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для естественнонаучных специальностей

English grammar files for Math students

Учебно-методическое пособие

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Представленный грамматический материал предназначен для студентов бакалавров и магистрантов, изучающих дисциплины «Профессиональный иностранный язык» и «Иностранный язык в академической и профессиональной коммуникации». Пособие ориентировано на формирование и закрепление грамматических навыков и умений, необходимых для перевода математических текстов с английского языка на русский и наоборот. Работа с упражнениями основана на примерах предложений из специализированных текстов по математике и способствует расширению профессионального словарного запаса студентов.

Пособие рекомендуется использовать на практических занятиях по английскому языку и для самостоятельного изучения английской грамматики.

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Содержание

Предисловие

Данное учебно-методическое пособие представляет собой сборник грамматических упражнений по английскому языку для студентов бакалавриата и магистратуры направлений «Прикладная математика и информатика», «Математика и компьютерные науки», «Механика и математическое моделирование» института математики, информационных технологий и физики. Пособие соответствует требованиям, обозначенным в рабочих программах дисциплин «Профессиональный иностранный язык» и «Иностранный язык в деловой и профессиональной коммуникации».

Актуальность создания пособия обусловлена тем, что материал, предложенный в данном методическом пособии, представляет собой сложные грамматические темы, которые не в полном объеме были представлены на предыдущих этапах изучения английского языка. Отличительной особенностью данного учебно-методического пособия является то, что в нём представлен грамматический материал, основанный на примерах лексики профессиональной направленности, который способствует формированию коммуникативной, когнитивной и лингвистической компетенции у студентов. В работе представлены упражнения на развитие и отработку грамматических навыков у студентов с учетом их специальности. Предложенные автором упражнения помогут студентам распознавать сложные грамматические структуры построения английских предложений, правильно переводить их, а также овладеть терминологией по специальности и улучшить фонетические навыки. Данное пособие рекомендовано для развития грамматической компетенции студентов, для которых владение грамматикой английского языка является важным

условием успешной работы с текстом по специальности. Разделы грамматики, включенные в пособие, отобраны с точки зрения их актуальности для студентов, обучающихся чтению и пониманию иноязычной информации и адекватному переводу на русский язык.

Материалы пособия прошли апробацию на занятиях со студентами и могут быть использованы для аудиторной или самостоятельной работы.

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UNIT 1. DEGREES OF COMPARISON

1. Write the words in brackets in the correct form of the degrees of comparison.

1. We use this method of research because it is the _____(interesting).
2. I could solve ____ (quick) than he because the equation given to me was ____ (easy) then the one he was given.
3. The remainder in this operation of division is ___ (great) than 1.
4. The name of Leibnitz is ____ (familiar) to us as that of Newton.
5. Mathematics is the _____ (difficult) subject this semester.

2. Put the adjective or adverb in brackets in the necessary degree of comparison.

1. The scholar's (significant) contribution to mathematics was his discovery of analytic geometry.
2. Diophantus' book was on (high) level than the works of Egyptian and Babylonian mathematics.
3. (early) records of organized mathematics date back to ancient times.

4. (simple) types of calculators could give results in addition and subtraction only.

5. (often used) numbers were two and three.

6. For numbers (large) than two and three, different word-combinations were used.

7. Even (primitive) people were forced to count and measure.

8. In the 19th century, mathematics was regarded (much) as the science of relations.

9. Mathematics is said to be (close) to art than to science.

10. Mathematics becomes the science of relations and structure in (broad) sense.

3. ***Put the adjectives in brackets into the correct form (comparative or superlative degree) to make an accurate description of computer sizes.***

Words and word combinations:

mainfraim computer – мэйнфрейм, «большой компьютер», суперкомпьютер

minicomputer – миникомпьютер

microcomputer – микрокомпьютер

portable – портативный

desktop – настольный компьютер

laptop – лэптоп (lap – колени сидящего человека)

notebook computer - ноутбук (компьютер типа «ноутбук»)

subnotebook – ультрапортативный ноутбук

handheld – ручной

palmtop computer–карманный персональный компьютер

1.There are different types of computer. The ... (large)1 … and ... (powerful) 2 … are mainframe computers. Minicomputers

are ... (small) 3 ... than mainframes, but are still very powerful. Microcomputers are small enough to sit on a desk. They are the ... (common) 4 … type of computer. They are usually ... (powerful) 5 … than minicomputers. Portable computers are ... (small) 6 … than desktops. The ... (large) 7 … portable is a laptop. ... (Small) 8 … portables, about the size of a piece of writing paper, are called notebook computers. Subnotebooks are ... (small) 9 … than notebooks. You can hold ... (small) 10 … computers in one hand. They are called handheld computers, or palmtop computers.

UNIT 2. ACTIVE VOICE

1. Complete the sentences with the Present Simple or the Present Continuous.

1. At the moment I (work) on the program for schools.
2. We always (ask) the users, not the managers, what they (need) from the system.
3. Paul (be) a database expert, so usually he (do) anything on databases and I (get) the interfaces.
4. We (use) Active Server for this project because it (be) web-based.
5. Whenever we (finish) part of a project, we (put) a copy of the software in a subfolder as a record.
6. I (subscribe) to two magazines.
7. Commonly we (use) C++ and JavaScript.
8. Right now I (try) to learn how to use Active Server properly.
9. At the moment we (develop) a web-based project.
10. It's a magazine for people who (know) what they (do).
11. The computer (not work) because it isn't plugged in.
12. What Jane (type) now?
13. Helen (talk) online to her friend. They (work) on their homework together.

14. I can't connect to the Internet. It (work)?

15. I (leave) at 8 o'clock every morning.

16. She usually (work) in the IT department in London, but at the moment she (do) a training course in Bristol.

17. Michael (check up) his laptop for viruses every day.

18. He (check up) his PC at the moment.

19. He (try) very hard in every game that he (play).

20. Excuse me, I (think) that you (use) my pendrive.

2. Complete the article with the correct form of the verbs in brackets, Past Simple or Past Continuous.

Last night, while I 1 (do) my homework, Angela 2 (call) me. She 3 (say) she 4 (call) me on her cell phone from her Math classroom in UCLA. I 5 (ask) her if she 6 (wait) for class, but she 7 (say) that the professor was at the front of the hall lecturing while she 8 (talk) to me. I couldn't believe she 9 (make) a phone call during the lecture. I 10(ask) what 11(go on). She 12(say) her Math professor was so boring that several of the students actually 13(sleep) in class. Some 14(talk) about their plans for the weekend, and a student next to her 15(draw) a picture of a horse. When Angela 16(tell) me she wasn't satisfied with the class, I 17(mention) that my Math professor was quite good and 18(suggest) that she should switch to my class. While we 19(talk) I 20(hear) her professor's yell. "Miss, are you making a phone call?" Suddenly, the line 21(go) dead. I 22(hang up) the phone and 23(go) to the kitchen to make dinner. As I 24(cut) vegetables for a salad, the phone 25(ring) once again. It was Angela, but this time she 26(not / sit) in class.

3. Complete the sentences with the Past Simple or the Past Continuous.

1. Her computer (crash) when she (search) the Internet.

2. She (print out) her email when the printer (develop) a fault.

3. While they (work) on the computer, someone (switch off) the power.

4. A glitch in the system (shut down) telephone service to nearly 6 million customers.

5. I (delete) the whole file by mistake.

6. I (google) her name and (find out) that she is the head of our rival company. 7. We (meet) at the conference a year ago.

8. Mary (type) the text when the screen (go) black.

9. He (change) the battery when the charger (stop) working.

10. He (print) from the multifunctional device when it (jam) the paper.

11. The printer (run) out of ink while I (use) it.

12. This morning the accountant (try) to save a spreadsheet and she (get) an error message.

13. The system administrator (test) the network a few minutes ago.

14. They (study) when the fire (start) in the computer lab.

15. I (text) a message when somebody (call) me.

16. When I (see) him, he (talk) to his groupmates.

17. You (chat) online when the phone (ring)?

18. While we (design) anew program, our rival company (launch) similar software.

19. When he (troubleshoot) the PC he (find out) what the problem (be).

20. I (try) to send a message when the program (crash).

4. Translate the sentences into English.

1. У вас когда-нибудь возникали какие-либо проблемы с вашим интернет провайдером?

2. Поиск информации никогда не был более удобным.

3. Вы когда-нибудь покупали что-нибудь через Интернет?

4. Мы стали очень зависимы от наших смартфонов.

5. Дуглас Энгельбарт не получил ни копейки за компьютерную мышь - свое изобретение, которое изменило мир.

6. Facebook сделал Цукерберга одним из самых богатых людей в мире.

7. Информационные технологии совершенно изменили наш образ жизни.

8. Современные гаджеты стали неотъемлемой частью нашей жизни.

9. У всех появилась привычка 'погуглить' на веб-сайте, чтобы найти какую-то информацию.

10. Интернет стал самым популярным средством общения и обмена информацией.

5. Complete the sentences with the Past Simple or the Present Perfect.

1. You (hear) about Clare? She (give up) her job.
2. The technology (change) a lot recently.
3. Oh dear! I (press) the wrong button.
4. Yesterday Colin (give) me the wrong advice about getting floppy disk out when jammed and then I (delete) the stuff off the hard disk.
5. She just (load) the new software.
6. You ever (do) any computing?
7. I always (like) computing.
8. I (make) a back-up copy last month.
9. I (make) a back-up copy recently.
10. My friend just (buy) a new tablet.
11. I already (edit) the text.
12. You (receive) my email yet?
13. I (go) to the Science Museum last weekend and (take) some photos there. 14. You ever (buy) anything on an auction site like eBay?
15. We (change) the ISP last month and we (not have) any problems with it so far.

16. I last (access) the Internet from my mobile phone.

17. You (try) restarting your computer? – Well, I (restart) it 5 minutes ago.

18. You (enter) your password yet?

19. You (enter) your password to log on to the website?

20. You (receive) my email yet? – I (not receive) anything from you today. – You (check) your junk mail folder?

6. Complete the sentences with the Past Simple or the Past Perfect.

1. When the manager (come), I already (send) an email.

2. When I (return) with my camera, the bird already (fly) away.

3. We (not need) to queue because I (book) the tickets online.

4. We (finish) our new project last week. We already (do) several projects before that. 5. What you (do) on the Internet yesterday?

6. I (make) a back-up copy before my PC (crash).

7. He (call) the technical specialist because the printer (jam) the paper.

8. The desktop computer (not switch on) because somebody (disconnect) it by mistake.

9. He (spend) two hours repairing the computer before he (manage) to solve the problem.

10. The computer automatically (delete) the files that you (not save).

11. I (compress) the file before I (send) it by email.

12. I (receive) much spam mail, so I (change) my email address.

13. When I first (turn it on), it (report) a hard disk failure.

14. When I (go out) I (remember) that I (forget) to turn off the computer.

15. When I (leave) the office, everybody already (go) home.

16. The webinar already (start) by the time we (arrive).

17. I (feel) very tired when I (get) home, so I (go) straight to bed.

18. He (be) surprised when he (get) an email from her, because she (not write) to him before.

19. When the manager (come) back, Jim already (finish) the work.

20. Peter (say) that he always (want) to be a software designer.

7. Read the sentences below, define the tense of the verbs in bold type and translate the sentences into Russian.

1. Use of basic mathematics **has** always **been** an integral part of individual and social life.
2. Mathematics **evolved** from counting.
3. Mathematics **is used** in many fields.
4. Modern maths **is composed** of many different divisions.
5. Charles Babbage **designed** a machine that **became** the basis for building today's computer in the early 1800s.
6. An angle **is** the union of two rays which **have** a common endpoint but which **do not lie** on the same line.
7. Numeral systems **have been** many and diverse.
8. Mathematical discoveries **have been made** throughout history.

8.The present simple or the past simple. Put the verbs in brackets in the correct forms.

1. The problem of constructing a regular polygon of nine sides which ……. (require) the trisection of a 60^0 angle …… (be) the second source of the famous problem.

2. The Greeks …… (add) "the trisection problem" to their three famous unsolved problems. It …… (be) customary to emphasize the futile search of the Greeks for the solution.

3. The widespread availability of computers …… (have) in all probability changed the world for ever.

4. The microchip technology which ……(make) the PC possible has put chips not only into computers, but also into washing machines and cars.

5. Fermat almost certainly …… (write) the marginal note around 1630, when he first …… (study) Diophantus's Arithmetica.

6. I …… (protest) against the use of infinitive magnitude as something completed, which …… (be) never permissible in maths, one …… (have) in mind limits which certain ratio ……(approach) as closely as desirable while other ratios may increase indefinitely (Gauss).

7. In 1676 Robert Hooke……(announce) his discovery concerning springs.

8. He ……. (discover) that when a spring is stretched by an increasing force, the stretch varies directly according to the force.

UNIT 3. ACTIVE OR PASSIVE VOICE

Passives Voice is very common in technical writing where we are more interested in facts, processes, and events than in people. For example:

1. Data is transferred from the internal memory to the arithmetic logical unit.

2. Distributed systems are built using networked computers.

3. The organization was created to promote the use of computers in education.

4. A new method for studying geometric figures and curves, both familiar and new were created by Descartes and Fermat.

1. Make the sentences passive. Use "by ..." only if it is necessary to say who does or did the action.

a) Charles Babbage designed a machine which became the basis for building today's computer in the early 1800s.

b) People submerged geometry in a sea of formulas and banished its spirit for more than 150 years.

c) People often appreciate analytical geometry as the logical basis for mechanics and physics.

d) Bill Gates founded Microsoft.

e) People call the part of the processor which controls data transfers between the various input and output devices the central processing unit (CPU).

f) You may use ten digits of the Hindu-Arabic system in various combinations. Thus we will use 1, 2 and 3 to write 123, 132, 213 and so on.

g) Mathematicians refer to a system with which one coordinates numbers and points as a coordinate system or frame of reference.

h) People establish a correspondence between the algebraic and analytic properties of the equation f (x, y) = 0, and geometric properties of the associated curve.

i) In 1946 the University of Pensylvania built the first digital computer.

2. Translate the following passive sentences.

a) This frame of reference will be used to locate a point in space.

b) Although solid analytic geometry was mentioned by R. Descartes, it was not elaborated thoroughly and exhaustively by him.

c) Most uses of computers in language education can be described as CALL.

d) Since many students are considerably more able as algebraists than as geometers, analytic geometry can be described as the "royal road" in geometry that Euclid thought did not exist.

e) Now new technologies are being developed to make even better machines.

f) Logarithm tables, calculus, and the basis for the modern slide rule were not invented during the twentieth century.

g) After World War 2 ended, the transistor was developed by Bell Laboratories.

h) The whole subject matter of analytic geometry was well advanced, beyond its elementary stages, by L. Euler.

3. Transform the sentences from Perfect Active into Perfect Passive.

1. She has just typed her report for the conference.
2. The teacher told us that she had checked all the tests.
3. The student will have written his degree work by May.
4. They have learnt a lot of new English words.
5. He hasn't found the answer yet.
6. I've just received my exam results.
7. By the end of the conference, the participants had discussed a number of important questions concerning the problem.
8. They will have read two books on topology by the end of the month.
9. We had planned the meeting months in advance, but we still had problems.
10. I had discussed the plan of my work with my science adviser before the end of the class.

4. Turn from Active into Passive.

Model: 1. Scientists introduce new concepts by rigorous definitions. New concepts are introduced by rigorous definitions.

2. Mathematicians cannot define some notions in a precise and explicit way. Some notions cannot be defined in a precise and explicit way.

1.People often use this common phrase in such cases.

2. Even laymen must know the foundations, the scope and the role of mathematics. 3. In each country, people translate mathematical symbols into peculiar spoken words.

4. All specialists apply basic symbols of mathematics.

5. You can easily verify the solution of this equation.

6. Mathematicians apply abstract laws to study the external world of reality.

7. A mathematical formula can represent interconnections and interrelations of physical objects.

8. Scientists can avoid ambiguity by means of symbolism and mathematical definitions.

9. Mathematics offers an abundance of unsolved problems.

10.Proving theorems and solving problems form a very important part of studying mathematics.

11.At the seminar, they discussed the recently published article.

12.They used a mechanical calculator in their work.

13. One can easily see the difference between these machines.

14.They are checking the information.

15.The researchers have applied new methods of research.

16.They will have carried out the experiment by the end of the week.

5. Use the correct tense / voice form of the verb. Model:

A lot of knowledge (to accumulate) in the second half of the 20th century. A lot of knowledge ***was accumulated*** in the second half of the 20th century.

1. In the early ages, primitive counting (to do) with the help of gestures, objects, fingers and toes.

2. The work of Leibniz (to publish) several years before Newton's results appeared in print.

3. In the past, people could not foresee that their life (to change) radically due to technological advances.

4. Scientists (to make) their discoveries due to the achievements of their predecessors.

5. Mathematics (to be) a science of numbers before it became a science of relations.

6. Archimedes (to make) his discovery while (to take a bath).

7. All spheres of life (to benefit) from computers in the future.

8. Many problems of artificial intelligence (not to solve) yet.

9. A lot of useful gadgets (to appear) in the last 10 years.

10. Nowadays, science and technology (to develop) at a great speed.

11. It is believed that in the future computers (to make) people's life still more comfortable.

12. Mathematics (to contribute) the most to the development of computer science. 13. Without the computer, the present-day achievements of many sciences (to be) impossible.

14. Very little (to know) to us about the life of Euclid.

15. Einstein (to be) young when he developed the theory of relativity.

16. Lobachevsky's new idea (to remain) unnoticed for a long time.

17. Till his dying day, Galileo was true to his ideas, though he (to renounce) them before under the pressure of the Inquisition.

18. Some new branches of mathematics (to develop) in the 20th century.

19. It (to take) mathematicians over three hundred years to prove Fermat's last theorem.

20. Mathematical language (to characterize) by its symbolic nature, brevity and precision.

Rewrite the following passages in the Passive Voice

A. Charles Babbage, an English professor of mathematics, built the first computer in 1827. They called it a "Difference Engine". Babbage also devised the basic principles of the modern computer. He spent much of his own money on his inventions. In 1834 Babbage designed a more complex "Analytical Machine" – the world's first digital computer with a memory and programming, but couldn't get the finance to build it. People forgot about Babbage's machine till 1937 when they rediscovered his papers.

B. The school provides the Internet for students to conduct research and communicate with others in relation to schoolwork. They give the access to network service to those students who agree to act in a responsible manner. The staff thinks that access is a privilege, not a right. They expect that the user will follow the certain rules of behavior.

UNIT 4. QUESTION STRUCTURE

1. Write questions to the answers. Use the prompts in brackets.

1. (essential / to update / your antivirus protection) – Yes, it's absolutely necessary.
2. (a hacker) – It's a person who illegally accesses somebody else's computer over the Internet.
3. (your current ISP) – Yota.
4. (the Internet connection / fast enough) – No, not at all.
5. (an optical sensor / of the mouse) – It's underneath.
6. (the spreadsheet) – It's in the 'documents' folder.
7. (there / batteries / in your camera) – No, I haven't inserted them yet.
8. (possible / to convert the file / into pdf) – Yes, it's quite easy to do.

2. Ask special questions using the words in parentheses.

1. There are really two types of problems involved here. (How many?)
2. Having understood the ideas, we can simplify our notation. (When?)
3. Being interested in set theory, he never missed his special course. (Why?)
4. Rational functions are functions involving an additional operation of division. (What?)
5. A point representing a variable is called a variable point. (How?)
6. The students studying the theory of sets find this statement interesting. (Who?)
7. Equations containing one or more variables to the first power only are linear in one or two variables. (What?)
8. We can find that some elements form a smaller group inside the big one. (What?)
9. Groups can arise in many quite distinct situations. (In what cases?)
10. When speaking of quantities, we shall have in view their numerical values. (What?)
11. The meanings of these words are often confused in speech. (Where?)

3. Put questions to the following sentences.

1. N. Wiener, the father of Cybernetics, is the author of 200 scientific papers and 11 books.
2. Wiener's mathematical prodigy helped him obtain his doctorate in science at the age of 19.
3. He had laid the foundations of the new science and coined the title Cybernetics.
4. The use of the word Cybernetics, however, goes back to Plato, who applied it to the science of steering ships.

5. The French scientist Ampere (XIX c.) used the same word, Cybernetics, for the study of the control of society.

6. Wiener's definition of Cybernetics is still generally being used.

7. Cybernetics bears all the hallmarks of an explosive science.

8. Man has been building more and more powerful computers since 1940s.

9. Nevertheless, man has remained computer's slave as he has still to control them.

10. The Third Industrial Revolution with computers capable of controlling themselves is looming on the horizon.

11. One is justified to call cybernetics a veritable 20th century Queen of Sciences.

12. The social sciences will have much to gain from Cybernetics in the future. 13. There is no realm of human activity in which Cybernetics will have no role to play in the future.

4. Put the questions to the following sentences.

1. A. M. Turing pioneered research in computer logic, decidability theory and artificial intelligence.

2. It is clear that the intellectual capabilities of a human being are directly related to the functioning of his brain.

3. The ability to solve certain types of problems has been studied and made the basis of intelligence tests, but the generality and validity of these tests are disputable.

4. Newton, for example, might have scored low on such tests when he was an adolescent (11-16); yet, he is estimated by some researchers to have had an Intelligence Quotient (I. Q.) near 200.

5. One of the shortcomings of these tests is that they predict little concerning the development of a person's intelligence, especially what problems he could learn to solve.

6. The ordinary conception of human intelligence is that it is limited, but it can learn and, thereby, improve its performance of certain tasks with time.

7. The central goals of artificial intelligence are to make computers more useful and to understand the principles which make intelligence possible.

8. Computers are ideal experimental subjects, for they exhibit unlimited patience and require no feeding.

9. Moreover, it is usually simple to deprive a computer program of some piece of knowledge in order to test how important that piece really is.

5. Read the sentences below, define the tense of the verbs in bold type and make up questions.

1. These numbers **are called** the addends.
2. Euclid **taught** in Alexandria.
3. Multiplication **can be checked** by interchanging the multiplier and multiplicand.
4 Pythagoras **was** a great mathematician.
5. Euclid's *Elements* **has been translated** into many languages.
6. Algebraic expressions **may be given** a simpler form.

UNIT 5. THE PARTICIPLE. ITS FORMS AND FUNCTIONS

1. Read and translate the following sentences in which:

a) ***Participle I Active*** *is used as an* ***Attribute***:

1. The line passing through these two points is a diameter.
2. The scientist working at this method is well known.
3. Maths is a science requiring professionals, not amateurs.
4. Yesterday the President of the company received an e-mail informing him about the arrival of his business partners.
5. Most mathematicians are men of genius having extraordinary mental abilities.

b) ***Participle I Passive*** *is used as an* ***Attribute***:

1. The examples being given justify what has already been proved.

2. The solution of the problem being considered can be expressed in other ways. 3. The methods being applied seem rather complicated.

4. The quantity being defined is related to the volume of this container.

5. The device being used in our laboratory should be improved.

c) ***Participle II*** *is used as an* ***Attribute***:

1. A number written in front of an algebraic expression is a coefficient.

2. A dot placed between any two numbers is sometimes used as a sign of multiplication.

3. Some questions asked by the teacher are to be stated more precisely.

4. The results so far received do not satisfy us.

5. The methods used in solving the problem were the same.

d) ***Participle I (Active, Passive)*** *is used as an* ***Adverbial Modifier***:

1. Being close to the solution of the problem, he published the results received. 2. When using mathematical language, we avoid vagueness and unwanted extra meanings of our statements.

3. Being spread throughout the world, the Internet provides the connection of networks to enable computers and software to communicate.

4. While considering the group concept, the students must remember four axioms.

5. Being reduced the fraction does not change its value.

e) ***Participle II*** *is used as an* ***Adverbial Modifier***:

1. Expressed in terms of symbols, these relations produce a formula.

2. When used as scientific terms, these concepts have different meanings.

3. If designed and devised in a proper way, the symbolic language becomes universal.

4. When given the information, they were able to complete the research.

5. When asked about the measure of the circumference, the pupil could not say anything.

f) ***Perfect Participle (Active, Passive)*** *is used as an* ***Adverbial Modifier***:

1. Having obtained the necessary devices, we could finish our experiment.

2. Having become familiar with the main laws of statics, we can study the laws of dynamics.

3. Having made a lot of experiments, Faraday discovered the electromagnetic induction.

4. Having picked out the product corresponding to these tables, we obtained a coordinate system for the space.

5. Having been properly approached, the problem appeared easy to solve.

6. Having been invited to the conference, the scientist started preparing his plenary report.

2. Answer the following questions using the model.

Model 1: **Sp.** They used some new method of definition. Did it give good results?

St. Yes, the method used gave good results.

1. They made some measurements. Are the measurements accurate?

2. They received good results. Do these results satisfy them?

3. They demonstrated some experiments. Do these experiments relate to your work?

4. He has measured the volume of the container. Is the volume very large?

5. You have found this relation. Does it remain constant under ordinary conditions?

6. You have determined the length of this line segment. Does this length equal 10 centimeters?

Model 2: Sp. He works at the Bureau of Standards. Does he deal with the units of measurement there?

St. You are right. Working at the Bureau of Standards, he deals with the units of measurements.

1. They follow that new method. Will they achieve good results?

2. We know length and time. Can we define velocity?

3. You were interested in these results. Did you discuss them?

4. The experiment was very important. Was it made accurately?

Model 3: Sp. Now, you have found the relation between these three lengths.

Can you define the volume?

St. Yes, having found this relation, we can define the volume.

1. Now, you have found the length in meters. Can you convert it into English yards?

2. They have just tested the new equipment. Will they put it into operation?

3. They have just measured the area. Can they show us the results?

4. They have calculated the sum of the areas of the two smaller squares. Will they find the area of the largest square?

3.Complete each of the sentences below by choosing one of the Participles given in parentheses.

1. An algebraic expression is one in which several numbers … (representing, represented, having been represented) are connected by signs … (being indicated, indicated, indicating) the operations and their order.

2. … (Defining, Having defined, Being defined) the first and the second lengths, we may find the area.

3. We explained the binary system … (being given, giving, having been given) a specific example.

4. We can always get a closer approximation … (adding, added, having been added) digits at the right.

5. Unless otherwise … (stating, stated, being stated), the values used are taken in the decimal system.

6. No number exists which has a negative value when … (multiplied, multiplying, having been multiplied) by itself.

7. … (Leaving, Having left, Being left) alone, they kept silence for some time and didn't know what to speak about.

8. Maths is a device … (designing, having designed, designed) to enlarge human power.

4. State the forms and functions of Participles in the following sentences and translate them.

1. Discussing some interesting problems, they didn't notice when somebody came in.

2. Being interested in mathematics, Tom spends more time on it than on any other subject.

3. Having informed her before, I was sure that she was waiting for me.

4. Don't forget to put the lights out when going to bed.

5. Being given two more days, the student could complete his term paper.

6. Having been considerably improved, the device was widely used in research.

7. When asked about his experiments, the scientist refused to give any details.

8. The substance obtained was thoroughly investigated.

9. The phenomenon was rather complicated and the processes involved are not yet clear.

10. A graph is given showing the dependence of pressure on temperature.

11. When crossing the street, first look left and then right.

12. The method followed by Professor Webster A.G. was accurate.

5. In which of the following English sentences the italicized group of words will be translated as:

1. Достигнув успеха …

a) *Having been achieved* the success did not prevent the scientist from working hard and developing the problem.

b) *Achieving* success and recognition some scientists stop working hard.

c) *Having achieved* success and recognition, the scientist went on working hard over his problem.

2. Используя алгебру …

a) *Having used* algebra, we can reduce complex problems to simple formulas.

b) *Using* algebra, we can reduce complex problems to simple formulas.

c) *Being used,* algebra helped us to reduce complex problems to simple formulas.

3. Поняв идею …

a) *Having understood* the idea, we can simplify our notation.

b) *Understanding* the idea, we can simplify our notation.

c) *Having been understood,* the idea turned out to be a simple one.

6. Transform the following sentences into Participle I constructions.

Model: The sign that stands for an angle … The sign standing for an angle …

1. The line which passes through these two points is a diameter.

2. If you express these statements in mathematical terms, you obtain the following equations.

3. A decimal fraction is a fraction which has a denominator of 10, 100, 1000 or some simple multiple of 10.

4. The mathematical language, which codifies the present-day science so clearly, has a long history of development.

5. When we amalgamate several relationships, we express the resulting relation in terms of a formula.

6. If we try to do without mathematics, we lose a powerful tool for reshaping information.

7. Calculus, which is the main branch of modern mathematics, operates with the rules of logical arguments.

8. When we use mathematical language, we avoid vagueness and unwanted extra meanings of our statements.

9. When scientists apply mathematics, they codify their science more clearly and objectively.

10. The person who looks at a mathematical formula and complains of its abstractness, dryness and uselessness fails to grasp its true value.

11. The book is useful reading for students who seek an introductory overview to mathematics, its utility and beauty.

12. Math is a living plant which flourishes and fades with the rise and fall of civilizations, respectively.

7. Transform the following sentences using Participle II constructions.

Model: 1. The reasons which ***are given*** for the study of mathematics … The reasons ***given*** for the study of mathematics …

2. When they ***are expressed*** in terms of symbols, these relations produce a formula. ***Expressed*** in terms of symbols, these relations produce a formula. Когда эти отношения выражены символами, они …

1. The procedure which was suggested at the meeting of the team had a number of advantages.

2. When they are used as scientific terms, these concepts have different meanings.

3. The formal language which is spoken in this country is Russian.

4. The tasks which were set for the students to fulfill were rather difficult.

5. If it is expressed in mathematical terms, this theorem gives a general method of calculating the area.

6. The sense which is implied in this assertion is not quite clear.

7. If it is designed and devised in a proper way, the symbol language becomes universal.

8. When math is used in any science, it brings precision, rigor and objectivity about.

9. The theory which was discussed at the seminar aroused great interest.

10. The code which has been designed by the programmer is rather inconvenient.

11. The statement which was made by the researcher did not satisfy certain conditions.

12. The rules that are learnt by the students are very important for their future professional activities.

8. Translate the following word combinations into English using either Participle I or Participle II.

1) решения, отвечающие нашим требованиям; 2) наука, обеспечивающая высокий уровень жизни общества; 3) приборы, изобретенные нашими инженерами; 4) методы исследований, хорошо известные ученым; 5) мир, созданный наукой; 6) функция, определенная посредством формулы; 7) прямая, соединяющая две точки; 8) угол, делящий плоскость; 9) разделенная диагональ; 10) примененный метод; 11) работа, продолженная на следующий день; 12) предмет, взятый в качестве модели.

9. Read and translate the following sentences. Write out (in row) the numbers of sentences in which the Participle is used as:

a) ***an Attribute***

b) ***an Adverbial Modifier***

1. Given two sets *X* and *Y*, there is a set whose elements are those which belong only to one of the two given sets.

2. Expressed in math terms, this theorem gives a general method of calculating the area.

3. The sense implied in this statement is not clear.

4. Certain properties of the real world can be described using numbers.

5. When finding the product of multinomials, we make use of the distributive law.

6. The group of integers under addition has subgroups comprising all even integers.

7. Lobachevsky wrote a new geometry asserting that there could be several parallels.

8. Having calculated the area, we can say now that the formula is exact.

9. Parallel lines are lines extending in the same direction and being the same

distance apart no matter how far extended.

10. Having supposed the inequality, we obtained the necessary results.

11. Considering specific physical phenomena, we may see that one and the same quantity in one phenomenon is a constant while in another it is a variable.

12. Having started from a system of axioms, we then could make certain logical deductions.

13. The statements followed by some illustrations were rather convincing.

10. Change each sentence using either an adverbial clause of time (after…) or Perfect Participle Active (having …).

Model: After we ***had combined*** these two groups, we produced a new set. ***Having combined*** these two groups, we produced a new set. После того как мы объединили эти две группы, мы получили новое множество. Объединив эти две группы, мы получили новое множество.

1. After we had considered the phenomena separately, we managed to establish a proper correspondence between them.
2. Having read the text closely, we understood the problem correctly.
3. After we had assigned numerals to these points, we established two one-tone correspondences between a set of numbers and a set of points.
4. Having obtained different results, we arranged a discussion.
5. After we had carried out the experiment, we understood that the machine had certain advantages.
6. Having analysed the situation properly, we found a solution to the problem.
7. After we had intensified the whole process, we managed to meet the deadline. 8. After we had tested the new computer, we came to the conclusion that it was more powerful than the old model.
9. Having replaced the variable with the proper numeral, we received a true sentence.
10. After we had checked the result, we could see that it agreed with the expected one.
11. Having solved the equation, they obtained the necessary data.

11. Translate the sentences from Russian into English. State the functions and the forms of the Participles.

1. Mathematicians have developed geometric ideas from the world around us having many physical objects.

2. When naming geometric ideas we usually use letters of the alphabet.

3. The line AB shown below is called a line segment as you might remember.

4. A line segment is a set of points consisting of the two end points and all of the points on the line between them.

5. A geometric figure being formed by a set of points is an abstract concept, it cannot be seen.

6. Having performed the operation of subtraction they found the difference.

7. Drawing a straight line I used a ruler.

8. The program improved by the expert was checked yesterday.

9. The procedure being fulfilled by the researchers needed modern equipment.

10. The translated text dealt with the practical use of geometry.

11. Working in various fields of science Lomonosov also have much of his time to practical application of natural sciences.

12. Testing the new system over and over they found the error at last.

13. All the necessary changes having been made, the experiment showed different result.

14. When asked to compare the two approaches he agreed immediately.

12. Translate the sentences from English into Russian. Denote the function of the Participle in the sentences.

1. The student writing a new programme works for our research department.
2. Solving these problems we must use a new rule.
3. While/ When solving a problem use a computer.
4. Students are considering the properties of sets.
5. The computers being developed now will be extensively used.

6. Being written on time, the article was published in the journal.

7. The system which is being tested seems very complicated.

8. The proposed method was used in our calculations.

9. The method proposed by the mathematician was used in our calculations.

10. The method just referred to is of great interest.

11. Translated from the language of mathematics into everyday language the relation became easier to understand.

12. As seen from the results the information was carefully collected.

13. When given enough time he will write his paper.

14. Unless properly constructed the device will not be reliable.

15. He was told about some new developments in this field of mathematics.

16. Having answered the instructor's questions, the student left.

17. Having been given the problem we began to analyse it.

13. Choose the correct form of the Participle.

1. (to name) geometric ideas we usually use letters of the alphabet.

2. We insisted on the (to follow) notation of the geometric object.

3. (to divide) both the numerator and the denominator by x you will get the following expression.

4. When (to speak) with my science adviser I got better understanding of the latest development in my special field.

5. The properties of the material (to use) in the experiment now are given in the latest article.

6. The advantages of the new system (to prove) by many tests are very important.

7. Two angles (to have) the same vertex and a common side are refered to as adjacent angles.

8. The concepts (to introduce) at the seminar should be considered in detail.

9. The (to obtain) difference must be checked carefully.

10. The (to expect) result must prove that this law holds for similar cases.

14. Change the sentences using the Participle Forms, follow the model.

Model: *I have got a book which deals with computers.*
I've got a book dealing with computers.

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.

Model: *The material which is used in the article is true.*
The material used in the article is true.

1) The most prevalent calculator in the United States is the slide rule, which is based on the principle of logarithms.

2) One of the original calculators was undoubtedly a version of the Japanese abacus, which is still in use today.

3) Most calculators are based on the fundamental mathematical principle which is called the binary number system.

4) The calculators which were traced back to the Tigris Euphrates Valley 5000 years ago are original.

UNIT 6. THE ABSOLUTE PARTICIPLE CONSTRUCTION
Nominative Absolute Participle Construction (Самостоятельный причастный оборот)

Самостоятельный причастный оборот – это такой оборот, в котором причастие имеет свое собственное

подлежащее, выраженное **существительным в общем падеже или местоимением в именительном падеже**. В конструкции может использоваться как причастие I, так и причастие II. Самостоятельный причастный оборот может стоять в начале или в конце предложения. Если независимый причастный оборот стоит **в начале предложения**, он переводится на русский язык придаточным предложением времени, причины, условия с союзами **когда, так как, если, поскольку**. Независимый причастный оборот **в конце предложения** обычно переводится самостоятельным предложением (иногда со словами **при этом, причем** и при помощи союзов **а, и, но**). Иногда предлог "with" вводит самостоятельный причастный оборот, что не влияет на перевод. В предложении независимый причастный оборот **выделяется запятой** и выполняет функцию обстоятельства. Самостоятельные причастные обороты широко употребляются в литературных произведениях и в научной литературе, но редки в обычной речи.

The classroom being occupied, they had to wait a little.

Поскольку аудитория была занята, им пришлось немного подождать.

The article having been translated, the student showed it to the teacher.

Когда статья была переведена, студент показал её преподавателю.

Two of them headed toward the director's office**, the other three staying in the hall.**

Двое из них направились к кабинету директора, **а** трое других остались в коридоре.

Sydney is the largest city in Australia**, with Melbourne being the second largest**.

Сидней – самый большой город в Австралии, **а** Мельбурн – второй по величине.

She listened to his story quietly**, with her eyes closed.**

Она слушала его рассказ спокойно**, при этом** её глаза были закрыты.

1. ***Read the following sentences, in which the Absolute Participle Construction is used at the beginning of the sentence. Translate them into Russian***.

1.The dictionaries being brought, we were given texts for translating.

2. All the preparations completed, we could start the experiment.

3. The first part of the work having been finished, the results were published in a journal.

4. The report being well written, it was read with pleasure.

5. Most of the work having been done, we decided to have a rest.

6 The article being difficult, I couldn't translate it without your help.

7. The advantages of the new machine being obvious, we decided to make use of it.

2. ***Read the following sentences in which the Absolute Participle Construction is used at the end of the sentence. Translate them into Russian***.

1. They finished the experiment, the result being quite satisfactory.

2. My friend was asked many questions, some of them being very difficult.

3. The teacher gave me two abstracts yesterday, both containing interesting facts. 4. The professor spoke about the latest achievements in the national economy, his lecture being illustrated with diagrams.

5. The plan was discussed in details, many scientists taking part in this discussion. 6. Many results used before remain true for our case, the proofs being similar.

7. We may use two different methods, the first being a more general one.

3. Read the following sentences, translate them paying attention to the place of the Absolute Participle Construction.

1.The examinations being over, most of the students left the city.

2. Cybernetics is a well-known branch of science; it being still developed in the 21st century.

3. Most of the students of our group go in for sports, many of them being fond of gymnastics.

4. With the value of x being given, the velocity of a body can easily be computed. 5. The sides of the triangle having the same measure, the angles opposite these sides have the same degree measure.

6. The area of a circle is given by the formula $A = \pi r2$, r representing the radius. 7. Every measurement can be named in many different ways; the most convenient name being chosen in every case.

8. With the distance having been defined, you can expect to find the speed.

4. Change the following according to the model. Use the Absolute Participle Construction.

Models: a) Since (as) numbers 4.12 and 3.5 are names for fractional numbers, we may write them as complex fractions.

Numbers 4.12 and 3.5 being names for fractional numbers, we may write them as complex fractions.

b) After the experimental work had been completed, they could publish the results obtained.

The experimental work having been completed, they could publish the results obtained.

1. As the speed of light is extremely great, we cannot measure it by ordinary methods.

2. After the first question had been considered, we could pass over to the next one. 3. Since other conditions are equal, the acceleration will be the same.

4. After the set of axioms had been accepted, we could predict many new properties of the system involved.

5. After the theorem had been stated, the students could begin solving it.

6. After all the necessary changes had been made, the experiment showed different results.

7. Since *a* and *b* are real numbers, the general expression *a + bi* represents a complex number.

8. As the measure of the circumference is given, you can find the area of the interior of the circle.

UNIT 7. THE GERUND. ITS FORMS AND FUNCTIONS
FORMS OF THE GERUND

1. Study the functions of the Gerund. State their forms. Translate the sentences into Russian.

a) *the Gerund is used as a* ***Subject****.*

1. Writing a sentence in algebraic form, as we have seen, involves two steps.

2. Drawing a straight line in one direction gives you a one way extension.

3. Reducing a fraction means bringing it to lower terms.

4. Reading slowly is useful for beginners.

5. Locating the point on the y-axis gives you the first point on the line.

6. Knowing the properties of equality will help you decide whether a sentence is true or false.

b) *the Gerund is used as a part of a* ***Predicate****.*

1. Our task is proving the correctness of the given statement.

2. The young scientist began experimenting.

3. We expected being given further assistance.

4. This terminology needs improving.

5. The scientist expected being included in the experimental group.

6. She stopped investigating the problem as her approach was wrong.

c) *the Gerund is used as a* ***Direct object****.*

1. We discussed improving the shape of the model.
2. Do you mind being examined first?
3. I don't remember speaking to him about this fact.
4. Avoid making such bad mistakes.
5. They are busy now reading the text.
6. He suggested taking part in this conference.

d) *the Gerund is used as a* ***Prepositional object****.*

1. He was prevented from finishing his work.
2. We succeeded in accomplishing our task.
3. He insisted on writing the thesis as soon as possible.
4. These computers are capable of solving systems with a hundred or more unknowns, if necessary.
5. They are concerned with applying their knowledge of the subject to solving these problems.
6. We cannot agree to testing the new method without being given additional time.

e) *the Gerund is used as an* ***Attribute****.*

1. What ways of learning words do you find most effective?
2. This is the method of doing such tasks.
3. I can't improve my English because I don't have any opportunities of speaking it.
4. The idea of using symbols instead of words proved very helpful.
5. There exists a very efficient algorithm for solving most linear programming problems.
6. The procedure of reducing a fraction to its lowest terms is not complicated.

f) *the Gerund is used as an* ***Adverbial modifier****.*

1. In considering the problem we have to deal with the laws of motion.

2. The product may be found by multiplying the factors contained in the given mathematical sentence.

3. We can't agree to testing the new method without being given additional time. 4. In naming geometric objects we often use capital letters.

5. By applying the knowledge of geometry you can locate the point in the plane.

6. After discussing the problem in detail they found the best solution.

2. State the form and the function of the Gerund. Translate the sentences into Russian.

1. We insisted on carrying out another experiment to check the results.

2. The absolutely new contribution made by Descartes was in importing the idea of motion into geometry.

3. This is the basic method of solving problems of statics.

4. It is worth noting that the work of the early Arab mathematicians makes no clear division between arithmetic and algebra.

5. Since the equation is linear and has constant coefficients it can be easily solved by using classical differential equation theory.

6. He also improved the notation for representing the extraction of roots.

7. Combining the integrals gives the following equation.

8. The preceding definitions have laid the foundation for considering the variation of a functional.

9. Leonardo's solution is worth quoting for its elegance.

3. Put the Gerund in the correct form. Use prepositions where necessary.

1. She continued (to translate) the text from English into Russian.

2. He found the product (to multiply) the numerals.

3. She is afraid (to take) the exam.

4. He used a ruler (to draw) a straight line.

5. One must be very careful (to measure) the volume of an object.

6. They insist on the question (to reconsider).

7. She stopped (to investigate) the problem as her approach was wrong.

8. The problem (to discuss) various points of view was a very useful exercise.

9. Measurement is a process (to associate) numbers with certain objects.

4.Insert prepositions (in, of, to, from, by). You can use the same preposition

in more than one sentence.

1. His mathematical power, which never failed him to the end of his life, was employed at this period originating the calculus of probabilities, and inventing the arithmetical triangle.

2. The mathematician who came nearest solving the challenge questions issued by Pascal on the cycloid (циклоид) was John Wallis.

3. But he differs from B. F. Cavalieri (an Italian mathematician) regarding lines as made up of infinitely small lines, surfaces of infinitely small surfaces, and volumes of infinitely small volumes.

4. Leonardo's favorite method solving many problems is by the method of 'false assumption', which consists assuming a solution and then altering (изменение) it by simple proportion as in the rule of three (вычислительный метод в математике).

5. We have succeeded verifying that the increment (приращение) can be written in the form of the following equation.

6. His famous experiment dropping bodies of different weights from the tower of Pisa enabled him to demonstrate that all bodies undergo the same acceleration falling towards the earth, a result which his experiment with light and heavy pendulums (маятники) also proved.

7. He also discusses solids generated revolving a curve about an axis, and in the last section deals with the problems of maxima and minima.

8. The intellectual trend of that time was such as to prevent mathematics becoming

a popular subject.

9. Since Euler's equations usually cannot be solved analytically, one naturally thinks using numerical integration.

10. F. Viet (a French mathematician) succeeded finding 23 of the 45 roots.

5. Change the time clause into the 'in + Gerund' structure.

Model: *He made a mistake when he was proving the theorem.*

He made a mistake in proving the theorem.

1. The solution of the cubic was, of course, unknown at that time, but Leonardo showed great ability when he obtained a very close approximate solution.

2. The middle years of the seventeenth century constitute the greatest period of mathematical activity, and when we describe the work of this period it must be remembered that mathematicians no longer worked in comparative isolation.

3. The fundamental theorem used when one finds extreme values of functions is the necessary condition that the differential vanishes at an extreme point.

4. When one considers the mathematical work of J. Kepler, one is chiefly impressed by the quality of his imagination.

5. The detailed investigation of this historical question is lengthy, but it is of sufficient interest and importance when we give the main facts.

6. We have already said that Henry IV was much struck by the ability shown by Viet when he was solving a certain problem.

7. Diophantus (Диофант) was satisfied with a single solution of such equations, and his amazing ingenuity (мастерство) was shown when he dealt with each equation as a particular case.

8. The variation plays the same role when one determines extreme values of functionals as the differential does when one finds maxima and minima of functions.

6. Answer the following questions using 'by + Gerund' structure.

Model: *How can you solve this problem? (to use Pythagoras' Theorem)*

We can solve this problem by using Pythagoras' Theorem.

1. How will the author introduce new concepts concerning functionals in this section? (to apply some familiar results from the theory of functionals)

2. How does Napier (a Scottish mathematician) obtain the notation of a logarithm? (to compare two motions)

3. How does Wallis (an English mathematician) reach several remarkable results in this work? (often to deduce general propositions from a number of particular cases)

4. How did he verify this result? (to extract the square root of $(1 - x2)$, and also to multiply the above series by itself)

5. How can we find six unknowns? (to solve the system of six equations)

6. How can we obtain the unknown quantities? (to solve the triangle)

7. How did mathematicians find a way out of the dilemma? (to change their conception of what a number is to what we nowadays call the real number)

8. How did he obtain a root of several cubics? (to use conic sections)

9. How does the search begin? (to find the curves that satisfy the fundamental theorem)

7. Translate the sentences with the Complex Gerundial Construction.

Вспомните! Герундиальный оборот при переводе на русский язык всегда вводится словами: то, что; тем, что; как; после того, как.

Model: His having failed the exam was a great disappointment.

То, что он не сдал экзамен, было большим разочарованием.

1. Our being invited to take part in the conference is very important for us.

2. We heard of those equations having been solved by the students at the previous seminar.

3. Do you mind my being examined first?

4. Newton's having discovered the law of gravitation contributed much to the world science.

5. We knew of his having translated the text a week ago.

6. On lecturer's appearing in the hall, there was loud applause.

7. Their not having done the task was quite a surprise.

8. They know of his presenting a paper at the seminar.

9. His having proved the theorem was very important for him.

8. Translate the following sentences.

1. He is fond of ***studying*** the mathematical theory of probability.

2. We remember ***having read*** very much about two French mathematicians R. Descartes and P. Fermat.

3. The students remember ***having been read*** a lot of the importance of Analytic Geometry.

4. ***Proving*** theorems is his hobby.

5. ***Our being invited*** to take part in such conferences is very important for us.

6. My favourite occupation is ***analyzing*** curves.

7. He doesn't like ***studying*** geometric figures and curves.

8. I remember ***having told*** you about Euclidean geometry.

9. After ***proving*** mathematical theorems he made a short summary of it.

10. In spite ***of being tired*** the mathematicians continued their discussion.

11. You will never be able to draw up a graph of an equation without ***knowing*** rule well.

9. State whether the -ing form is the Gerund, the Participle or the Verbal Noun.

Give your reasons.

1. He was not a professional mathematician, **being** an engineer and an architect, but he came into contact with the greatest mathematicians of his time.

2. We started the **reading** of English books last year.

3. He repeated Torricelli's experiments, and showed that barometric **readings** really did depend on atmospheric pressure by **obtaining**, at the same moment, readings at different heights on the slope of the hill of the volcano.

4. By **considering** a number of special cases Cavalieri finally arrived at a theorem.

5. In the last section of the book various theorems are proved **relating** to the centrifugal force on a body **moving** in a circle.

6. Even today, despite the simple picture of the real numbers as the points on a line, university students of mathematics always have trouble **understanding** the formal (and highly abstract) development of the real numbers.

7. Similarly, most people have difficulty in **coming** to terms with complex numbers – numbers that involve the square root of negative quantities, such as $i = \sqrt{} - 1$.

8. Intuitively **speaking**, the norm of the difference of two functions should be zero if the functions are identical, small if the functions are "close", and large if the functions are "far apart".

9. John Pell was a minor seventeenth-century English mathematician who was mistakenly credited by Euler with **having** investigated this equation.

10. Translate into English using the following models:

1. *I can't help* doing the task. – *Я не могу не* сделать задание. (Не принять участия в этой конференции; не перевести этот текст с русского на английский, не доказать эти теоремы; не прочитать книгу.)

2. *It's no use* solving the problem. – *Бесполезно* решать эту задачу. (Пытаться найти эту книгу; объяснять это правило ему ещё раз; говорить с ними на эту тему; искать решение этого уравнения.)

3. *We enjoyed* reading this book. – *Нам понравилось* читать эту книгу. (Слушать лекцию этого профессора; участвовать в конференции; делать этот доклад; посещать семинарские занятия.)

4. *Do you mind* our attending your lecture? – *Вы не возражаете*, если мы посетим вашу лекцию? (Если он представит свою работу первым; если я немного опоздаю на занятие; если она попробует перевести это предложение ещё раз; если они сдадут экзамен раньше.)

5. *I remember* proving the theorem last week. – *Помню*, что доказывал эту теорему на прошлой неделе. (Читал этот текст на английском, учил эти слова, обсуждал эту книгу с ним, переводил эти статьи.)

11. Join the two sentences to make one sentence, beginning with a gerund.

Model: *She's a teacher. It's hard work.*

Being a teacher is hard work / Teaching is hard work.

1.Capital letters are used to name geometrical objects. It is very convenient.

2. You are to classify these quadrilaterals. It requires the knowledge of some properties.

3. We are going to locate this point on the y axis. It will give us the first point on the line.

4. The student intends to divide a circle into a certain number of congruent parts. It will help him to obtain a regular polygon.

5. The base and the altitude of a rectangle are to be multiplied. It will give the product of its dimensions or the area of the rectangle.

6. Don't argue! It's no use. In a crossed quadrilateral, the interior angles on either side of the crossing add up to 720°.

7. Don't deny this fact! It is useless. A square is a quadrilateral, a parallelogram, a rectangle and a rhombus.

8. You are going to divide a heptagon (a 7-sided polygon) into five triangles. Is it any good?

12. Complete the sentences using a gerund as an attribute.

1. I didn't very much like the idea of … .
2. What is the purpose of … ?
3. She had no difficulty (in) … .
4. You have made great progress in … .
5. He was late, and he was afraid of … .
6. Can you imagine the pleasure of … .
7. He always produces the impression of … .
8. I am afraid you do not realize the importance of … .

13. Complete the sentences using a gerund as an attribute.

1. I didn't very much like the idea of … .
2. What is the purpose of … ?
3. She had no difficulty (in) … .
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5. He was late, and he was afraid of … .
6. Can you imagine the pleasure of … .
7. He always produces the impression of … .
8. I am afraid you do not realize the importance of … .

14. Complete the second sentence so that it has a similar meaning to the first one. Use the word in bold and other words to complete each sentence.

(forward to, interested in, prevents from, am used to, feel like, can't stand, apologized for, suggest)

1. I'll be happy when I can have a rest after exams. I'm looking ... a rest after exams.

2. Learning new geometric theorems is something I like doing. I'm always ... new geometric theorems.

3. If I study a lot at night, it keeps me awake.... Studying a lot at night ... sleeping.

4. I often operate the computer at university. I ... the computer at university.

5. He didn't want to take the books back to the library. He didn't... the books back to the library.

6. He hates it if he has to do a lot of boring exercises. He ... a lot of boring exercises. 7. 'I'm sorry. I've broken the speed limit', said Sue. Sue ... the speed limit.

8. Let us write a new program. I ... a new program.

15. **Translate the following sentences paying attention to the use of the Gerund.**

1. The students expected being included in the experimental group.
2. Drawing a line in one direction gives you a one-way extension.
3. In naming geometric objects we often use capital letters.
4. We discussed improving the shape of the model.
5. The method is certainly worth applying.
6. He remembered having seen her at the last conference.
7. You should avoid changing the direction of your further investigation.
8. He suggested exchanging information on the subject.
9. They could not avoid including him in their research group.
10. This terminology needs improving.
11. One cannot feel the Earth's moving.
12. The idea of using symbols instead of words proved very helpful.
13. Writing a sentence in algebraic way involves two steps.
14. Our task is proving the correctness of the given statement.
15. The researchers began looking for another solution.

16. **Translate these sentences paying special attention to the ing-forms.**

1. Newton created his theory of Universal Gravitation being only 24 years old.
2. All the necessary changes having been made, the experiment showed different results.
3. With the work completed, it was possible to use the new data in the article.
4. We have defined these sets as being equal.
5. It is no use performing this operation now.

6. Having reduced the fraction, we obtained the expected result.

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.

11. The speed of light being extremely great, we cannot measure it by ordinary means.

12. Other things being equal, the given relationship holds for this particular case.

13. With the distance defined, you can expect to find the speed.

14. With an object moving at constant speed, the distance covered is directly proportional to time.

15. The sides of triangles having the same measure, the angles opposite these sides have the same degree measure.

16. The two scientists doing research independently made it possible to create two essentially different ways of solving the same problem.

UNIT 8. THE INFINITIVE. ITS FORMS AND FUNCTIONS

The Forms of the Infinitive

The Functions of the Infinitive

1. ***Translate the following sentences paying attention to the function of the Infinitive as:***

I. *Subject.*

Models: a) '*To'* + *Infinitive* before the predicate (It's formal)

To make mistakes is easy. *Совершать* ошибки легко.

b) *It + the Infinitive clause* (‘*It*’ is a preparatory subject).

It’s easy *to make* mistakes. Легко *совершать* ошибки.

1. To solve the equation is to find the numerical values of the unknowns.

2. It’s not difficult to define which of the numbers is less.

3. To evaluate an expression means to substitute the numerical equivalents for the letters.

4. To find the logarithm of the given number means to find its exponent.

5. To prove a theorem in a deductive system is to show that it is a necessary logical consequence of some previous proposition.

6. It’s necessary to determine this distance for further research.

7. It’s difficult to refuse his invitation. 8. It’s nice to be sitting here with you.

II. *Object.*

Model: You have the right *to remain* silent.

У вас есть право *хранить* молчание.

1. They expected to be given complete information.

2. This force caused the body to move.

3. The use of algebra in geometry permits one to speak of a space of more than three dimensions.

4. We were asked to solve the equation in three variables.

5. The students wanted to investigate the properties of square matrices.

6. The word “smooth” is used to suggest that the motion of a point has no abrupt changes of direction.

7. The teacher told me to speak loudly in order that everyone could hear me.

8. She wants to visit a lot of exciting places in Europe.

III. *Adverbial modifier of purpose or result.*

Models: a) He went to the florist *to buy* a bouquet of flowers.

Он пошел в цветочный магазин *купить* букет цветов.

(adverbial modifier of purpose).

b) I woke one morning *to find* myself famous.

Однажды утром я проснулся *и обнаружил*, что я знаменит.

(adverbial modifier of result).

c) after *too* + adjective *(слишком …, чтобы)*

after adjective /adverb + *enough (достаточно …, чтобы)*

He is too tired *to answer* my questions.

Он *слишком* уставший, чтобы *отвечать* на мои вопросы.

The text is difficult enough to understand it at once.

Текст *достаточно* сложный, чтобы *понять* его сразу же.

1. To understand some formulas, she used the text-book of mathematics.
2. To raise a power to a power, it is sufficient to multiply their exponents.
3. To simplify an expression in two unknowns, one transforms it in the same way as an equation in one unknown.
4. To keep the number unchanged in value, we must multiply it by the same power of ten.
5. He checked the results of the experiment only to find it didn't agree with the expected one.
6. He looked around to see them coming up.
7. She went to see her old friend only to find out he was away.
8. She is clever enough to win the competition.
9. He is too young to stay out so late.

IV. *Predicative or Part of Predicate.*

Models: a) His course paper is *to be submitted* in May.

Его курсовая работа *должна быть представлена* на рассмотрение в мае.

b) Her dream is to become a good programmer.

Ее мечта – стать хорошим программистом.

(The Infinitive follows the subject expressed by the words: *task, method, plan, problem, aim, purpose and function*).

c) *part of a modal predicate*

He must have studied several proofs of this theorem.

Он, вероятно, изучил несколько доказательств этой теоремы.

1. Fortunately, people can visualize or picture two- or three-dimensional ideas by means of drawing on paper.

2. They should have used some graphs.

3. They might have permitted them to reason from visual pictures.

4. A more general treatment of the whole subject is to be found in the monograph. 5. Our aim is to master this subject.

6. We are to use a similar device in triple integrals.

7. They had to change the date of the conference.

8. Their intention was to win the first prize in the competition.

V. *Attribute (in post-position)*

Models: a) after abstract nouns and concrete nouns.

There is every reason to *believe* it.

Есть все основания *поверить* этому.

I want some paper to write on.

Мне нужна бумага *для письма.*

b) after pronouns.

I have nothing to *tell* you.

Мне нечего тебе *сказать*.

c) after adjectives.

I’m sorry *to leave* you.
Мне жаль *уходить* от вас.
I was glad to meet him.
Я был рад *познакомиться* с ним.
d) after *the last, the first, the only*
She was the last *to leave* the room.
Она *последней вышла* из комнаты.

1. The terms to be insisted on are as follows.
2. The first issue to be considered is one about the coming examinations.
3. All operations to be performed in succession will give the expected result.
4. This student was the first to prove this law.
5. There will be six independent elements to be determined.
6. The proof to be tested concerns the conditions of function series convergence.

2. ***Read the sentences and state the form and the function of the Infinitive.***

Translate into Russian.

1. Einstein was to develop the theory of relativity which replaced Newton’s theories of gravity.
2. It’s important to save your work before you switch off the computer.
3. Students are under enormous pressure to learn huge amounts of vocabulary.
4. It’s easy to be wise after the event, as the saying goes.
5. We assembled to discuss and arrange our plans.
6. He was the first to claim to have solved the problem.
7. I’m glad to have finished the translation of this article.
8. The plane to be constructed should contain two intersecting lines.
9. We need to introduce a function in order to solve the equation.

10. They must be determining now whether a given equation is or is not solvable algebraically.

11. Jacobi was the first to apply elliptic functions to the theory of numbers.

12. To create one of the great masterpieces of all mathematics Lobachevsky had to have been working for twenty years or even more.

3. ***Open the parentheses and give the correct form of the Infinitive.***

1. The methods (to describe) the motion are widely used.

2. In order (to find) the square of a number you are to multiply it by itself.

3. Had Gauss found Clerk Maxwell's equations of the electromagnetic field, he might (to be satisfied).

4. Differential geometry may roughly (to consider) as the study of properties of curves, surfaces, and their generalizations by means of the calculus.

5. He was happy (to work) weeks or even months over his research and (to obtain) expected results.

6. Likewise on the surface of a sphere the coordinates in this case can (to think) as latitude and longitude.

7. The scientist had to show his mathematical genius (to make) discoveries in astronomy surpassing those of all his predecessors.

8. To show the way in which common logarithms are used to facilitate calculation attempts should (to make).

9. He pretended (to look) for necessary information via the internet.

4. Change the verb in parentheses to a to-infinitive or-ing-form as appropriate.

1. Using algebra I like (reduce) complex problems to simple formulas, but I dislike (spend) too much time on such work.

2. We were meant (give) the definition of a curve but that

would have meant (consider) two fundamental problems of analytic geometry.

3. As you're so keen on (get) to know more about education in Oxford University, you'll probably be keen (visit) it.

4. I regret (inform) you that you have not been enrolled for this course.

5. Fortunately I remembered (hand) in the abstract by the end of the week, but to be honest I don't remember (do) so.

6. She stopped (make) a speech about outstanding mathematicians and he decided (ask) her some questions.

7. To stop (think) about things for a while is something we all need to do.

8. Have you ever considered (study) mathematical analysis; it is considered (be) one of the most difficult subjects of mathematics.

5. ***Choose the correct form of the Infinitive or the Gerund.***

1. I'll never forget … four more or less happy years in Cambridge.

a) to have spent; b) having spent

c) spending d) to spend

2. Only to enumerate all the fields of mathematics he enriched would take more space in the book than can … to one man.

a) have been devoted b) to be devoted

c) to devote d) be devoted

3. This time next week I'll … to the lecture on the applications of the calculus to curved surfaces (twisted curves).

a) be listening b) being listened

c) listen d) have listened

4. Some of the mathematicians in the 19th century, notably Leibniz and De Morgan, went on … of adding logic itself to the domain of algebra.

a) to be dreaming b) to dream

c) being dreamt d) dreaming

5. I'm sorry … the problem of determining the equation of a locus.

a)have not studied b) not studying

c) not to have studied d) being not studied

6. Teachers do not allow … and … in the exams

a) to speak / cheat

b) to be spoken to / be cheated

c) speaking / cheating

d) speaking / to cheat

7. The accuracy of the root needs … Why not … the number to the power?

a) being checked /raising

b) be checked /be raised

c) to be checked /raise

d) checking /to raise

8. The theory of analytic functions of a complex variable … one of the greatest fields of mathematical triumphs in the nineteenth century.

a) should have been b) were to have been

c) must have been d) might have been

6. Change the following sentences using infinitive to express the purpose.

Model: We have to subtract this number from the sum obtained because we want to check the result of addition. – To check the result of addition, we have to subtract this number from the sum obtained.

1) We must know the details because we want to understand the situation. –

2) You must do the following because you want to operate this machine. –

3) He put the figures in a table because he wants to look at the data. –

4) He included the empty set at the beginning because he wants to have a complete table.

5) We made a conjecture and then proved this because we want to have the correct procedure. –

7. ***Match a line in A with a line in B.***

1) We apply the Euclidean algorithm	a) to denote sets.
2) We use the symbol e	b) let us use the unit circle.
3) We use the braces { }	c) to mean "is an element of ".
4) To clarify this idea	d) we return to one-dimensional geometry and line segments.
5) We draw a picture	e) we must find a statement that conforms to the rule stated above.
6) To fix our thoughts	
7) To find the negation of some statements,	f) to express GCD as a linear combination.
8) In order to introduce the concept of measure,	g) to show the physical realization on this vector sum.
	h) we present some examples of set.

8. Read these sentences and state the form and the function of the Infinitive. Translate into Russian.

1. To solve the equation was not difficult for her.

2. The speaker at the conference didn't like to be interrupted.

3. The article is difficult to translate.

4. He is always the first to come to the University.

5. The method to be applied is rather complicated.

6. He worked hard in order not to be behind the other students.

7. Our aim is to extend the definition.

8. It isn't easy to speak any foreign language.

9. Translate into Russian:

• To convert an improper fraction into a mixed number, break it up into the sum of an integer and a proper fraction

• To reduce a fraction to its lowest terms, divide the numerator and the denominator by their highest common factor (or: measure, or: divisor)

• To find the sum (the difference) of two unlike fractions, change them to like fractions (fractions having their least common denominator) and combine the numerators

• To find quotient of two fractions, multiply the dividend by the inverted divisor

• To find the product of two fractions, multiply the numerators together and the denominators together

• To reduce a fraction to higher terms, multiply the numerator and the denominator by the same number.

10. Choose the correct variant of translation.

1. It's difficult to study a foreign language.

a) Это трудный иностранный язык для изучения.
b) Трудно изучать иностранный язык.
c) Изучать иностранный язык было трудно.

2. He hopes to pass his examination in mathematical analysis.

a. Он надеется сдать экзамен по математическому анализу.
b. Он надеялся на сдачу экзамена по математическому анализу.
c. Он будет надеяться на сдачу экзамена по математическому анализу.

3. She was writing the dictation very carefully in order not to make mistakes.

a. Она написала диктант очень осторожно и не сделала ошибок.

b. Она писала диктант внимательно и в правильном порядке, не делая ошибок.

c. Она писала диктант очень внимательно, чтобы не сделать ошибок.

4. I'm sorry not to have seen this film in English at the lesson.

a. Мне жаль, что на уроке я не посмотрела этот фильм на английском языке.

b. Я сожалею о том, что не посмотрю этот английский фильм на уроке.

c. Я не сожалею о том, что не посмотрел этот фильм на уроке английского.

4. He read the rule several times to understand it better.

a. Он читает правило несколько раз, чтобы понять его лучше.

b. Он прочитал правило несколько раз, чтобы лучше понять его.

c. Он читал правило несколько раз и понимал его лучше.

5. This is just the person to speak to on this problem.

a. Вот человек, о котором говорится в этой проблеме.

b. Это как раз тот человек, с которым можно поговорить на эту тему.

c. Только с этим человеком говорят об этой проблеме.

11. Identify the non-finite forms of the verb in the following text: the gerund, the participle or the infinitive.

The Value of Solving Problems in Mathematics

There is much *thinking and reasoning* in mathematics. The students master the subject matter not only by *reading and learning*, but by *proving* theorems and *solving* problems. The problems, therefore, are an important part of *teaching*, because they make the students discuss and reason and polish up their own knowledge. To understand how experimental knowledge is matched with theory and how new results are obtained, the students need to do their own *reasoning and thinking*. Of course, it is easier for both teacher and student if the text states all the results and outlines all the **reasoning**; but it is hard to remember such *teaching* for long, and harder still to get a good *understanding* of science from it. *Solving* problems, you do your own *thinking*, and for this reason, problems form a very important part of *teaching*. Some questions *raised* by the problems obviously do not have a single, unique or completely correct answer. More than that, the answers to them may be sometimes *misleading*, *demanding* more reasoning and further proving. Yet, thinking your way through them and *making* your own choice and *discussing* other choices are part of a good education in science and a good method of *teaching.*

UNIT 9. THE INFINITIVE CONSTR UCTIONS. THE OBJECTIVE WITH THE INFINITIVE. CONSTRUCTION (COMPLEX OBJECT).

***The Objective with the Infinitive Construction (Complex Object)*:**

a) **With the verbs: *to want, to wish, to like, to love, to prefer and to desire*.**

Example. I want ***you to participate*** in the experiment.

Я хочу, чтобы вы участвовали в этом эксперименте.

1. The teacher wanted his *students to learn* as quickly as possible. 2. I prefer *you to call* me by my first name. 3. He would

like *me to change* my mind. 4. They wished *the article to be published* next month. 5. We want *one of her best students to be granted* a scholarship.

b) **With the verbs: *to order, to ask, to tell, to advise, to allow, to forbid and to cause.***

Example. Did he allow ***you to take*** the dictionary? Он разрешил тебе взять словарь?

1. Professor permitted *us to be helped* with the solution of the problem. 2. We don't allow *students to cheat or talk* to each other during exams. 3. I advise *you to look for* a new job. 4. They ordered *us to finish* our projects until Tuesday. 5. She asked *everybody not to use* the office photocopier.

c) **With the verbs: *to think, to believe, to mean, to admit, to expect, to suppose, to***
consider, to know and to prove.

Example. She knows York to be a historic city in England with many ancient buildings.

Она знает, что Йорк исторический город в Англии, где много древних зданий.

1. In the future they suppose *students to use* computers instead of text books. 2. We expect you *to be able to account* for this mistake. 3. I suppose *the sense* of beauty *to be* very personal and subjective. 4. We consider the algebraic *language* of analytic geometry *to have* both advantages and disadvantages. 5. They know *maths to provide* basic tools for computer science.

Complex Object + with Infinitive without 'to'

a) **With the verbs: *to see, to feel, to watch, to notice and to hear.***

Example. Do you feel the Earth move? Вы чувствуете, как Земля движется?

1. We cannot see a *point move* along the line. 2. We both heard *him say* that I was leaving. 3. The students watched their *teacher draw* two perpendicular lines. 4. Nobody heard *him complain* about being overworked. 5. He noticed *them walk* out of the building together laughing and joking.

b) **With the verbs: *to let, to make (заставлять), to have*.**

Example. Let him stay up late tonight. Разрешите ему позже лечь спать сегодня вечером.

1. She made *him accept* full responsibility for the accident. 2. Shall I have my *secretary send* you the details? 3. Let *him solve* this cubic equation in terms of substitution. 4. You can't make *her come* on time. She is not punctual. 5. The teacher let his *students use* a calculator in the test.

1. Translate these sentences into English using Complex Object.

1. Мне бы хотелось, чтобы эта задача была решена другим способом. 2. Декарт (R. Descartes) хотел, чтобы методы, используемые математиками, были обобщены и расширены. 3. Гений и трудолюбие Эйлера (L. Euler) позволили ему стать самым плодовитым (prolific) математиком за всю историю ее существования. 4. Ученые полагают, что эта теория может стать основой для получения многих новых идей в науке. 5. В соответствии с постулатом геометрии мы знаем, что точка M и направляющий вектор q определяют прямую линию L. 6. Сегодня мы заставляем компьютер решать сложные задачи, запоминать непростые цепочки операций, рисовать графики и выполнять другую полезную и нужную работу.

UNIT 10. THE NOMINATIVE WITH THE INFINITIVE CONSTRUCTION (COMPLEX SUBJECT)

The Nominative with the Infinitive Construction (Complex Subject) Subject + /*predicate*/ + ***to – Infinitive***.

a) **With the predicate in the passive voice:** ***to see, to believe, to suppose, to expect,***

to think, to know, to announce, to report and to say.

Example. ***He*** is believed ***to be*** a great authority on the subject. *Считают*, что он крупный специалист по этой теме.

1. Unless stated otherwise, curves are always assumed to be simple, that is they do not intersect.

2. The binary system is expected to be appropriate to the nature of an electronic machine.

3. The Earth is known to rotate and as a result it has the shape of a ball.

4. When the limits of integration to be performed are stated, the integral is said to be definite.

5. Lack of oxygen is believed to make people lose health.

b) **With the predicate in the active voice:** ***to seem, to appear, to happen, to chance, to prove, to turn out.***

Example. His method proved to be the only possible one. *Оказалось*, что его

метод является единственно возможным методом.

1. I chanced to be passing when she fell and hurt herself.

2. Computers do not seem to be able to use their memories in the way human beings use theirs. 3. The fundamental concepts of many branches prove to have been suggested by physical experiments. 4. This function, whose graph is a line, appears to be classified as a linear function. 5. The graph turned out to be drawn without picking up the pencil.

c) **The predicate *to be + adjective (likely, unlikely, sure, certain)*.**

Example. The computer is not likely to make such mistakes. *Маловероятно*, что компьютер делает такие ошибки.

1. When the quantity is a constant multiple of another quantity, they are certain

to be directly proportional to one another. 2. He is unlikely to know what a discontinuous function is. 3. Such an effect is likely to be the result of an experimental error. 4. The traditional role of science seems to make people healthy and the world

a brighter place to live in. 5. Any quantity associated with a curve (e.g. the coordinates of a point on a curve, the length of a tangent to the curve) are sure to represent a function.

1. Change the sentences according to the model using the Complex Subject pattern.

Model: It ***is believed that he*** is an efficient specialist. **He is believed to be** an efficient specialist. Считается, что он опытный специалист.

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 the laboratory with such complex equipment. 6. It appears that they are unable to account for this absurd situation. 7. It seemed that he was an experienced researcher. 8. It happened so that the error was quickly detected. 9. It appears that the law holds for all the equations. 10. It is unlikely that most fundamental processes of arithmetic and algebra should change a great deal. 11. It was expected that the students knew the law. 12. It is known that these laws are applied to all kinds of exponents. 13. It is expected that the students remember these proportions. 14. It appeared that the procedure was appropriate. 15. It seems that the computation is correct. 16. It appears that these

statements are mathematically correct. 17. It is expected that the scientists will establish an appropriate pattern. 18. It is believed that the result is of great importance. 19. It is expected that he will speak on number relations. 20. It is unlikely that he will speak on the coordinate system.

2. Translate these sentences into English using Complex Subject.

1. Маловероятно, что этот план утвердят на собрании.
2. Несомненно, что они выбрали другую систему координат.
3. Оказывается, что если значение одной тригонометрической функции *A* будет дано, то все остальные функции будут однозначно определены.
4. Предполагали, что полученные данные будут точными.
5. Говорят, что такое уравнение $(x + 1)2 + y2 = –4$ не имеет решения и описывает мнимую окружность.
6. Известно, что такие поверхности, как сфера или эллипс, характеризуются квадратными уравнениями.
7. Несомненно, что значение математики непрерывно возрастает.

2. Replace the Object Clause with Complex Object. See the models.

Example 1. I would like to draw both axes (she). She would like me to draw both axes.

1. The astronomers wish to locate this distant object in the sky. (they) 2. We expect to find the equation of the ellipse with foci at the points (0,4). (he) 3. We want to use analytic methods to find the equation of loci. (she) 4. I expect to prove the advantages of this system of notation in this particular case. (you) 5. He wants to interpret these facts correctly. (they)

Example 2. Scientists suppose that non-Euclidean geometries liberated the science.

Scientists suppose ***non-Euclidean geometries to have liberated*** the science.

1. We know that P. Fermat and R. Descartes came to develop analytic geometry almost simultaneously. 2. We believe that Cybernetics is the twentieth century Queen of sciences. 3. I know that more and more prospective employees take lie-detector tests. 4. Programmers assume that community networks, like public libraries, serve citizens and society. 5. He believed that concepts of importance in science had come to men with great difficulty.

3. Change the sentences with Complex Object to the sentences with Complex Subject.

Example. We know **the concepts** of gravity, of energy and of limitless space **to have taken** years to develop.

The concepts of gravity, of energy and of limitless space are known **to have taken** years to develop.

1. They believe men of genius to be required to express the concepts of importance in science. 2. We expect the best mathematical proofs to be short and direct. 3. I believe CD-ROM to be going to replace printed books and newspapers. 4. She supposes him to understand such simple sentences. 5. My science adviser expects me to take part in the international conference.

5. Choose the correct variant of translation.

1. We expect them to solve this problem.

a. Мы ожидаем, что они решат эту задачу.

b. Мы ждали, что они решат эту задачу.

c. Мы ждем их, пока они решат эту задачу.

2. They are believed to have done their best.

a. Они верят, что сделали все возможное.

b. Полагают, что они сделали все возможное.

c. Полагали, что они сделали все возможное.

3. They appear to have known all about the set theory.

a. Они появляются, чтобы узнать все о теории множеств.

b. Они пришли и узнали все о теории множеств.

c. Оказывается, они узнали все о теории множеств.

4. What made the students do the test quickly?

a. Что сделали студенты, чтобы выполнить тест быстро?

b. Что заставляет студентов выполнять тест быстро?

c. Что заставило студентов выполнять тест быстро?

5. First-year students are thought to show very good results at the exams.

a. Первокурсники, как считают, показывают очень хорошие

результаты на экзамене.

b. Считают, что первокурсники хотят показать очень хорошие результаты на экзамене.

c. Считали, что первокурсники покажут очень хорошие результаты на экзамене.

6. Name the Complex Subject and the predicate in every sentence.

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 produced on the line at this 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.

7. Translate from Russian into English.

1. Предполагают, что студент знает этот математический закон.

2. Этот подход, полагают, даст определенные преимущества.

3. Кажется, он изменил свою точку зрения.

4. Кажется, этот факт уже объяснили соответствующим образом.

5. Вычисление оказалось очень сложным.

6. Так случилось, что мой преподаватель прочел эту статью.

7. Имеются сведения, что они согласны с нашей теорией.

8. Этот принцип оказался противоположен принципу, приведенному выше в этом исследовании.

9. Можно предположить, что каждая дробь представляет собой.

8. Change the sentences according to the model using the Complex Subject pattern.

Model: It is believed that he is an efficient specialist. He is believed to be an efficient specialist. Считается, что он опытный специалист.

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 the laboratory with such complex equipment. 6. It appears that they are unable to account for this absurd situation. 7. It seemed that he was an experienced researcher. 8. It happened so that the error was quickly detected. 9. It appears that the law holds for all the equations. 10. It is unlikely that most fundamental processes of arithmetic and algebra should change a great deal. 11. It was expected that the students knew the law. 12. It is known that these laws are applied to all kinds of exponents. 13. It is expected that the students remember these proportions. 14. It appeared that the procedure was appropriate. 15. It seems that the computation is correct. 16. It appears that these statements are mathematically correct. 17. It is expected that the scientists will establish an appropriate pattern. 18. It is believed that the result is of great importance. 19. It is expected that he will speak on number relations. 20. It is unlikely that he will speak on the coordinate system.

UNIT 11. FOR + INFINITIVE CONSTRUCTION

For + object + to – Infinitive
(*Can be used in different functions*).
а) ***The Subject*** (подлежащее).

It’s for you to decide what university to choose. Тебе решать, какой университет выбрать.

b) ***The Predicative*** (именная часть сказуемого).

The best thing to do is for us to come to an agreement. Лучшее, что мы можем сделать, это прийти к соглашению.

c) ***The Object*** (дополнение).

The conference called for the government to take measures against growing unemployment.

Конференция потребовала, чтобы правительство приняло меры против растущей безработицы.

d) ***The Adverbial modifier of purpose*** (обстоятельство цели).

For the expected results to be obtained, we have to use the computations. Чтобы получить ожидаемые результаты, мы должны использовать эти вычисления.

e) ***The Attribute*** (определение).

The speaker proposed a new method for the experiment to be carried out successfully.

Выступающий предложил новый метод для успешного выполнения эксперимента.

1. Translate these sentences into Russian.

1. I must find somewhere for him to practice his English.
2. It’s important for the meeting to start at eight a.m.
3. It seems unnecessary for him to start his work this week.
4. It was a real shame for them not to have won after all their attempts.
5. For us to fail the experiment now would be a disaster.
6. Two conditions must be met for the phenomenon to occur.

2. Translate these sentences into English using the for + Infinitive Construction.

1. Математикам важно помнить, что строгий метод легче понять.

2. Возможно, что фигура будет иметь больше, чем одну ось симметрии.

3. Чтобы этот закон выполнялся, необходимо соблюдать два условия.

4. Потребуется больше экспериментальной работы, чтобы мы смогли объяснить это явление.

5. Необходимо, чтобы финансовые сделки (transactions) в интернете были безопасны. Однако существует определенная проблема.

6. Жизненно важно (vital), чтобы существовала хорошая система общественного транспорта в больших городах.

3. Make up sentences about the mathematicians using the same models with any of the given verbs: *alleged, believed, claimed, considered, known, reported, said,*

supposed, thought and understood.

Models:

1. ***Marie Curie*** was thought ***to be*** the greatest scientist of her generation.

2. ***She*** is known t***o have succeeded*** where all others had failed.

3. ***It used to be said*** that she owed her success to her husband Pierre.

L. Euler – a great geometer of 18th century;

– worked at the St. Petersburg Academy;

– dealt with analytic functions;

– was the first to solve the equation in three variables;

– his greatest discovery was the calculus of quaternion (кватернион).

P. Fermat – the greatest “amateur in the history of mathematics”;

– enjoyed classical literature, wrote verses;

– inventor and discoverer of coordinate geometry;

– the proofs of his famous theorems are not obtained;

– his books were not lost after his death.

W. P. Hamilton – one of the greatest scientists;

– at the age of 21 submitted to the Royal Irish Academy a paper

"A Theory of Systems of Rays";

– when an undergraduate was elected to the chair of Professor

of Astronomy at Trinity College;

– devised math tools for the exploration of physical space;

– thanks to his mathematical tools the subject of vector analysis appeared.

UNIT 12. CONDITIONAL SENTENCES

1. State the type of the conditional sentences and translate them.

1. If you work hard, you'll be able to finish your work in time.

2. If it is not raining, we shall play football.

3. If he had time, he would do the work.

4. If she were more attentive, she would not make so many mistakes.

5. If I had known your telephone number, I should have phoned you.

6. If he had gone to the station an hour ago, he wouldn't have missed the train.

7. You will not solve this problem unless you know the Viet's theorem.

8. If it were not so late, we would continue our debates.

9. If you follow the advice of the teacher, you will save a lot of time.

10. If I had understood the importance of learning English earlier, I should have taken part in the international scientific conference for young scientists.

2. Complete these sentences following one of the patterns for conditionals of Type 1.

1. We'll just manage to find the correct solution if … .
2. If I see him again, I … .
3. I will accept your explanation only if … .
4. If you tell me the truth, I … .
5. What will happen if … .
6. If your work harder, … .
7. If you don't reserve the ticket, … .
8. If it rains, … .
9. If you are hungry, … .

3. Complete the sentences following the pattern of Type 2 conditionals.

1. If you explained the situation to your friend, he … .
2. Perhaps he… if you spoke to him.
3. If you changed your job, you … .
4. If they came to see us in London, we … .
5. If you read the book a second time, you … .
6. If I were you, I … .
7. If they had more money, … .

4. Write sentences following the pattern of Type 3 conditional based on the given facts.

Model: The driver was not careful enough last Sunday, the accident happened.

If the driver had been more careful last Sunday, the accident wouldn't have happened.

1. As you didn't explain your problem to me, I wasn't able to help you.
2. She didn't read the book, she couldn't discuss a new novel.
3. We didn't take a map, we didn't find the hotel quickly.
4. You didn't invite him, he didn't come to the party.
5. I didn't know you were arriving on the train, I didn't meet you.
6. He missed the seminar, he was not told about it.

5. ***Translate into English.***

1. Если мы определим кривую, мы найдем уравнение геометрического места точек.

2. Он бы помог вам, если бы он был в городе сейчас.

3. Если бы я знала ее электронный адрес, я бы написала ей немедленно.

4. Если бы наша студенческая группа приняла участие в спортивных соревнованиях вчера, мы бы заняли первое место.

5. Я бы взял такси, если бы знал, что у нас мало времени.

6. Если бы я хорошо знал английский, я бы читал всю новую научную литературу по-английски.

7. Ваша команда обязательно выиграет следующий матч, если вы будете много тренироваться.

8. Если бы я был на вашем месте, я бы не просил его помочь, а постарался бы справиться с трудным заданием сам.

9. Если она не сможет прийти сама, она позвонит по телефону.

10. Если бы он мог получить необходимую информацию вчера, он бы сказал нам о своих планах на выходной день.

Mixed Conditionals

All types of conditionals can be mixed. Any tense combination is possible if the context permits it.

Write mixed sentences based on the given facts, use the table given above.

1. He failed his examination last year, so he is taking it again in June.

2. Since you didn’t take my advice, you’re in a difficult position now.

3. There was a sharp frost last night, so we are able to go skating now.

4. She isn't at the meeting because she wasn't told about it.
5. I didn't apply for the job as I don't want to work there.
6. He is not a fast runner, so he didn't win the race.
7. She didn't save her money, so she isn't going on holiday.

Inversion

We can omit **if** in conditional sentences. When we do that, **should**, were, **had** (Past Perfect) and **could** come before the subject.

If he **were** here, he **would help** us. **Were** he here, he **would help** us.

If I **should see** him today, I'll tell him to call you.

If he **were** here now, we could work together.

If I **had known** about that matter, I would have told him yesterday.

Should I see him today, I'll tell him to call you.

Were he here now, we could work together.

Had I known about that matter, I would have told him yesterday.

1. Rewrite the sentences making an inversion in the conditional clauses.

Model: If he should come, give him my letter. Should he come, give him my letter.

1. The talks will continue if the need should arise.
2. If you should be late again, you'll lose your job.
3. If he had taken a little more time to think, he might have acted more sensibly.
4. If it were not for the price of the ticket, I would go there by plane.
5. If he had known the news, he would have told us.
6. If I were you, I wouldn't buy such an expensive iPhone.
7. If you should drink too much coffee, you won't be able to sleep.

2. ***Translate the following sentences.***

1. Were these words synonyms, you could use either of them.

2. Had I known the facts better, I should have made a new test.

3. Were he not so tired, he would continue his work.

4. Had you taken part in our experiment, you would have helped us a lot.

5. Were she good at mathematical analysis, she would be able to solve some of these problems.

6. Should he come to the laboratory, tell him to leave his notes there.

7. Had the students of our group attended all lectures and seminars, the results of the examination in functional analysis wouldn't have been so bad.

3. Answer the questions.

1. What will you do next Sunday if the weather is fine?
2. Where would you go if you were free now?
3. Would your favourite football team have won the last match if the football players trained more?
4. Will you study German if you have enough time?
5. Will you speak English better if you watch a lot of foreign films in English?
6. Who will you ask to help you if you can't translate the article yourself?
7. What places of interest would you visit in London if you had an opportunity to go there?
8. How long can you stay in the south if you go there in summer?
9. What present would you buy to your mother if it were her birthday tomorrow?
10. Will you go to the station by underground or will you take a taxi if you have little time?
11. Will he improve his health if he goes in for sport?

4. Say the same in a different way using conditional sentences. See the model.

Model: *If it were not* for the works of the preceding scholars, the scientists of the following generations would not have made their discoveries.

But for the works of the preceding scholars, the scientists of the following generations would not have made their discoveries.

Если бы не труды учёных прошлых времён, современные учёные не смогли бы сделать свои открытия.

1. If it were not for a trifling error, the experiment might have been a success.

2. But for Babylonian and Mesopotamian mathematicians, Alexandrian scholars would not have achieved such remarkable results.

3. If it were not for the unreliable equipment, there would be fewer mistakes in print. 4. But for the absurdity of the solution, we might not have noticed the error.

5. If it were not for the discovery of logarithms, the scholars of the 18th century would not have been able to make such great and successful advances.

6. But for Kepler's enthusiasm, the tables of logarithms would not have so rapidly spread.

7. But for mathematics, the present-day achievements in science and technology would have been impossible.

8. If it were not for the greatest discoveries of world-famous scholars, our life would not be so comfortable as it is now.

9. But for the computer, many sciences would not have advanced so far.

5. Follow the model and insert the required form of the verb.

Model: It would be helpful if you (to find) the article. 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.

5. You would solve this problem if you (to find) the value of the unknown. 6. They would improve the situation if they (to suggest) some modification.

7. He would be sure of the result if he (to check) it.

8. It would be easier to make a correct conclusion if they (to describe) the process in greater detail.

9. You would understand his work in case you (to know) the work of his predecessors in this area.

10. We would have a better situation if he (to clarify) his statement.

6. Read and translate the text.

AT THE ZOO.

One day a man went to the Zoo with a bag of nuts. He stopped near three cages of monkeys and decided to give them all the nuts in the bag.

"If I divide the nuts equally among the eleven monkeys in the first cage," he thought, "one nut will remain. If I divide equally among the thirteen monkeys in the second cage, eight nuts will remain. If I divide them among the seventeen monkeys in the third cage, three nuts will remain. And if I divide the nuts equally among the forty-one monkeys in all three cages or among the monkeys in any two cages, some nuts will remain too. How can I I divide them so that none will remain?"

Could you help the man to divide his nuts among the monkeys?

UNIT 13. THE SUBJUNCTIVE MOOD

The Subjunctive Mood shows that the action or state expressed by the verb is presented as non-fact, as something imaginary, or desired. The Subjunctive mood is also used to express an emotional attitude of the speaker to real facts.

Subject Clause Expresses

It is necessary *Необходимо,*

It is important (recommended, advisable, requested, probable, strange, etc.)

Важно, that you (should) make a report.

чтобы вы сделали доклад.

Supposition

Necessity

Probability

Order

Purpose

Advice

Object Clause

I demand/demanded (order, advise, insist, suggest, require, propose, etc.) that they (should) work together.

Я требую/потребовал, чтобы они работали вместе.

1. Translate the sentences into Russian.

1. It is extremely important that you should carry out as many exercises as possible, no matter how trivial some of them may seem.

2. It is essential that the students should know all the rules.

3. I demand that they employ the differential calculus to deal with curves and surfaces.

4. He suggests that we deduce the properties of the curves involved by algebraic equations.

5. It is requested that the researcher (should) complete the calculations next week. 6. He advised that the students (should) inscribe a regular *n-gon* in a circle.

7. She proposed to her groupmates that they (should) discuss the topics of the term papers.

In Object Clause, introduced by the conjunction *lest* we use *should* for all persons.

She fears (feared) *lest* her secret *should* be discovered.

Она боится, чтобы ее секрет не был раскрыт.

Object Clause (after **wish**)

Unreal Present

I wish (if only) + Past Tense

Use

I wish (if only) you worked more efficiently. *Я бы хотел, чтобы вы работали более*

эффективно.

We wish (if only) we were not so busy now. *Если бы только мы не были так заняты сейчас.*

Regret about the **present situation**

I wish I could drive a car. *Жаль, что я не умею водить машину.*

Regret in the **present** concerning lack of ability

Unreal Past

I wish (if only) + Past Perfect

I wish I had attended the seminar yesterday. *Жаль, что я не пришел на семинар вчера.*

Regret that something

happened or didn't happen in **the past**

I wish (if only) + subject + would + Indefinite

Infinitive

I wish he would calculate more carefully. *Хотелось бы, чтобы вы делали вычисления более внимательно.*

I wish it would stop raining.

Я бы хотел, чтобы дождь прекратился.

Wish for **a future change**

unlikely to happen, or annoyance

2. Translate the sentences from English into Russian.

1. I wish I knew the dimension of the body to calculate its volume.

2. I wish they had solved the three famous construction problems under the specified condition.

3. I wish I had written the test better, I have to revise the material again.

4. I wish he would stop working, he is very tired.

5. I wish I could understand the theory better.

6. I wish a new experiment would be started in our laboratory this month.

7. If only I were as good as you at mathematics.

8. I wish I had invited more people to the party.

9. If only you had taken his advice when he gave it.

Attributive clauses modifying the now "time" in the main clause

It is (*high, about*) *time… Пора…* (*давно пора, уже пора*)

It is time we **left** for the University, our classes start at 8.15. *Пора уходить в университет, наши занятия начинаются в 8.15.*

1. It's time we went there.

2. It's time you learnt you're a student of Mechanics and Mathematics Faculty.

3. It's high time you made up mind!

4. It's about time you obtained the expected result.

Comparison clause (*as if …, as though …*)

It **is** as cold as if it **were** winter.

Холодно, как будто сейчас зима.

He **looks** as if he **were** very tired. *Он выглядит так, как если бы он очень устал.*

Present

He **spoke** as though she **had known** about it long before that day.

Он говорил, как если бы он знал об этом задолго до этого дня.

Past

Had better = should

I ***had better*** + Present Infinitive

You had better give up smoking.

Вам бы лучше бросить курить.

Present, Future reference

It ***would have been better*** if + Past Prefect

It ***would have been better*** if you hadn't said that. *Было бы лучше, если бы вы это не говорили.*

Past reference

Would rather = I'd prefer

I'd rather smb. + Past Simple

I'd rather smb. + Past Perfect

I'd rather you studied a little harder. *Лучше бы вы учились немного усерднее.*

I'd rather you had read the book last term. *Лучше бы вы прочитали эту книгу в прошлом семестре*.

Present, Future reference

Past reference

3. Translate the sentences from English into Russian.

1. I wish I weren't having my final test tomorrow. 2. I'd rather you hadn't spoken so rudely to him. 3. The man speaks as if he had never heard of this country. 4. He acts as though he owned the house. 5. It's time we went to the students' canteen. 6. I had better obtain the necessary information using the Internet. 7. He looks as if he were impressed by the news. 8. The teacher advised that the students discuss the material in detail. 9. I'd rather you didn't keep asking me every time you have a problem. 10. We worked slowly lest the task should have many mistakes.

4. Put the verbs into the correct form.

1. We'd better (to take) some money for a taxi in case we (to miss) the last bus home. 2. Would you rather (to write) in ink or in pencil? 3. I'd rather you (not/ mention) this anyone until next week. 4. He didn't win the prize, but the looked as though he (to

win) one. 5. It's about time you (to go) on holiday. 6. Helen went to France this year, but she says she would rather (to go) to Spain. 7. You had better (not to speak) to me like that again. 8. I wouldn't argue with her if I (to be) you. 9. If only I (not to drink) so much coffee. 10. I wish I (to listen) to you but I didn't. 11 It's essential that these conditions (to be satisfied).

5. Translate from Russian into English.

1. Важно, чтобы студенты работали в компьютерных классах. 2. Странно, что он всегда опаздывает. 3. Желательно, чтобы вы выполнили это задание как можно скорее. 4. Я настаиваю, чтобы вы написали эту статью. 5. Жаль, что я не знал об этой научной конференции, я бы хотел послушать доклады по аналитической геометрии. 6. Он выглядит так, как если бы он провел свой отпуск на юге. 7. Пора бы знать такие простые истины! 8. Ты бы лучше купил билет на этот концерт заранее. 9. Я бы предпочел побыть сейчас один. 10. Ах, если бы только я тогда сделал правильный выбор!

6. Complete the sentences.

1. It is probable that the question … .
2. If I were you … .
3. I'll dictate slowly lest you … .
4. It seems as if … .
5. I shall go to the theater with pleasure unless … .
6. It's time they … .

7. Translate the sentences from Russian into English, use the Subjunctive Mood.

1. Проверьте решение этой задачи, чтобы не получить неверный результат. 2. Он предложил, чтобы они рассмотрели многоугольники, так как этот тип геометрических фигур очень важен при изучении геометрии. 3. Жаль, что мы не исключили неизвестные, мы смогли бы решить эту систему уравнений. 4. Чтобы составить уравнение данной кривой,

определим геометрическое место точек. 5. Пора ввести однопараметрическое семейство кривых на поверхности *S*. 6. Нам следует представить данные кривые аналитически с помощью системы уравнений. 7. Необходимо, чтобы часть поверхности не содержала особых точек. 8. Нам бы хотелось, чтобы в этом случае якобиан стремился к нулю. 9. Было бы лучше, если бы один из параметров менялся, в то время как другой оставался постоянным.

UNIT 14. DIRECT AND INDIRECT SPEECH

1. Use the general questions below in indirect speech. Follow the model.

Model: Did the hypothesis prove to be correct? You've asked me if the hypothesis proved to be correct

1. Does the image of a man usually accompany his name?
2. Is there a connection between the works of mathematicians of all times?
3. Do you visualize a man when hearing his name?
4. Was the theory of relativity a turning point in physical thinking?
5. Has Fermat's last theorem been proved?
6. Was the hypothesis based on the wrong assumption?
7. Does the new method have any advantages over the old one?
8. Do these two phenomena have anything in common?
9. Does he seem to have changed his point of view?
10. Do the results which have been obtained agree with the results that were expected?
11. Did you hear him speak at the conference?
12. Does this law hold for all similar cases?
13. Did you see him switch off the computer?
14. Was Christopher Columbus the first to have travelled from Europe to America?

15. Was your purpose to gain some time?

16. Will you make a report at the seminar?

17. Did you wish to express the same idea in a different way?

18. Did Einstein develop an absolutely new idea of the world we live in?

2. Use the questions in indirect speech following the model (Sequence of Tenses).

Model: 1. They said, "We will go to the South". They said that they would go to the South.

2. She said, "I have done the test." She said that she had done the test.

3. They said, "We saw the film two years ago." They said that they had seen the film two years before."

4. He said, "I am taking driving lessons." He said that he was taking driving lessons. 5. She said, "I was reading for the exam at that time." She said she had been reading for the exam at that time.

6. He said, "I am working on my diploma paper project."

7. She said, "I haven't been to the lecture."

8. They said, "We won't come to the party."

9. He said, "We have installed a new antivirus program".

10. He said, "I wrote the article three years ago."

11. They said, "We won't go to France."

12. He said, "I was working at five o'clock."

13. She said, "I have been waiting for you since three o'clock."

14. They said, "The lecture will be held in the assembly hall."

3. Use the imperative sentences in indirect speech.

Model. 1. Don’t contradict him. You’ve told me not to contradict him.

Come at 8.30, please. You’ve asked me to come at 8.30.

1. Don’t change the conditions of the experiment.
2. Use the rule that you have learnt today.
3. Don’t postpone the discussion.
4. Speak louder, please.
5. Don’t go into details.
6. Read and memorize the terms.
7. Don’t continue working until you process the obtained results.
8. Don’t apply the same rule for the two different procedures.
9. Use the same words to denote the same notions.
10. Don’t fail to switch off the printer.
11. Read the task carefully so as to avoid the possible errors.
12. Don’t test the new method without being given additional time.
13. Copy out the new words.
14. Don’t start working on the project without speaking to the head of the laboratory. 15. Don’t sign the contract until you have read it to the end.

4. Turn direct speech into reported speech.

1. Plato advised, "The principal men of our state must go and learn arithmetic, not as amateurs, but they must carry on the study until they see the nature of numbers with the mind only."
2. Descartes, father of modernism, said, "All nature is a vast geometrical system. Thus all the phenomena of nature are explained and some demonstration of them can be given."
3. In Descartes's words, "You give me extension and motion then I'll construct the universe."

4. The often repeated motto on the entrance to Plato's Academy said, "None ignorant of geometry enter here."

5. J. Kepler affirmed: "The reality of the world consists of its maths relations. Maths laws are true cause of phenomena. "

6. I. Newton said, "I don't know what I may appear to the world; but to myself I seem to have been only like a boy playing on the seashore, and diverting myself now and then by finding a smoother pebble or a prettier shell than usual; whist the great ocean of truth lay all undiscovered before me. If I saw a little farther than others, it is because I stood on the shoulders of giants".

UNIT 15. PREPOSITIONS

1. Fill in each blank with an appropriate preposition: of, to, in, at, through, with, on. One preposition can be used several times.

… our modern world, mathematics is related … a very large number … important human activities. Make a trip … any modern city, look …the big houses, plants, laboratories, museums, libraries, hospitals and shops, … the system … transportation and communication. You can see that there is practically nothing … our modern life which is not based … mathematical calculations. … co-operation … science, mathematics made possible our big buildings, railroads, automobiles, airplanes, spaceships, subways and bridges, artificial human organs, surgical operations and means of communication that in the past seemed fantastic and could never be dreamt ….

2. Fill in each blank with an appropriate preposition: in, to, among, of, for, into, at. One preposition may be used several times.

1. Mathematics ranks … the highest cultural developments … man.

2. Mathematical reasoning is … the highest level known … man.

3. Mathematical style aims … brevity and perfection.

4. Arithmetic, geometry, and astronomy were to the classical Greece music … the soul and art … the mind.

5. Most mathematicians claim that there is great beauty … their science.

6. …1933, George Birkhoff, one … the most distinguished mathematicians … his generation, attempted to apply mathematics … art.

7. Joseph Fourier showed that all sounds, vocal and instrumental, simple and complex, are completely describable … mathematical terms.

8. Each musical sound, however complex, is merely a combination … simple sounds.

9. Thus, thanks … Fourier, the nature … musical sounds is now clear … us.

10. The role of mathematics … music stretches even …the composition itself.

11. Masters, such as Bach, constructed and advocated vast mathematical theories … the composition … music.

12. … such theories, cold reason rather than feeling and emotions produce the creative pattern.

13. Through Fourier's theorem, music leads itself perfectly … mathematical description.

14. Hence, the most abstract … the arts can be transcribed … the most abstract … the sciences.

3. Choose the right preposition. Make sensible sentences.

1. Are you interested	**On**	a. disturbing you.
2. She is very good		b. looking after the children.
3. He insisted	**Of**	c. learning foreign
4. I apologize		languages.

5. The teacher is fed up	**To**	d. having more time for doing things he wants to.
6. She succeeded		
7. My friend is keen	**At**	e. understanding this – it's too difficult.
8.Professor is looking forward	**In**	f. answering our stupid questions.
9. This student is not capable	**With**	g. studying.
10. His sister is tired	**For**	h. considering his solution of the problem.
		i. doing sums.
		j. getting good education.

UNIT 16. CHECK YOUR VOCABULARY

1. Fill in the gaps using the words / forms of the words given below.

(a) basic tool – (b) represent – (c) number – (d) representation – (e) organization – (f) originate – (g) insolvability –(h) set – (i) change – (j) exist

1. There are many properties of Euclid's powerful algorithm which has become a … (1) ... in modern algebra and number theory.

2. Euclid's algorithms for finding the greatest common divisor of … (2) ... – is the best illustration.

3. In all branches of mathematics, the task to prove the solvability or … (3) ... of any problem requires a precise algorithm.

4. In computer science, the emphasis has now shifted to the study of various structures by which information … (4) ....

5. It is precisely these features of algorithms that sometimes make algorithms models more suitable than traditional mathematical models for the … (5) ... and … (6) ... of knowledge.

6. The word algorithm itself … (7) ... in the Middle East.

7. An algorithm is a … (8) ... of rules or directions (instructions) for getting a specific output from a specific input.

8. The algorithm itself is a mental concept that … (9) ... independently of any representation.

9. The rapid rise of computer science, which has the study of algorithms as its focal point, has radically … (10) ... the fate of the term algorithm: its use has become essential.

2. Complete the following sentences with one of the words given below.

(a) recognition – (b) simplicity – (c) originally – (d) convenient – (e) advantages – (f) problems – (g) descendent – (h) reasonable – (i) variety

1. An indirect address allows great ... (1) ... in programming.

2. The PASCAL programming language was ... (2) ... developed by Niklaus Emil Wirth.

3. Symbolic and automatic coding languages are more similar to English, so they are more ... (3) ... for the use of the programmer.

4. ALGOL was developed as an international language which gained more ... (4) ... in Europe than in the United States.

5. The ... (5) ... of using GLOBOL are that it is simple in learning, programs can be quickly written and tested.

6. The idea of an automatic computer that would not only add, multiply, subtract, and divide but perform the sequence of ... (6) ... operations was given by the English scientist Charles Babbage.

7. PASCAL is noted for its ... (7) ... and structured programming design.

8. ADA is a PASCAL-based language designed for both commercial and scientific ... (8)....

9. PASCAL, which was named after the mathematician Blaise Pascal, is a direct ... (9) ... from ALGOL60, which Wirth helped to develop.

3. Choose the variant that suits best.

1. A programming language is a language

a) a language generated by a programmer

b) spoken by the programmers

c) specially designed to communicate instructions to a computer

2. A mnemonic machine language uses:

a) the numeric code

b) symbols, such as letters and numbers

c) symbolic addresses

3. An assembly language has the following advantages for the programmer's use:

a) it is a low level language

b) the processes of reading and introduction of data are made easier

c) it uses numeric names

4. Symbolic and automatic coding languages are more convenient for

a) the computer

b) the programmer usages

c) English speaking users

5. The machine code, or auto code can be … by a computer without translation. a) stored b) immediately obeyed c) sequentially retained

4. Answer the questions:

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. Does he have to summarize the results of the research work of the department? (of our laboratory)

6. Were you able to notice the difference between these two methods? (their similarity)

IRREGULAR VERBS

Infi-nitive	**Past Simple**	**Past Participle**	**Перевод**
be	was, were	been	быть, являться
beat	beat	beaten	бить, колотить
become	became	become	становиться
begin	began	begun	начинать
bend	bent	bent	гнуть
bet	bet	bet	держать пари
bite	bit	bitten	кусать

Infi-nitive	**Past Simple**	**Past Participle**	**Перевод**
blow	blew	blown	дуть, выдыхать
break	broke	broken	ломать, разбивать, разрушать
bring	brought	brought	приносить, привозить, доставлять
build	built	built	строить, сооружать
buy	bought	bought	покупать, приобретать
catch	caught	caught	ловить, поймать, схватить
choose	chose	chosen	выбирать, избирать
come	came	come	приходить, подходить
cost	cost	cost	стоить, обходиться
cut	cut	cut	резать, разрезать
deal	dealt	dealt	иметь дело, распределять

Infi-nitive	Past Simple	Past Participle	Перевод
dig	dug	dug	копать, рыть
do	did	done	делать, выполнять
draw	drew	drawn	рисовать, чертить
drink	drank	drunk	пить
drive	drove	driven	ездить, подвозить
eat	ate	eaten	есть, поглощать, поедать
fall	fell	fallen	падать
feed	fed	fed	кормить
feel	felt	felt	чувствовать, ощущать
fight	fought	fought	драться, сражаться, воевать
find	found	found	находить, обнаруживать
fly	flew	flown	летать
forget	forgot	forgotten	забывать о (чём-либо)

Infi-nitive	**Past Simple**	**Past Participle**	**Перевод**
forgive	forgave	forgiven	прощать
freeze	froze	frozen	замерзать, замирать
get	got	got	получать, добираться
give	gave	given	дать, подать, дарить
go	went	gone	идти, двигаться
grow	grew	grown	расти, вырастать
hang	hung	hung	вешать, развешивать, висеть
have	had	had	иметь, обладать
hear	heard	heard	слышать, услышать
hide	hid	hidden	прятать, скрывать
hit	hit	hit	ударять, поражать
hold	held	held	держать, удерживать, задерживать
hurt	hurt	hurt	ранить, причинять боль, ушибить

Infi-nitive	**Past Simple**	**Past Participle**	**Перевод**
keep	kept	kept	хранить, сохранять, поддерживать
know	knew	known	знать, иметь представление
lay	laid	laid	класть, положить, покрывать
lead	led	led	вести за собой, сопровождать, руководить
leave	left	left	покидать, уходить, уезжать, оставлять
lend	lent	lent	одалживать, давать взаймы (в долг)
let	let	let	позволять, разрешать
lie	lay	lain	лежать
light	lit	lit	зажигать, светиться, освещать
lose	lost	lost	терять, лишаться, утрачивать
make	made	made	делать, создавать, изготавливать

Infi-nitive	Past Simple	Past Participle	Перевод
mean	meant	meant	значить, иметь в виду, подразумевать
meet	met	met	встречать, знакомиться
pay	paid	paid	платить, оплачивать, рассчитываться
put	put	put	ставить, помещать, класть
read	read	read	читать, прочитать
ride	rode	ridden	ехать верхом, кататься
ring	rang	rung	звенеть, звонить
rise	rose	risen	восходить, вставать, подниматься
run	ran	run	бежать, бегать
say	said	said	говорить, сказать, произносить
see	saw	seen	видеть
seek	sought	sought	искать, разыскивать

Infi-nitive	Past Simple	Past Participle	Перевод
sell	sold	sold	продавать, торговать
send	sent	sent	посылать, отправлять, отсылать
set	set	set	устанавливать, задавать, назначать
shake	shook	shaken	трясти, встряхивать
shine	shone	shone	светить, сиять, озарять
shoot	shot	shot	стрелять
show	showed	shown, showed	показывать
shut	shut	shut	закрывать, запирать, затворять
sing	sang	sung	петь, напевать
sink	sank	sunk	тонуть, погружаться
sit	sat	sat	сидеть, садиться
sleep	slept	slept	спать

Infi-nitive	Past Simple	Past Participle	Перевод
speak	spoke	spoken	говорить, разговаривать, высказываться
spend	spent	spent	тратить, расходовать, проводить (время)
stand	stood	stood	стоять
steal	stole	stolen	воровать, красть
stick	stuck	stuck	втыкать, приклеивать
strike	struck	struck, stricken	ударять, бить, поражать
swear	swore	sworn	клясться, присягать
sweep	swept	swept	мести, подметать, смахивать
swim	swam	swum	плавать, плыть
swing	swung	swung	качаться, вертеться
take	took	taken	брать, хватать, взять
teach	taught	taught	учить, обучать

Infi-nitive	**Past Simple**	**Past Participle**	**Перевод**
tear	tore	torn	рвать, отрывать
tell	told	told	рассказывать
think	thought	thought	думать, мыслить, размышлять
throw	threw	thrown	бросать, кидать, метать
under-stand	under-stood	understood	понимать, постигать
wake	woke	woken	просыпаться, будить
wear	wore	worn	носить (одежду)
win	won	won	победить, выиграть
write	wrote	written	писать, записывать

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