless, helplessly
 history — historic
 home — homeless
 hope *n, v* — hopeful, hopeless, hope-
 lessly

hypothesis — hypothetic(al), hypothet-
 ically

I

idea — ideal, idealist, idealistic, idea-
 lize, idealization
 identity — identify, identification
 illustrate — illustrative
 imagine — imaginary, imagination
 implicit — implicitly
 imply — implication
 important — unimportant
 impress — impression, impressionist,
 impressionistic, impressive
 improve — improvement
 inadequate — inadequacy, inadequate-
 ly, adequate, adequately
 include — indication, indicative
 industrial — industry

information — to inform
 inscribe — inscription
 instinct — instinctive, instinctively
 instruction — to instruct
 integer — integrable, integrand, inte-
 grate, integrated, integrity
 intelligent — intellect, intelligence, in-
 telligent
 intersect — intersection
 introduce — introduction
 intuitive — intuitively
 invariable — invariance, invariant
 invent — inventor, invention, inven-
 tive
 inverse *a, v* — inversion, invertible
 involve — involution

L

law — lawful, lawfully, unlawful
 lazy — laziness
 lead — leader, leading
 lecture *n, v* — lecturer
 limit *n, v* — limitless, limitation, limi-

ted, unlimited
 linear — linearity, linearly
 locate — localize, localization, locally
 logical — logic, logician, logistics
 lucky — luck, luckily

M

main — mainly
 major — majority
 material — materialism
 measure — measurable, measurability

mechanics — mechanical, mechaniza-
 tion
 method — methodology
 minimize — minimization

mixed — to mix
modification — to modify, modifier
monotonous — monotony
month — monthly

motion — motionless
move *n, v* — movement, movable,
immovable

N

natural — nature, naturally, unnatural
need *n, v* — needless
negative — negation, to negate

normal — norm, normalize, normaliza-
tion
numeral — numerable, innumerable,
numerically

O

object *n, v* — objective
observe — observation, observable
occasion — occasional, occasionally

operation — to operate
opposite — to oppose, opposition

P

part *n, v* — partial, partition
period — periodically
person — personal, personally, per-
sonify, personification
philosophy — philosophic(al), philoso-
phically
physics — physical, physiology, phy-
siologist
place *n, v* — to displace, to replace
popular — popularity, population, to
populate
possess — possession

power — powerful, powerless
precise — precisely
prefer — preference, preferable, pre-
ferably
pressure — to press
previous — previously
probability — probable
problem — problematic
product — productive, productivity
prove — provable, to disprove
publish — public, publicly, publicity
purpose — purposeful, purposeless

Q

quantity — quantify, quantitative
quality — qualitative, qualify, qualifi-
cation

question — questionable, unquestio-
nable

R

rapid — rapidity
real — reality, realistic, realization,
unreal
recently — recent
recognize — recognition
rectangle — rectangular
reflect — reflection, reflex
region — regional
regular — regularly, regularity, regu-
late, regulation, irregularity

remove — removal, removable
repeat — repetition
represent — representation, represen-
tative
require — requirement
restrict — restriction
result *n, v* — resultant
reverse *n, v* — reversible, irreversible
revolution — to revolve
rotation — to rotate

S

save — safe
same — sameness
satisfy — satisfaction, satisfactory
select — selected, selection, selective,
selectivity

sense — senseless, sensibility
separate — separation, separable, se-
parability, separatrix
serve — service
shape — shapeless

similar — similarity
simple — simplify, simplification,
 simply
single — singularity
slow — slowly, slowness
small — smallness
smooth — smoothly, smoothness
solid — solidify
solve — solvable, unsolvable
special — speciality, specialization,
 specialize, specialist
specific — specify, specific
sphere — spherical, sphericity, spheroid

tangent — tangency
technology — technical, technique
theory — theoretic(al), theoretically,
 theorist
thin — thinness
total *n, a* — totality, totally, totalitarian

unfortunately — fortunately, fortune
uniform — uniformity, uniformly, unified

valid — invalid
value — valuable, valueless, valuation

square *n, v* — squarable
substitute — substitution
suggest — suggestion
suitable — to suit, suitably, suitability
suppose — supposition
suppress — suppression
symbol — symbolic, symbolically,
 symbolize, symbolism
symmetric — symmetry, symmetrically
system — systemless, systematic(al),
 systematically, systematize, systematization

T

travel — traveller
treat — treatment
triangle — triangular
true — truth, truthful, truthfully
type — typical, typically

U

unit — unity, unite

V

visualize — visual, visible
vary — variability, invariability

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