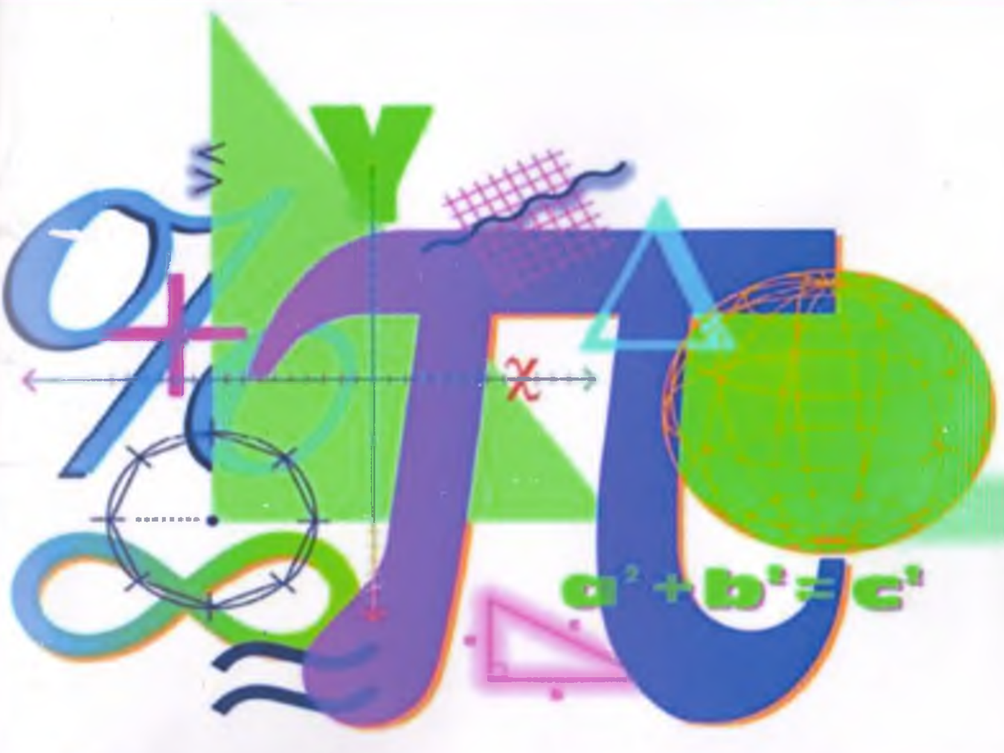
# ENGLISH FOR SPECIFIC PURPOSES (MATHEMATICS)

## Oliy o'quv muassasalarining matematika yo'nalishi talabalari uchun ingliz tilidan uslubiy qo'llanma



# ENGLISH FOR SPECIFIC PURPOSES (MATHEMATICS)

**Oliy o'quv muassasalarining matematika yo'nalishi talabalari uchun ingliz tilidan uslubiy qo'llanma**



**Toshkent – 2017**

Mazkur o`quv-uslubiy ko'rsatma universitet va institutlarning matematika yo'nalishi talabalari uchun mo'ljallangan bo'lib, u mutaxassislikka oid matnlardan iboratdir. Uslubiy ko'rsatmada matematika fani bo'yicha mutaxassislikka oid matnlar, matnlar yuzasidan savollar, 72 ta test topshiriqlari va ularning kaliti, matematik terminlar berilgan. Uslubiy ko'rsatma matematika yo'nalishida ta'lim olayotgan talabalarning tanlagan mutaxassisligi bo'yicha ingliz tilida so'z boyligini boyitishda va og'zaki nutqini rivojlantirishda yordam beradi. Shu bois sohaga yo`naltirilgan ingliz tili fani o`qituvchilariga, matematikani o`rganuvchi talabalar va magistrantlarga qoshimcha adabiyot sifatida tavsiya etiladi.

Qo`llanma sohaga yonaltirilgan ingliz tili va amaliy ingliz tili fanlarining dasturlariga mos rahishda tuzildi. Ushbu o`quv-uslubiy ko'rsatma Termiz davlat universiteti o'quv-uslubiy Kengashining (2017- yil 16- mart, 8-sonli) bayonnomasiga asosan tasdiqlangan va nashrga tavsiya etilgan.

**Tuzuvchi:** Isoqova Feruza Shamsiddin qizi

**Mas'ul muharrirlar:**
Abdulla Xudayqulov, Shahodat Usmanova

**Taqrizchilar:**
Nasiba Panjiyeva, filologiya fanlari nomzodi
Ismatulla Xayrullayev, fizika-matematika fanlari nomzodi

## PREFACE

This manual makes no pretension to deal with the whole, vast field of English For Specific Purposes. As an additional reader it has a more limited aim, i.e. to assist the students of bachelor's and master's degree levels of universities, who study English as foreign Language. Post graduaters and researchers specializing in mathematics and teachers of English who teach English For Specific Purposes may also find it useful.

The author does not seek to provide all-embracing theory points for all the topics treated in books on English For Specific Purposes; it is not a comprehensive review of all aspects of English For Specific Purpose, but its sections cover the vast majority of texts which included in the program for ESP for mathematics.

It is thought that it is advisable to confine oneself to the most burning branches of English For Specific Purposes for mathematics course, we chose 36 texts on mathematics. At the end of each text there given a list of new words and expressions, and questions for the discussion.

The book is based on the course syllabus of Practical English course for the third year students of universities. The subject-matter fully corresponds to the programme on English issued by the Ministry of Higher and Secondary Special Education of the Republic of Uzbekistan.

In preparing this book the author has tried to take into consideration the latest achievements and trends in modern linguistics made in Uzbekistan and elsewhere.

I am highly indebted to my tutors A.E.Khudaykulov and I.Khayrullaev who encouraged me to create this version in its entirety and made many extremely valuable suggestions aimed at improving the treatment of the subject and the arrangement of the material. I am very grateful to my teacher Sh.A. Usmanova who helped me catch many errors in the manuscript; the errors that remain are my responsibility, not theirs. Their discussions were helpful and positive. My thanks go above all to my father for his patient endurance and constant encouragement throughout. Finally, my gratitude to the reviewers and my teachers at the university, whose comments and suggestions made at various stages in the development of the manuscript were most helpful.

*"Mathematics is the queen of sciences,*
*but arithmetic is the king of mathematics"*
*C.F. Gauss.*

## Text 1. MATHEMATICS

The word "mathematics" comes from the Greek "mathema", which means learning, study, science and additionally came to have the narrower and more technical meaning "mathematical study", even in Classical times. It is the study of quantity, structure, space, change and related topics of pattern and form.

We use mathematics in everyday life. Mathematics is a kind of human computer. Mathematicians seek out patterns whether found in numbers, space, natural science, computers, imaginary abstractions or elsewhere.They formulate new conjectures and establish their truth by rigorous deduction from appropriately chosen axioms and definitions. The mathematician Benjamin Peirce called mathematics "the science that draws necessary conclusions". Albert Einstein stated that "as far as the laws of mathematics refer to reality, they are not certain; and as far as they are certain, they do not refer to reality".

The history of mathematics is very antiquity. Rigorous arguments first appeared in Greek mathematics, most notably in Euclid's Elements. The development continued in fitfull bursts until the Renaissance period of XVI century, when mathematical innovations interacted with new scientific discoveries, leading to an acceleration in research that continues to the present day.

Mathematics is the product of many lands and it belongs to all mankind. Imagine that at all times and practically in all places people thought constantly on supplies of food, clothing and of shelter. Sometimes there was not enough food or other things. So even the most primitive people were always forced to think of how many people they had, how much food and clothing they possessed and how long all these things would last. These questions could be answered only by counting and measuring. Now you understand how necessary it was for the early people to become familiar with mathematical ideas, processes and facts. In the course of time counting led to arithmetic and measuring led to geometry. Arithmetic is the study of number, while geometry is the study of shape, size and position. Now mathematics is related to a very large number of important human activities.

Today mathematics is used throughout the world as an essential tool in many fields, including natural science, engineering, medicine and the social sciences such as economics and psychology. Make a trip through any modern city. Look at the big houses, plants, laboratories, museums, libraries, hospitals, shops, at the system of transportation and communication. You can see that there is practically nothing in our modern life, which is not based on mathematical calculations. In cooperation with science mathematics made possible our big buildings, railroads, automobiles, airplanes, ships, subways, bridges. There are very many things in our age which depend on mathematics and there will be even more in future.

Mathematics will have a wider application than it has now. That is why we can say that mathematics is a truly universal servant of mankind. Mathematical discoveries have been made throughout history and continue to be made today. According to Michail B. Sevryuk, on January, 2006 issue of the Bulletin of the American Mathematical Society " The number of papers and books included in the Mathematical Reviews database, since 1940( the first year of operation of MR) is now more than 1.9 mln and more than 75 thousand items are added to the database each year. The overwhelming majority of works in this ocean contain new mathematical theorems and their proofs".

**New words and expressions**

Mathematics – matematika
Shape – shakl, forma
To measure – o'lchamoq
Subway – yer osti yo'li, tunel
Addition – qo'shish
Multiplication - ko'paytirish
Figure – figura, shakl
To express – ifodalamoq
Antiquity -qadimiy, qadimgi
Size – o'lcham
Mathematician - matematik
To depend – bog'liq bo'lmoq
Subtraction – ayirish
Division – bo'lish
Cipher – no'l

**Questions for the discussion**

1. Can you explain the word "mathematics"?
2. Do you use mathematics in everyday life?
3. Who is a kind of human computer?
4. Is the history of mathematics very antiquity?
5. What do you study in arithmetic?
6. Is mathematics a truly universal servant of mankind?
7. Do you know about famous mathematicians?

## Text 2. ARITHMETIC

***"Arithmetic has a very great and elevating effect, compelling the soul to reason about abstract number".***
***Platon***

Arithmetic is the elementary branch of mathematics dealing with the properties of numbers and their operation; the fundamental operations are *addition, subtraction, multiplication and division.*

The arithmetic symbols now in use were derived from the Arabs and the Hindus, the latter of whom introduced the symbol O. These symbols have been in use since the VI century. Before the introduction of Arab notation in Europe Roman numerals were used.

The decimal system created in 595 in India.The Arabic system, which is adecimal system, employs ten figures to express numbers, viz.:

0 1 2 3 4 5 6 7 8 9

naught one two three four five six seven eight nine

Naught is also called *zero* and *cipher*. By combining these figures any numbers can be expressed. Naught was invented by M.Al-Khorezmi. In writing and reading numbers, the figures are separated into groups of three figures each called periods. These periods contain the hundreds, tens, and units of each denomination.

In reading numbers expressed by three figures, the tens are read after the hundreds and the units after the tens **without** the word **and.** Thus:

745 is read "seven hundred and forty-five".

609 is read "six hundred and nine".

Number 20 673 210 040 385 861 reads: twenty quadrillion six hundred seventy three trillion two hundred ten billion forty million three hundred eighty five thousand eight hundred and sixty one.

The periods above quadrillions in their order are: quintillions, sextillions, septillions, octillions, nonillions. decillions. etc. The Roman system uses seven capital letters to express numbers, viz:

Letters: I V X L C D M

Values: 1 5 10 50 100 500 1000

The following table illustrates the method of combination: I – 1, II- 2, III – 3, IV– 4, V – 5, VI – 6, VII – 7, VIII – 8, IX – 9, X – 10, XI – 11, XII – 12, XIII – 13, XIV – 14, XV – 15, XVI – 16, XVII -17, XVIII – 18, XIX – 19, XX – 20, XXIV 24, XXIX – 29, XXX – 30, XXXV – 35, XL – 40, L – 50, LX – 60, LXXX – 80, XC – 90, C – 100, CC – 200, CCC – 300, CD – 400, D – 500, DCCC – 800, M – 1000, MMM – 3000.

### New words and expressions

Addition – qo'shish
Subtraction – ayirish
Multiplication – ko'paytirish
Division – bo'lish
Figure – figura, shakl
Cipher – no'l
To express – ifodalamoq

### Questions for the discussion

1.Is arithmetic the elementary branch of mathematics?
2.What are the fundamental operations?
3.What is called zero and cipher?
4. What is called periods?
5. How do you read number 745?

## Text 3. ADDITION (+)

Addition is the basic operation of arithmetic. In its simplest form, addition combines two numbers, the *addends* or *terms*, into a single number, the *sum* of the numbers (Such as $2 + 2 = 4$ or $3 + 5 = 8$).

Adding more than two numbers can be viewed as repeated addition; this procedure is known as summation and includes ways to add infinitely many numbers in aninfinite series; repeated addition of the number 1 is the most basic form of counting.

Addition is commutative and associative so the order the terms are added in does not matter. The identity element of addition (the additive identity) is 0, that is, adding 0 to any number yields that same number. Also, the inverse element of addition (the additive inverse) is the opposite of any number, that is, adding the opposite of any number to the number itself yields the additive identity, 0. For example, the opposite of 7 is −7, so $7 + (-7) = 0$.

Addition can be given geometrically as in the following example:

If we have two sticks of lengths *2* and *5*, then if we place the sticks one after the other, the length of the stick thus formed is $2 + 5 = 7$.

## SUBTRACTION (−)

Subtraction is the inverse of addition. Subtraction finds the *difference* between two numbers, the ***minuend*** minus the ***subtrahend***. If the minuend is larger than the subtrahend, the difference is positive; if the minuend is smaller than the subtrahend, the difference is negative; if they are equal, the difference is 0.

Subtraction is neither commutative nor associative. For that reason, it is often helpful to look at subtraction as addition of the minuend and the opposite of the subtrahend, that is $a - b = a + (-b)$. When written as a sum, all the properties of addition hold.

There are several methods for calculating results, some of which are particularly advantageous to machine calculation. For example, digital computers employ the method of two's complement. Of great importance is the counting up method by which change is made. Suppose an amount $P$ is given to pay the required amount $Q$, with $P$ greater than $Q$. Rather than performing the subtraction $P - Q$ and counting out that amount in change, money is counted out starting at $Q$ and continuing until reaching $P$. Although the amount counted out must equal the result of the subtraction $P - Q$, the subtraction was never really done and the value of $P - Q$ might still be unknown to the change-maker.

## Text 4. MULTIPLICATION (× or · or*)

Multiplication is the second basic operation of arithmetic. Multiplication also combines two numbers into a single number, the *product*. The two original numbers are called the *multiplier* and the *multiplicand*, sometimes both simply called *factors*.

Multiplication may be viewed as a scaling operation. If the numbers are imagined as lying in a line, multiplication by a number, say $x$, greater than 1 is the same as stretching everything away from 0 uniformly, in such a way that the number 1 itself is stretched to where $x$ was. Similarly, multiplying by a number less than 1 can be imagined as squeezing towards 0. (Again, in such a way that 1 goes to the multiplicand.)

Multiplication is commutative and associative; further it is distributive over addition and subtraction. The multiplicative identity is 1, that is, multiplying any number by 1 yields that same number. Also, the multiplicative inverse is the reciprocal of any number (except 0; 0 is the only number without a multiplicative inverse), that is, multiplying the reciprocal of any number by the number itself yields the multiplicative identity.

The product of $a$ and $b$ is written as $a \times b$ or $a \cdot b$. When $a$ or $b$ are expressions not written simply with digits, it is also written by simple juxtaposition: $ab$. In computer programming languages and software packages in which one can only use characters normally found on a keyboard, it is often written with an asterisk: *a* * *b*.

## DIVISION (÷ or /)

Division is essentially the inverse of multiplication. Division finds the *quotient* of two numbers, the *dividend* divided by the *divisor*. Any dividend divided by 0 is undefined. For distinct positive numbers, if the dividend is larger than the divisor, the quotient is greater than 1, otherwise it is less than 1 (a similar rule applies for negative numbers). The quotient multiplied by the divisor always yields the dividend.

Division is neither commutative nor associative. As it is helpful to look at subtraction as addition, it is helpful to look at division as multiplication of the dividend times the reciprocal of the divisor, that is $a \div b = a \times 1/b$. When written as a product, it obeys all the properties of multiplication.

## Text 5. ALGEBRA

This text describes in brief the development of algebra. We should remember that the beginning of algebraic thinking dates back to the days of ancient Babylonia and Egypt.The term "algebra" was taken from the long title of one of the works of an Arabian mathematician who lived in Bagdad in the 9th century. The long title was shortened to "al-jabr" and began gradually to take from algebra. At one time there was much debate among scientists concerning the exact meaning of this title, but it may now be regarded as settled that the word "al-jabr" really means the "science of equations".

Algebra developed slowly in comparison with arithmetic and geometry. What is now known as elementary algebra is largely the work of mathematicians of the XVI and XVII centuries. Our present knowledge of Babylonian mathematics is possible thanks to the translation of mathematical records found on ancient tablets. These tablets are now preserved in the world's leading museums. The information obtained in this way proves that as early as 2000 B. C. the Babylonians had advanced very far in their study of mathematics. Using algebraic methods they were able to solve many problems.

Our present symbols of operations are comparatively modern origin. For example, the sign of equality (=) was invented by the English scholar Robert Record and appeared in 1557. The origin of the use of letters in algebra to represent known or unknown quantities is also of great interest. Among the mathematicians who invented algebraic notation, we must mention the names of Vieta, Harriot, Descartes, Newton and Leibniz.

### New words and expressions

Symbol – belgi, ishora
Title – sarlavha
height – balandlik
To develop – rivojlanmoq
length – uzunlik
to debate – bahslashmoq

### Questions for the discussion

1. Do you study algebra, geometry and mathematical analyse?
2. Is this article describes in brief the development of algebra?
3. What can you say about the development of algebraic thinking in Babylonia & Egypt?
4. Was the term "algebra" taken from the long title one of the works of an Arabian mathematician? Who lived in Baghdad in the 19 th century?
5. Was the long title shortened to "Al-jabr"?
6. What can you say about the word "Al-jabr"?
7. What can you say about the later development of algebra?
8. Are our present symbols of operations comparatively modern origin?
9. Was the sign of equality invented by the English scholar, Robert Recorde?
10. Can you say the inventors of algebraic notation? (Viete, Harriot, Descartes, Newton & Leibniz?).

## Text 6. ARCHIMED

Archimed was the greatest mathematician of antiquity. He was born in the Greek city of Syracuseon the island of Sicily about 287 B. C. Roman historians have related many stories about Archimed. There is a story which says that once when Archimed was taking a bath, he discovered a phenomenon which later became know in thetheory of hydrostatics as Archimed''s principle.He was asked to determine the composition of the golden crown of the King of Syracuse, who thought that the goldsmith had mixed base metal with the gold the story goes that when the idea how to solve this problem came to his mind, he became so excited that he ran along the streets shouting Eureka, eureka (I have found it). Comparing the weight of pure gold with that of the crown when it was immersed in water and when not immersed, he solved the problem.

Archimed made many discoveries. He was engaged in geometry and added new theorems to the geometry of the sphere and the cylinder and stated the principle of the lever. He also discovered the law of buoyancy. When Syracuse was taken by the Romans, a soldier commanded Archimed to go to the Roman general, who admired his genius. At that moment Archimed was absorbed in the solution of a problem. He refused to fulfill the command and was killed by the soldier. Archimed died in 212 B. C.

**New words and expressions**

Phenomenon – voqea
To excite – ta'sir qilmoq
To immerse – kirishib ketmoq
To absorb – berilib ketmoq,
Sphere – shar
Buoyancy – suzish
To mix – aralashtirmoq
To compare – solishtirmoq
Genius – ulug' iste'dod
To be ingage – shug'ullanmoq,g'arq bo'lmoq
Lever – richag

**Questions for the discussion**

1. What was Archimed?
2. When and where was he born?
3. Is there a story about Archimed?
4. Who had solved the problem?
5. Who was killed by the soldier?
6. Did he make many discoveries?
7. What was his principle?
8. Did he also discover the law of buoyancy?

## Text 7. COUNTING

The concept of number and the process of counting developed so long before the time of recorded history that the way of this development is unknown to us.Try to imagine how it probably took place. People even in most primitive timeshad some number sense, they could distinguish between "more" and "less" when some objects were added to or taken from a small group of objects. With the gradual evolution of society simple counting became especially necessary. A tribe had to know how many members it had or how many enemies it had to fight. A man had to know how many sheep he had in his flock.

Probably the earliest way of counting was by some simple method, using the principle of one-to-one correspondence. While counting sheep, for example, one finger per sheep was probably turned under. People could also count with the help of pebbles or sticks, scratches on a stone or knots in a string.Then, perhaps later, vocal sounds were developed to denote the number of objects in a small group. And still later, with the development of writing, some symbols appeared to stand for these numbers.This imagined development is supported by the descriptions of anthropologists in their studies of primitive people. In the earlier stages of the vocal period of counting different sounds were used, for example for "two men","two sheep". Don't forget that the number "two", independent of any concrete association, appeared much later. Our present number words probably referred to sets of certain concrete objects, but these connections, except for that relating"five" and "hand", are now forgotten and lost to us.

### New words and expressions

To imagine – tasavvur qilmoq, hayol qilmoq
Primitive – oddiy, sodda.
Especially – ayniqsa
Stick – sanchmoq, yopishtirmoq, suqmoq
Knots – tugun, tuguncha, tugmoq, tugun qilib bog'lamoq
Probably – ehtimol, balki
Gradual – asta-sekin, bora- bora
Flock – to'da, gala, yig'in, to'planib yurmoq
Scratch – tirnalgan joy, tirndalamoq

### Questions for the discussion

1. Why did simple counting become necessary?
2. What does the principle of one to one correspondence mean?
3. How it probably took place?
4. Could people count with the help of pebbles or sticks, scratches on a stone or knots in a sting?
5. Were vocal sounds developed to denote the number of objects in a small group?
6. Is this imagined development supported by the descriptions of anthropologists in their studies of primitive people?
7. What do our present number words probably refer to?
8. Is subtraction indicated by a minus sign?
9. Was the solution of the equation wrong?

## Text 8. EUCLID

Euclid was the famous scientist. Little is known to us about the life of Euclid. His works have very few survived. It is believed that Euclid lived in Egypt approximately 330-275 B. C. When the famous Library of Alexandria was founded, he was invited to open the mathematical school. He wrote his main ideas on geometry in his books. His most famous book on geometry which was called "Elements" was written by him between 330 and 320 B. C. This fundamental book written more than 2000 years ago is still regarded as the best introduction to the mathematical sciences. The book has been translated into many languages. Euclid's "Elements" is still used in Britain as a textbook on geometry. It is said that when Euclid was asked if there was an easier way to master geometry than by studying "Elements", Euclid said, "There is no royal road to geometry."Besides "Elements", there is a collection of his geometrical theorems "The Data". The first printed edition of Euclid's books appeared in the 15th century.

### New words and expressions

To survive – saqla(ni)b qolmoq, tirik qolmoq
Approximate (ly) – taxminan, taxminiy
Royal – qirol
Fundamental – asosiy
To print – nashr etmoq, bosmoq
Data – yangilik, dalil
Edition – nashr

### Questions for the discussion

1. Do you know about Euclid?
2. What was he?
3. Will you tell us about the life of Euclid?
4. When he was invented to open the mathematical school?
5. What is his famous book?
6. When it was written?
7. Is this book still regarded as the best introduction to the mathematical sciences?
8. Has the book been translated into many languages?
9. Is it used in Britain?
10. Is it a collection of his geometrical theorems "The Data"?

## Text 9. CARDINAL NUMERALS
## (Sanoq sonlar)

Abstrakt miqdor yoki predmetning tartibini, o'rnini bildiruvchi so'z turkumi son deyiladi. Son ot bilan ishlatilganda otning ma'nosini to'ldirib otlashib keladi. Mustaqil ishlatilganda esa ular mavhum ma'noda bo'ladi. Strukturasiga ko'ra sonlar quyidagi turlarga bo'linadi:

1. Simple Numerals ya'ni tub yoki sodda sonlar. Tub morfemadan iborat bo'lgan sonlar tub sonlar deyiladi yoki sodda sonlar deyiladi. M: one, two, five, ten, hundred, thousand, million, billion.

2. Derivative Numerals ya'ni yasama yoki derivative sonlar.Yasama sonlar tub sonlarga so'z yasovchi affikslar qo'shilishidan tashkil topadi. M: thirteen, fourteen, twenty, fourteenth va boshqalar.

3. Compound or Composite numerals ya'ni qo'shma yoki murakkab sonlar. Qo'shma yoki murakkab sonlar ikki yoki undan ortiq sonlarning qo'shilishidan tashkil topadi. M: twenty-one, fifty- six, one hundred andone.

Ingliz tilida sonlar belgili (marked) yoki belgisiz (unmarked) shakllarning oppozitsiyadan iborat bo'lgan sanoq (Cardinal) va tartib (ordinal)sonlarga bo'linadi. Sanoq va tartib sonlardan kasr sonlar yasaladi. Ammo ularning maxsus shakli yo'q. Sonlar gapda quyidagi vazifalarni bajarib keladi: Ega, to'ldiruvchi, aniqlovchi, hol, predikativ vazifasida.

Sanoq sonlar how many, how much (qancha), tartib sonlar which (qaysi) so'rog'iga javob bo'ladi. Son kelishik, rod, son kategoriyalariga ega emas.13 dan 19 gacha bo'lgan sanoq birinchi o'nlikdagi tegishli sonlarga ***–teen*** suffiksini qo'shish orqali yasaladi: four**teen**, six**teen**, nine**teen.** O'nliklarni anglatuvchi sanoq sonlar birinchi o'nlikdagi tegishli sonlarga ***–ty*** suffiksini qo'shish orqali yasaladi: twen**ty**, thir**ty**, fif**ty**, six**ty**, seven**ty**, nine**ty**

*Quyidagi sonlarga suffikslar qo'shilganda o'zakda o'zgarishlar yuz beradi.*

| | | |
|---|---|---|
| two | twelve | twenty |
| three | thirteen | thirty |
| four | fourteen | forty |
| five | fifteen | fifty |
| eight | eighteen | eighty |

**Sanoq sonlar quyidagicha o'qiladi:**

1 – one [w^n] – bir
2 – two [tu:] – ikki
3 – three [θri:] – uch
4 – four [fo:] – to'rt
5 – five [faiv] – besh
6 – six [siks] – olti
7 – seven [sevn] – yetti
8 – eight [eitl – sakkiz
9 – nine [nain] – to'qqiz
10 – ten [ten] – o'n
11 – eleven [i'levn] – o'n bir
12 – twelve [twelv] – o'n ikki
13 – thirteen [θ:ti:n] – o'n uch
14 – fourteen ['foti:n] – o'n to'rt
15 – fifteen [fifti:n] – o'n besh
16 – sixteen [siks'ti:n] – o'n olti
17 – seventeen ['seven'ti:n] - o'n yetti
18 – eighteen ['ei'ti:n] . – o'n sakkiz
19 – nineteen ['nain'ti:n] – o'n to'qqiz
20 – twenty ['twenti] – yigirma
21 – twenty-one[twenti'w^n] – yigirma bir
22 – twenty-two [twenti'tu:] – yigirma ikki
30 – thirty [θə:ti] – o'ttiz
40 – forty [' foti] – qirq
50 – fifty [fifti] – ellik
60 – sixty [siksti] – oltmish
70 – seventy [sevnti] – yetmish
80 – eighty [eiti] – sakson
90 – ninety [nainti] – to'qson
100 – one(a) hundred ['h^ndrəd] – yuz

Hundred, thousand, million sonlarida ko'plikda –s qo'shimchasi qo'shilmaydi. Lekin bu so'zlar qo'shma ot bo'lib kelganda – s qo'shiladi. Two hundred persons – ikki yuzta odam. Hundreds of people – yuzlab odamlar. Hundred so'zidan keyin kelgan o'nlik va birlik sonlar orasiga and ishlatiladi.

110 – one hundred and ten
246 — two hundred and forty-six
357 — three hundred and fifty-seven
710 — seven hundred and ten

Xronologik sanalar quyidagicha o'qiladi:

1958 – nineteen fifty eight
1945 – nineteen forty five
2018— two thousand eighteen
8541— eight thousand five hundred (and) forty-one
3410936-three million four hundred and ten thousand nine hundred and thirty-six
20 673 210 040 385 861 – twenty quadrillion, six hundred seventy-three trillion, two hundred ten billion, forty million, three hundred eihgty- five thousand, eight hundred and sixty one.

O'nli kasrlar quyidagicha o'qiladi:

1, 24 – one point twenty four yoki one point two four
16, 23 – sixteen point twenty three

Kasr sonlarda surat sanoq son bilan mahraj esa tartib son bilan o'qiladi. M:

2/ 6 – two the sixth
5/7 - five the seventh

Ikki butun beshdan o'n esa "two and five the tenth" deb o'qiladi.

Telephone numbers: 245 – 75- 89 ( two four five seven five eight nine)

Oy , kun va yillar quyidagicha yoziladi:

September 1, 1991 – The first of September, nineteen ninety one yoki March 25, 1956 – March twenty fifth, nineteen fifty six.

Son turlari haqida gapirilganda ingliz tilida chama sonlar deb ataluvchi mustaqil son yo'qligini aytib o'tish kerak. O'zbek tilida bunday sonlar mavjud bo'lib,ular morfologik va sintaktik yo'llar bilan yasaladi. M: beshtacha, o'ntacha, elliktacha, yetmishtacha va boshqalar. Ingliz tilida sonlar chamasini ko'rsatish uchun son oldidan "about" yoki ikkita son o'rtasida "or" suffiksi ishlatiladi. M: about five, about ten, about fifty- elliktacha, one or two- bir-ikki, bir-ikkita,three or four- uch to'rt,to'rttacha.

Vaqt soat va minutlarni aytishda at, past, to predloglaridan foydalaniladi.What time is it? It is 10 o'clock. When do you go to library? I go to there at 15o'clock. Yarim soat va ungacha o'tgan vaqtni ifodalash uchun past predlogi ishlatiladi. At five minutes past three — uchdan5 minut o'tganda. At a quarter past five —5 dan 15 minut o'tganda. At half past six - 6 yarimda. Yarim soatdan keyingi vaqtni ifodalashda to predlogidan foydalaniladi. At a quarter to five – 15 ta kam 5 da. At 20 minutes to five- 20 ta kam 5 da.

**Ex 1. Read and write the following numerals**

sixty-two, three, eighty-one, four, fwenty-eight, five, one thousand and one, two,

two million, seventy-one, thiriy-nine, one hundred and twenty-three, ten, two hundred and seven, eleven, ninety-two, twelve, a million, six, billion, one hundred and twenty-nine, eight.

## Text 10. LETTERS IN ALGEBRA

Some mathematicians thought that the invention of symbols was the greatest event in the history of man and that without them no intellectual advance could be possible. In thousands of offices all over the world a large amount of correspondence is looked through during the day. It would require much work and time to write all these letters in the usual way. That is why offices often depend on the services of stenographers who have mastered the art of commercial shorthand. In this way much valuable time has been saved. After a business letter has been dictated, it is printed on a typewriter.

After that another kind of shorthand is used. It is illustrated by the address which is written on the envelope. Each of the names in the adress is preceded by certain initials. For example, instead of writing the name James Parker Lewis, the shorter form J.P. Lewis has been used. Many other examples of every day shorthand can be given. You have certainly known such name the USA and so on. In these cases we have abbreviated certain words by using their first letters.

In the same way mathematicians have succeeded in developing mathematical shorthand, which is known as algebra. Let us suppose, for example, that we must find the area of an auditorium. To do it we must know its length, width and height. In order to solve this problem we use initial letters, writing l for "length", w for"width", h for "height". Many other examples could be given to show how the initial letters of important mathematical words are used for the purpose of mathemarical shorthand.

Algebra as a branch of mathematics is much younger than arithmetic or geometry. It is used in many applied fields. School and institute students study it in our country and abroad. Algebra can be compared to a language, but it says more in fewer words, than any other language.

### New words and expressions

| | |
|---|---|
| Symbol – belgi, ramz | Shorthand – stenografiya |
| Valuable – qiymatli | Length – uzunlik |
| Width – enlik | Height – balandlik |

### Questions for the discussion

1. Do you know how letters are used in algebra?
2. Is it printed on a typewriter?
3. Is after that another kind of shorthand used?
4. By what is it illustrated?
5. What was James Parker Lewis?
6. Is algebra a branch of mathematics?

## Text 11. ORDINAL NUMERALS
## (Tartib sonlar)

Tartib sonlar tegishli sanoq songa –th suffiksini qo'shish vositasida yasaladi.
M: four —(the) fourth
seven— (the) seventh
eighteen— (the) eighteenth
one, two, three sonlari mazkur qoidadan mustasnodir:
one — (the) first
two—(the) second
three — (the) third
five, eight, nine, twelve sanoq sonlariga -th qo'shilganda asos son yozilishida quyidagi o'zgarishlar yuz beradi: five — (the) fifth, eight—(the) eighth, nine — (the) ninth, twelve—(the) twelfth- ty ga tugovchi sanoq sonlarga tartib son yasovchi th suffiksi qo'shilgandayharfi ie ga aylanadi:
twenty—(the) twentieth. forty— (the) fortieth

Qo'shma sanoq sonlardan tartib son yasalganda tartib son suffiksi oxirgi songa qo'shiladi:
(the), forty-eighth (the) fifty-third
Ingliz tilida tartib sonlar quyidagicha o'qiladi:
the first [fə:st] – birinchi
the second ['seknd] – ikkinchi
the third [θə:d] – uchinchi
the fourth [fo: θ] – to'rtinchi
the fifth [fifθ] – beshinchi
the sixth [siksθ] – oltinchi
the seventh [sevnθ] – yettinchi
the eighth [eitθ] – sakkizinchi
the ninth [nainθ] – to'qqizinchi
the tenth [tenθ] – o'ninchi
the eleventh [i'levnθ] – o'n birinchi
the twelfth ['twelθ] – o'n ikkinchi
the thirteenth ['θə:ti:nθ] – o'n uchinchi
the fourteenth ['fo:ti:nθ] – o'n to'rtinchi
the fifteenth ['fif'ti:nθ] – o'n beshinchi
the sixteenth ['siks'ti:nθ] – o'n oltinchi
the seventeenth ['sevn'ti:nθ] – o'n yettinchi
the eighteenth ['eiti:nθ] – o'n sakkizinchi
the nineteenth ['nain'ti:nθ] – o'n to'qqizinchi
the twentieth [twentiθ] – yigirmanchi
the twenty-first ['twentifə:st] – yigirma birinchi
the twenty-second ['twentisaknd] – yigirma ikkinchi

Sanalarni ifodalashda tartib sonlardan foydalaniladi.August 15, 1987 deb yozib, uni the fifteenth of August nineteen eightysevenyoki August the fifteenth

nineteen. eighty-seven tarzida o'qiladi.Agarda ma'lum bir kunda biror narsa bo'lganligini aytish zarur bo'lsa, sanada on predlogi ishlatiladi.
On November I4th, 14 Noyabrda – On the I4th of November

## Text 12. FRACTIONS

There are 360 degrees in a revolution. If we divide a revolution into two equal parts, each part will contain 180 degrees. As we know, 180 degrees is regarded as one-half or of a revolution. Then if we divide a revolution into four equal parts, each part will have 90 degrees, which is called one – quarter or 1/4 of a revolution. We can continue this process dividing a revolution into five equal parts, and each part will contain 72 degrees, which is one the fifth or ( one the fifth) of a revolution. These parts, such as , , ( one the second, one the forth,one the fifth) are called fractions. The top figure of the fraction is called the numerator and the bottom one – the denominator. A fraction in which the numerator and the denominator are the same, is equal to 1. A. proper fraction is a fraction whose numerator is less than its denominator,i,,e. a fraction less than 1. For example: and (seven the eighth vaeleven the thirteenth) are proper fractions. An improper fraction is a fraction whose numerator is greater than its denominator,i,e. a fraction greater than 1. For example: and ( eight the seventh va thirteen the eleventh ) are improper fractions.Since (eight the seventh) is also written as (one and one the seventh), we say that this fraction has a whole number and a proper fraction. A fraction of this kind is called a mixed number.

### New words and expressions

Fraction – kasr
Degree – daraja
Numerator – surat
Equal – teng
Whole number – butun son
Revolution – to'liq aylana
Part - qism
Denominator – maxraj
Proper (improper) fraction – to'g'ri(noto'g'ri) kasr
Mixed number – aralash son

### Questions for the discussion

1. What is the fraction?
2. Are there 360 degrees in a revolution?
3. Is the top figure of the fraction called the numerator?
4. What is the denominator?
5. What is a proper fraction?
6. What is an improper fraction?
7. What kind of fraction is called a mixed number?
8. What is in Uzbek for "equal"?
9. Are you speaking about "fractions?"
10. Can you explain the meaning of "fraction"?

## Text 13. MUSO AL-KHOREZMI

**(780 – 847)**

Muso al – Khorezmi was the greatest mathematician, astronomer and geographer. He is " the father of algebra". He was born approximately in780 in Khorezm. His full name is Abu Abdullah Mukhammad ibn Muso al – Khorezmi al Majusi. The first part of the name Abu Abdullah Mukhammad is a traditional name, the part of the name ibn Muso gives the meaning "Muso's son", the last part of the name "al –Majusi" is his pen - name. He was a clever and hardworking boy in his childhood. He devoted much time to study. Soon he knew reading and writing. He was interested to mathematics, that's why he work hardly on mathematics. He knew many foreign languages and he was in many towns and cities. He was interested to know the history of geography of those cities. His activities were in Khorezm and Mavaunnahr. At the beginning of the IX century" Bayt ul – Khikmat" ( the Wisdom's House ) was organized in Bagdad. Khaliph Ma'mun was the governor of it at that time. 'Bayt ul – Khikmat' was the centre of scientific research. Many scientists of the world came to there and they were engaged in research. Muso al – Khorezmi came to "Bayt ul-Khikmat"and he was also an active member of it. He worked there with many young scientists of the world and he was a research adviser to their scientific researchs. He carried research with talented scientists and his countrymen. For ex: Ahmad ibn Abdullah al – Marvazi, Mukhammad ibn Kassir al– Farghoni, Abbas ibn Said al – Javkhari and others. He wrote works on mathematics, astronomy, geography. He wrote many books but only ten books survived to us. He is the author of the books ' Al –jabr',' Algorithm about Indian calculation', ' Ziji al – Khorezmi', ' The Sun's Watch', 'About History', ' About Music','Kitab ul – Muhtasar fi khisab al – jabr val Mukabala' ( Manuscripts of the book " Kitab ul – Muhtasar fi hisab al –jabr val –Mukabala' copied in 1342. English translation of this book was printed in 1831) and others Muso al-Khorezmi's main work "The Book of Addition and Subtraction according to the Indian Method " was one of the cause why the Pope Sylvester IIin the tenth century passed a decision to introduce Arabic figures in Spain. Hisbook about calendar found from India and it was printed in Khaydarabad in 1948.

The book "Al – jabr val – Mukabala" laid the fundamentals of algebra and gave the name for a whole branch of mathematics. "Al-jabr" was his the first book and [illegible] the main conceptions, [illegible] and the rules of mathematics in it. This book was translated into Latin by English scholar Robert Chester in 1145, into English in 1911. Italian translator Gerardo also translated it into Latin. The translation of the book was printed in 1983. Now its Arabian manuscripts are keeping at the Oxford library. The book "Ziji al – Khorezmi" is at the Badliyan library in Oxford, the Museum library in Paris, the National library in Madrid. The work consists of introduction, 37 chapter and 116 tables. The 10th chapter is about Saturn, Yupiter , Mars and others, the 11th chapter is about trigonometry. He gave the exact coordinates of 2402 towns, mountains, seas and rivers in his books on geography.

The Latin form of the author's name Algorismus and Algorithmus began to be used as the mathematical term "algorithm" in medieval Europe to denote a system of decimal arithmetic. Indian astronomers made up tables and. Khorezmi analysed those tables and he had made up his "Astronomical Tables". It translated into Latinin 1126. The last variants of the table translated into English in 1962. Three chapters of this book translated from Latin into Russian by Yu. L. Kopelevich and it was printed in Tashkent. Muso al- Khorezmi died in 847. Sarton who was the well – known Western historian called that the beginning of the IX century is "the epoch of Khorezmi". Nowadays all the people of the world and we learn his works. We are rightfully proud of his great heritage. His name is eternal in the history of science and in our heart.

### New words and expressions

To be born – tug'ilmoq
Pen- name – taxallus
To be interested – qiziqmoq
Research adviser – ilmiy rahbar
Heritage - meros
Traditional- an'anaviy
To devote – bag'ishlamoq
Activity – faoliyat
Countrymen – vatandosh

### Questions for the discussion

1. What was M. Al- Khorezmi?
2. Where and when was he born?
3. What will you say about his childhood?
4. When and where was printed his book about calendar?
5. What can you tell us about his book "Ziji- Khorezmi"?
6. Are you learn his great heritage?

## Text 14. Al - FARGHONI (797- 861)

Ahmad Al-Farghoni was the greatest astronomer, geographer, mathematician and philosopher. He was from Zardushti. His father renounced Zardushti and adopted Islam. Ahmad Farghoni was born approximately in 797 in Ferghana (Kuva). He spent his childhood in his own country. Then he moved to Samarkand fromFerghana through Khojand, after to Marv (in Turkmenistan) through Bukhara to Al-Maun Ibn Khorun Ar-Rashid. Many scientists of the world came to Bagdad and carried out their activities at "Bayt ul – Khikmat" (The House of Wisdoms).When he was22 years old he was married. His wife's name is Sarvijamol. Her father was a rich man and he was a member of" Bayt ul –Khikmat". Sarvijamol has a son and a daughter. Being young Ahmad Al-Farghoni began his activity in Bagdad. His first book was printed in Italy in 1493 and it was already translated in XII century by Geranto and then the book was translated into many languages in XIII century. In 1669 Yakob Qolius printed the book in Arab and Latin languages in Amsterdam. The generations of astronomers read the book and became scientists. The scientists of Europe read the lectures about Farghoni. The famous astronomer and mathematician Regiomonton (1436-1476) read a lecture about the works and the life of Farghoni in 1464. The famous Italian poet Dante Aligeri also wrote about Farghoni's works in his book "New life". Even in Shiller's book " Wallenshtein" Fargoni was known as Alfraganus.Al-Farghoni became more famous in the countries of East-Europe than in the countries of East. In his books about astronomy he spoke much about the geography, climates and positions of the country. Ahmad Farghoni was the first who opened the way to the geographic maps. Farghoni learnt the ellipse of the Sun and the Moon. During the Al-Mamun time there were built observatories, one of these was built in Shammasiya, the second in Damashk. These observatories were built by Ahmad Farghoni. He was occupied with scientific and administrative work in obser-vatories. He also knew the classification of the star, their movements, distance and he measured and described 1022 stars. He also gave the names for month and now the 12 stars are in the flag of Uzbekistan. The method of making the sun watch was also given by him. He wrote some commentaries to al-Khorezmi's book "Zij". He also tried to solve not only the mysteries, but also the Earth mysteries, he proved the Earth is round. His main work was the 'Book of Celestial Movements and a Code of the Science of Stars". He identified the date of the longest – June 22 and the shortest –December 22 days of the year. The book which was written by Farghoni was used as a text book at the Universities of Europe.

The theory of stenographic projection was given the book "About constructing" by Ahmad Farghoni. According to the written information Ptolome stenographic projection but they are given with argument (proof).Circles lying on the sphere, which are projection on the plane as a circle move through the centre projection as a straight line.The curved line which lies on the sphere and angle between them equals to the angle on the project.While turning around the diameter, moving through pole, on the plain occurs turning around the touching with the sphere on the same angle.One of the illustrious, erudite personalities whose name fasinated the world was our contemporary Ahmad Al-Farghoni. The East and the West scientists used Ahmad Al-Farghoni's heritage in their research work.

### New words and expressions

| | |
|---|---|
| Mathematician- matematik | Philosopher – faylasuf |
| To adopt – qabul qilmoq | Approximately – taxminan |
| Activity – faoliyat | Observatory – rasadxona |
| Mystery – sir, mahfiylik | Heritage – me'ros |

### Questions for the discussion

1. What was A.Al-. Farghoni?
2. Where and when was he born?
3. Where did he spend his childhood ?
4. When and where was printed his first book?
5. Who was printed the book in Arab and Latin?
6. Did he learn the eclipse of the Sun and the Moon?

## Text 15. P.FERMA

Pierre de Ferma was a famous French mathematician of XVII century. He was born near Toulouse about 1601. He was the son of a leather merchant and received his early education at home. At the age of 30 he was given the post of councilor to the local parliament of Toulouse. While working as a lawyer he devoted a lot of his time to the study of mathematics. Though he made a lot of discoveries, he published very little during his lifetime. He was scientific correspondence with many leading mathematicians of his time and in this way influenced their ideas. He made important contributions to many branches of mathematics.

One of Ferma's outstanding contributions to mathematics is the founding of the modern theory of numbers. Ferma possessed extraordinary ability. It was Ferma's custom when reading to record the results of his meditations in brief marginal notes in his book. Many of Ferma's contributions to the field are given as marginal statements made in Diophantus' "The Arithmetic". He died in 1665. Five years after his death in 1670, these notes appeared in a new edition of "The Arithmetic". Many of Ferma's improved theorems have later been found to be correct.

### New words and expressions

Leather – charm
Education – ta'lim, ma'lumot
councilor – maslahatchi
Local – mahalliy
Lawyer – himoyachi
To devote – bag'ishlamoq
To influence – ta'sir o'tkazmoq

### Questions for the discussion

1. What was Pierre de Ferma?
2. When & where was he born?
3. Was he the son of a leather merchant?
4. When was he given the post of councilor to the local parliament of Toulouse?
5. Did he devote a lot of his time to the body of mathematics?
6. Did he make a lot of discoveries?
7. Was he in scientific correspondence with many leading mathematicians of his time?
8. What is one of his outstanding contributions to mathematics?
9. When did he die?
10. When did appeare his book "The Arithmetic"?

## Text 16. GEOMETRY

The word "geometry'' comes from the Greek word "geos" and "metron" which mean respectively "earth" and "measure". Geometry is a part of mathematics which is one of the oldest sciences. It probably appeared with the efforts to survey land and it is the basis of many things that we use today. It is a study of the size, shape and position of figures in space. A mathematician who works in the field of geometry is called a geometer. Many scientists carried out on geometry. They are: Piphagor, Archimed, Aristotel and others.

Geometry has practical value. It is necessary for people in many occupations and it is also necessary in the study of physics, engineering, architecture and related subjects. In geometry we use such terms as triangle, angle, bisector, perpendicular and circle. To develop facts about geometric concepts, we prove statements concerning them. The statements we accept without proof are called postulates, axioms or assumptions. Statements that we can prove are called theorems or corollaries. One of the main theorems of geometry is the theorem of Piphagor. It is: a2+b2+c2. The basic figures in geometry are points, lines and planes. We represent a point on paper by a dot, though the dot is not a real geometric point. A geometric point is a mental concept, it has no length, breadth or thickness, that is, no size. But if we want to make a picture of a point we can use a dot and place a capital letter near it. Thus, A represents a point. Like a point, a geometric line is a mental concept. To represent a straight line we draw a picture of a line along a ruler. A straight line is named by any two points on it or by a small letter near it. In space there are sets of points which we call planes. Objects with flat surfaces, such as a table or a mirror are planes, but no matter how flat a surface is, it is not a geometric plane. A geometric plane cannot be seen it can only be imagined. A plane is most often represented as a parallelogram. There are many theorems of solid geometry. They are:

1. If two planes cut each other, their intersection is a straight line.
2. If a line is perpendicular to each of two other lines at their point of intersection, it is perpendicular to the plane of the two lines.
3. Two lines perpendicular to the same plane are parallel.
4. Two planes perpendicular to the same line are parallel.
5. The intersections of two parallel planes by a third plane are parallel lines.
6. Through a given external point their can be drawn one line perpendicular to the plane and only one.
7. A dihedral angle is the opening between two intersecting planes.
8. The plane angle formed by two straight lines, one in each plane, perpendicular to the edge at the same point is called the plane angle of the dihedral angle.
9. Two dihedral angles are equal if their plane angles are equal.
10. If a line is perpendicular to a plane , every plane passed through this line is perpendicular to the plane.

**New words and expressions**

| | |
|---|---|
| Angle – burchak | Bisector – bissektrisa |
| Perpendicular – perpendikulyar | Assumption – taxmin, gumon |
| Plane – yuza, tekislik | Surface – sirt, yuza |
| Solid – sof, jism(geometric jism) | To survey – yer o'lchamoq (yer o'lchash ishlari) |

### Questions for the discussion

1. Where does come from the word "geometry"?
2. What does geometry study?
3. What are the basic figures in geometry?
4. What are postulates?
5. What are theorems or corollaries?
6. What is a geometric point?
7. What is a geometric line?
8. What is a straight line?
9. What do we call planes?
10. Can imagined be the geometric plane?

## Text 17. GEOMETRY IN THE ART

Geometry is the bases of many things that we use and enjoy today. We know that nature uses geometric forms in the construction of crystals and in the sphere of plant and animal life. Very often the beauty found in nature is due to some geometric pattern or to the use of numbers which are associated with geometry. Man has discovered many other applications of geometry in nature, remember that some of these applications of geometry to the arts are easily seen but others are latent and can't be seen at once.

Geometry is applied in painting, sculpture and architecture. Artists, sculptors and architects often use geometric forms and proportions. In paintings the geometric figures are usually latent and they must be discovered. Some of the early painters whose works were based on geometric principles were Raphael, Michelangelo and Leonardo da Vinchi.

The geometry in architecture is both latent and visible. Almost every building is a harmonious arrangement of geometric forms. One of the most famous buildings of all times is the Parthenon, the largest of the group of buildings on the Acropolis in Athens. It was built in the years 447-438 B.C. and is famous for its perfection of form.

The plane figures which are most often used in architecture are the circle, rectangle, square and equilateral triangle. The Romans used these figures in determining the proportions of triumphal arches and the Italians in constructing Gothic cathedrals. Sculpture makes even greater use of geometry than painting, especially when it is combined with architecture. Great art critics say that the beautiful lines of a statue show the action of the most exact mathematics.

### New words and expressions

Application –ariza
Pattern – namuna
Visible – ko'rinib turadigan
Athens – Afina
Square – kvadrat

Sphere – olam
Latent – yopiq holatda
To apply – murojaat qilmoq
B.C – Before Christ – eramizdan avval
Equilateral triangle –teng tomonli Uchburchak

### Questions for the discussion

1. What is geometry?
2. Does geometry use in nature?
3. Do artists, sculptors and architects use geometric forms?
4. Is applied geometry in painting and sculpture?
5. Are the geometric figures latent in painting?
6. Do you know famous painters?
7. Where are the famous & the largest buildings?
9. When was built the famous building?
10. What are the plane figures?

## Text 18. FUNDAMENTAL IDEAS

Solid, Surface, Line, Point. All objects that we see around us take up room, they occupy some space; they are in the geometrical sense of the word "solids"; for in geometry the shape and size of objects are considered apart from the materials of which they may be composed, A box takes up just as much room when empty as when full; it is in either case a "solid" in the geometrical sense of the word, for it occupies some space and the amount of space it occupies depends upon its size alone.A box-shaped solid is called a "rectangular" block; the surfaces which form its boundaries are called its "faces"; the measurements which describe its extent are called its "dimensions". A flat surface is called "a plane surface" or simply "a plane".

The shapes with their names of some of the simplest forms of solid figures bounded by plane surfaces are shown here; these sketches are drawn representing the solids as they would appear if made of glass, the edges seen through the glass being denoted by dotted lines.

In speaking of the dimensions of a box –shaped solid we called them the length, the width and the height. We do not speak of the length, width and height of a solid which has a curved surface; yet is as much as all solids take up room, they all have three such dimensions.An upright straight line is called a vertical line; a level straight line is called a horizontal line.

### New words and expressions

| | |
|---|---|
| Solid – jism (geometric jism) | Depend – himoya qilmoq |
| Dimension – hajm, o'lcham | rectangular – to'g'ri burchakli |
| Empty – bo'sh, bo'shatmoq | Track – iz, qoldiq, nishon |

### Questions for the discussion

1. What is called a rectangular?
2. What is called a plane surface?
3. Is the life full of numbers?
4. Do the numbers accompany us throughout life?
5. Do you use numbers to measure your age?
6. Are numbers a part of human life?

## Text 19. I. NEWTON
## (1642 - 1726)

Isaak Newton was the greatest scientist. He was born on the 25th of December, 1642 in the little village of Woolsthorpe in Lincolnshire. His father wasa farmer and he died before Newton was born. The farm was situated in a lonely place where there were no schools and Newton got his education in a school in the neighbouring village. When he was 12 year sold he was sent to the Grammar school. Soon he became the best pupil at his school. He didn't take part in games like his schoolmates, he spent a lot of time constructing models. He made a model of a wind mill, a wooden clock that was driven by water and other things. His mother wanted her son to become a farmer, so when he was fourteen, he began working on the farm. But soon his mother realized that it was no use teaching him farm work, because he was always busy reading books, constructing models or observing various phenomena in nature. When he was eighteen years old he was sent to Cambridge University. Newton studied mathematics at Cambridge and took his degree there in 1665. Then the University was closed from the danger of plague. Then Newton went home for a period of 18 months, which was a most important period, for during that time he, between the ages of 22 and 24, made his three great discoveries: the discovery of the differential calculus, of the nature of white light and of the law of gravitation. Those three great discoveries, which changed the course of thought have also influenced the course of science from the day until our days. It is interesting how the idea which led to the discovery of the laws governing the forces of gravitation first came to him. Once, as he sat in his garden the fall of the apple made him think: why must that apple always descend perpendicularly on the ground, why must it not go sideward or upwards, but usually to the earth's centre.

He was forty two years old and at the very peak of his scientific genius, whenhe began his famous masterpiece called "The Principle", It is a book that is little read today. Ask for it in a bookshop or even in many libraries and no copy will be available. It is true that this book is hard to find nowadays, but throughout the world there still thousands of shelves containing tens of thousands of books with modernized versions of the basic truths in "The Principle". Certainly, the reason is that the earth draws it. Later he began to apply this property of gravitation to the motion of the earth and the heavenly bodies round the sun. Newton died when he was 84 and was buried in Westminster Abbey where his monument is today.

**New words and expressions**

Scientist – olim
To take part – qatnashmoq
The law of gravitation – tortishish qonuni
Monument – haykal
Genius – ulug' isde'dod
Discovery – kashfiyot
To be bury – dafn et(il)moq

### Questions for the discussion

1. What was I. Newton?
2. When was he born?
3. What was his father?
4. What did he make?
5. Was he sent to Cambridge University?
6. Who is the author of the book "The Principle"?
7. Where is his monument?
8. Can you say about Newton's laws?

## Text 20. MATHEMATICAL FORMULAS

There are at present millions of different homes all over the world. Naturally the problem of housing concerns every person. Perhaps you have never thought of the amount of planning that even a small house requires before its construction begins. Many questions have to be solved before the architect designs such a house – questions of dimensions, of materials and of probable costs. After the blue prints have been completed, a lot of computing and figuring must be done. The same problems arise in manufacturing automobiles, airplanes and machinery. The computational work which is necessary in solving these problems is simplified by using formulas. They have been discovered and developed by the combined effort of mathematicians, scientists and engineers. That is why the formula has been called a key to knowledge. It contains the results of investigations that may have extended over many years.

A mathematical formula arises when a mathematical rule or relation is written in the shorthand of algebra. Therefore its very important to be able to discover the rule or relation which underlies such a formula. Formulas used in each chapters of mathematics. We can also obtain formulas from tables. There are many situations in which it is necessary to have tables showing related sets of numbers. For instance, there is a table used in a gasoline station for the purpose of determining the cost of the number of gallons bought by a motorist. You will see there is a uniform relation between the number of gallons bought and the price. This relation can be expressed by making a formula. It is the same with a scientist or an engineer who has been experimenting for some time to obtain new information. He usually records his results in the form of a table. In this way formulas can be obtained from tables.

### New words and expressions

Blueprint – loyiha
Figure – figura
Table – jadval
To compute – hisoblamoq
To simplify –soddalashtirmoq
Gallon –gallon

### Questions for the discussion

1. What is called a key to knowledge?
2. When does arise a mathematical formula?
3. Can we also obtain formulas from tables?
4. Are there many situations in sets of numbers?
5. What will you see if you look at this table?
6. Can this relation be expressed by making a formula?
7. Does he usually records his results in the form of a table?
8. By what does he express?
9. Can formulas be obtained from tables in this way?
19. Do you know mathematical formulas?

## Text 21. ALGEBRAIC EXPRESSION

A number represented by algebraic symbols is called an algebraic expression. Division. In multiplication two numbers are given and their product is to be found. The inverse process, finding one of the two numbers when their product and the other number are given, is called division. The dividend corresponds to the product, the divisor to the multiplier and the quotient to the multiplicand.

Law of signs for division. The sign of the quotient is when the dividend and divisor have like signs and when they have unlike signs.

Multiplication. The number multiplied is called the multiplicand in arithmetic; the number by which the multiplicand is multiplied, the multiplier; and the result – the product. Law of signs for multiplication. The sign of the product of two factors is + when the factors have like signs and when they have unlike signs. Rule. To multiply a polynomial by a polynomial. Multiply the multiplicand by each term "of the multiplier and find the algebraic sum of the products". The sign of addition is +. It reads "plus". A + b read "a plus b", means that b is to be added to a. The sign of subtraction is -. It reads "minus". a-b, read "a minus b", means that b is to be subtracted from a (the number preceding it). The sign of multiplication is x or the dot. It reads "multiplied by". A xb or a.b. The sign of equality is=. It reads "is equal to" or "equals". The signs of aggregation are: the parentheses ( ); the brackets [ ]; the braces { }. They are used to group numbers, each group being regarded as a single number. Thus, each of the forms (a+b)c, [a+b]c, {a+b}c signifies that the sum of a and b is to be multiplied by c. All operations within groups should be performed first. When numbers are included by any of the signs of aggregation, they are commonly said to be in commonly said to be in parenthesis, in a parenthesis, or in parentheses. The sign of continuation is . . . , read or "and so on to" 2,4,6,8, . . . 50 read "2,4,6,8 and so on to 50".The sign of deduction is . . , read "therefore" or "hence".

### New words and expressions

| | |
|---|---|
| Expression – ifoda | Quotient – qism, xissa, dalil keltirmoq |
| Sign - belgi, imzo, ishora | Correspond – mos kelmoq |
| Multiple - karrali son | Sum - yig'indi, jamlamoq |

## Questions for the discussion

1 What is called an algebraic expression?
2 What is called division?
3 What is the law of signs for division?
4 What do you call the multiplicand?
5 Does the dividend correspond to the product?

## Text 22. LOGARITHMS

Early in the seventeenth century it was suggested to simplify long computations by presenting all real positive numbers as powers of some particular number. The *exponents* of these powers are called logarithms. They were arranged in tables for convenient reference; and in accordance with the principles of exponents, multiplication was replaced by addition, division by subtraction, involution by a single simple multiplication, and evolution by a single simple division.

Napier Scotchman was the inventor of logarithms and he published the first tables, but to Henry Briggs belongs the honour, next to Napier, for their development, to represent all numbers as powers of ten and work out the system now in common use.

The exponent of the power to which a fixed number (called the base) mustbe raised in order to produce a given number is called the logarithm of the given number. When 2 is the base, the logarithm of 8 is 3, for $8 = 2^3$. When 10 is the base, the logarithm of 100 is 2; for $100= 10^2$; the logarithm of 1000 is 3; for $1000= 10^3$; the logarithm of 10,000 is 4; for $10{,}000= 10^4$. When 10 is the base, the logarithm is written without the base, As lg 100 = 2. The base of the common, or Briggs, system of logarithms is 10.Since $10^0 = 1$, the logarithm of 1 is 0. Since $10^1 = 10$, the logarithm of 10 is 1. Since $10^2 = 100$, the logarithm of 100 is 2. Since $10^3=1000$, the logarithm of 1000 is 3. Since $10^{-1} = 1/10$, the logarithm of .1 is— 1. Since $10^{-2}=$ 1/100, the logarithm of 0.01 is -2.

It is evident, then, that the logarithm of any number between 1 and 10 is a number greater than 0 and less than 1. For example, the logarithm of 4 is approximately 0.6021. Again, the logarithm of any number between 10 and 100 is a number greater than 1 and less than 2. For instance, the logarithm of 50 is approximately 1.6990. Most logarithms are endless decimals. The integral part of a logarithm is called the **characteristic;** the fractional or decimal part — the **mantissa.**In lg 50=1.6990, the characteristic is 1 and the mantissa is 6990.

The following illustrates *characteristics, mantissas* and their significance:
lg 4580 = 36609; that is, 4580= $10^{3'6609}$ log 458.0 = 26609; that is, 458.0= $10^{2'6609}$.
lg 45.80 = 1.6609; that is, 45.80 = $10^{1'6609}$. lg 4.580 = 0.6609; that is, 4.580 =10
$^{0'6609}$ lg .4580 = 1.6609; that is 4580 = $10^{'1''6609}$

From the above examples it is evident that: *The characteristic of the logarithm of a number greater than I is either positive or zero and 1 less than the number of digits in the integral part of the number. The characteristic of the logarithm of a* *decimal is negative and numerically /*greater than the number of ciphers immediately following the decimal point.*

To avoid writing a negative characteristic before a positive mantissa,it is customary to add 10 or some multiple of 10 to the negative characteristic, and to indicate that the number added is to be subtracted from the whole logarithm. Thus, 1 6609 is written 9 6609—10; 23010 is written 83010—10, etc.

It is evident, also, that in the logarithms of numbers expressed by thesame figures in the same order, the decimal parts, or *mantissas,* are the same, and the logarithms differ only in their *characteristics.* Hence, tables of logarithms contain only the *mantissas.* Since logarithms are the exponents of the powers to which a constant number is to be raised, it follows that:

*The logarithm of the product of two or more numbers is equal to the sum of their logarithms;* that is lg *(mn)*= lg *m*+ lg *n.*

The logarithm of the quotient of two numbers is equal to the logarithm of the dividend minus the logarithm of the divisor; this may be written lg *(m/n)*=lg *m*—lg *n.* Involution by logarithms. The logarithm of a number is equal to the logarithm of the number multiplied by the index of the power; that is Evolution by logarithms. The logarithm of a root of a number is equal to the logarithm of the number divided by the index of the required root; thus lg $m'' = n$ lg *m.*

**New words and expressions**

| | |
|---|---|
| Accordance –moslashuv | Decimal – o'nlik son |
| Exponent – daraja ko'rsatkichi | To represent – ifodalamoq |
| To fix – belgilanmoq | number – son, raqam |

**Questions for the discussion**

1.What are called logarithms?
2. Was Napier Scotchman the inventor of logarithms?
3. Did he publish the first tables?
4. What is called the logarithm of the given number?
5. What is called the characteristic?

## Text 23. FACTOR, POWER AND ROOT

Each of two or more numbers whose product is a given number is called a factor of the given number. Since 12 =2X6, or 4x3, each of these numbers is a factor of 12; 3ab, 3a, 3b and ab are factors of 3ab. In 5xy, 5 is a known number and it is called the coefficient of xy, in ax if a is a known number, it is the coefficient of x. Coefficients are numerical, literal or mixed, as they are composed of figures, letters, or both figures and letters. When no numerical coefficient is expressed, the coefficient is considered to be 1. When a number is used a certain number of times as a factor, the product is called a power of the number. When a is used twice as a factor, the product is the second power of a, or the square of a: when a is used three times the product is the third power, or the cube of a; four times, the fourth power of a; n times, that is, any number of times, the n the power of a, A figure or *a* letter placed a little above and to the right of a number is called an index.

A number $a_2$ reads "a square" or "a second power", $a_3$ reads "a cube" or "athird power", $a_4$ reads "a fourth power" or "a exponent 4", $a_n$ reads "a nth", "a nth power" or "a exponent n".

When no exponent is written, the exponent is regarded as $5_1$ is regarded as the first power of 5 and $a_1$ is usually written a. The terms coefficient and exponent should be distinguished. $5_a$ means a+a+a+a+a , but $a_5$ means axaxaxaxa. When thefactors of a number are all equal one of the factors is called a root of the number. 5 is the root of 25, a is the root of $a_2$. The symbol which denotes that a root of a number is sought is written before the number. It is called the root sign. The letter written in the opening of the radical sign indicates what root of the number is sought, it is called the index of the root. When no index is written the second or square root is meant. 3 under the root 8 indicates that the third or cube, root of 8 is sought, ax indicates the square root of ax and a—b — the square root of a - b.

### New words and expressions

| | |
|---|---|
| Factor – ko'paytma | Coefficient – koeffisient |
| Consider – hisoblamoq | To indicate – ko'rsatmoq |
| Power – kuch, daraja | Root – ildiz |

### Questions for the discussion

1. What is called a factor?
2. What is called a coefficient?
3. What is called a power of the number?
4. Do you know index?
5. What is called the index of the root?
6. What is called a root of the number?

## Text 24. ANGLE

Two straight lines which meet form an angle at the point where they meet and are called the arms of the angle and the point is called its vertex. If a pair of "dividers" or compasses be opened an angle is formed and the more they are opened the greater is the angle. The size of an angle does not depend upon the length of the arms, but upon the extent to which they are opened. An angle is usually denoted in geometry either by one capital letter at the vertex or by three capitals, one at the vertex and one on each arm. When three letters are used that at the vertex must be read or written between the other two. This angle shown in the figure may be described either as "angle A" or as "angle BAC" or as angle "CAB". An angle is called acute or obtuse according as it is less or greater, than a right angle. Thus, AOR is an acute angle and AOS is an obtuse angle. An angle which is greater than two right angles is called a reflex angle. When two straight lines form a right angle, they are perpendicular to each other. Thus, if PNQ is a right angle, then PN is perpendicular to QN and QN is perpendicular to PN. Theorems and corollaries:

1. The sum of adjacent angles, formed by two straight lines, =2 right angles and the converse. Hence, the sum of all angles at and pt. = 4right angles.
2. If two sides of a triangle are equal the angles opp.those sides are equal and the converse. Hence, 1) an equilateral triangle has all its angles equal and are converse. 2) the bisector of the vertical angle of an is osceles triangle bisects the base and is perpendicular to the base.
3. If angle C is an obtuse angle, then $AB_2 = BC_2 + CA_2 + 2BC\ x\ SINC$.
4. If angle C is an acute angle , then $AB_2 = BC_2 + CA_2 - 2BCx\ AC$ and conversely angle C is right, obtuse or acute, according as $AB_2$ is equal, greater or less than $BC_2 + CA_2$.

### Questions for the discussion

1. What are called the arms of the angle?
2. What is vertex?
3. What is called a reflex angle?
4. Is AOR an acute angle?
5. Is AOS an obtuse angle?
6. Will you draw angle on the blackboard?
7. Can you draw a right angle on the blackboard?
8. Can you draw an acute angle?

## Text 25. ANGLES MEASURED IN DEGREES

Just as in the case of length, it is often convenient to employ a smaller unit than the meter or yard; so also in angular measurement a smaller unit than the right angle is generally used. This unit is the one-ninetieth part of the right angle; it is called a degree and is denoted thus: 1°.Hence, one complete revolution or four right angles = 360° and half a revolution or two right angles =180°.Two angles whose sum is a right angle are called complementary angles and each is called the complement of the other. Thus angles of 30° and 60° are complementary, because 30°+ 60° = 90°, or a right angle. Two angles whose sum is two right angles are called supplementary angles and each is called the supplement to the other. Thus angles of 75° and 105° are supplementary, because 75°+105°=180° or two right angles. Coincidence and Congruence. If two figures correspond so completelythat one would exactly fit into the place occupied by the other, they are said tocoincide. Figures which coincide are called congruent figures; that is, they are equal in all respects.

If two angles coincide, the arms of one lie along the arms of the other, but of course the arms need not necessarily coincide as to their lengths, for we know that the size of an angle is quite independent of the length of its arms. The inclination of a plane to a plane is called a dihedral angle. The two planes are the faces of the angle, and the line of intersection of the two planes is the edge of the angle.

A polyhedral (or solid) angle is formed by three of more planes which meet a tone point. The planes are the faces of the angle, the lines of intersection of the faces are the edges of the angle and the point common to the planes or to the edge is the vertex of the angle. A polyhedral angle formed by three planes is a trihedral angle.

### New words and expressions

Complementary – maqtovli
Supplementary – qo'shimcha
Degree – daraja
Equal – teng
To coincide – muvofiq kelmoq
Figure – shakl
Plane – yuza

### Questions for the discussion

1. What are called complementary angles?
2. What are called supplementary angles?
3. What are called congruent figures?
4. Are two planes the faces of the angle?
5. What is the vertex of the angle?
5. What is a trihedral angle?

## Text 26. TRIANGLE

Any figure bounded by three straight lines is called a triangle. Any one ofthe three lines may be called the base, and the line drawn from the angleopposite the base at right angles to it is called the height or altitude of thetriangle.

If all the three sides of a triangle are of equal length, the triangle is called equilateral. Each one of the three angles in an equilateral triangle equals 60 degrees. If two sides are of equal length, the triangle is an isosceles triangle. If one angle is a right or 90-degree angle, the triangle is a right or a right-angled triangle. The side opposite the right angle is called the hypotenuse.

If all the angles are less than 90 degrees, the triangle is called an acute or acute-angled triangle. If one of the angles is larger than 90 degrees, the triangle is called an obtuse-angled triangle. Both acute and obtuse-angled triangles are known under the common name of oblique-angled triangles. The sum of the three angles in every triangle is 180 degrees.

If a triangle is considered as consisting of six parts, three angles and three sides, the unknown parts can be determined when any three parts are given, provided at least one of the given parts is a side.An equilateral triangle has all its <s equal and the converse. The bisector of the vertical <of an isosceles triangle bisects the base and its perpendicular to the base.Two right-angled triangles with equal hypots and one other pair of equal sides are conqruent.

The Law of Sinus. In a triangle any side is to any other side as the sine of the angle opposite the first side is to the sine of the angle opposite the other side; or if a and b be the sides and A and B the angles opposite them: a/b = sna/snb.The Law of

Cosines. In a triangle, the square of any side is equal to the stun of the squares of the other two sides minus twice their product times the cosine of the included angle: or if a, b and c be the sides and the angle opposite side a bedenoted A, then: a2 = b2 = c2 – 2bc cos A.

**New words and expressions**

To be bound – chegaralamoq
Altitude – balandlik
Equilateral triangle – teng tomonli uchburchak
Acute angled – o'tkir burchakli
Obtuse -angled – o'tmas burchakli
Oblique-angled – qiya burchakli
To determine – aniqlamoq
To denote – anglatmoq

**Questions for the discussion**

1. What is called a triangle?
2. What is called the height of the triangle?
3. What is called an equilateral triangle?
4. What is the hypotenuse?
5. Is the sum of the three angles in every triangle 180 degrees?
6. Will you say the law of sinus?
7. Will you say the law of cosines?
8. Can you draw the obtuse-angled triangle?

## Text 27. CIRCLE

The circle has many properties which no other plane figure possesses. For example, it is symmetric with respect to its centre and with respect to any of its diameters. Of all the plane geometric figures, the circle is the only one which can be rotated about a point without changing its position.The circle very well harmonizes in composition with other geometric figures. The circle is very useful figure. Without using the circle there would be nowatches, clocks, bicycles, automobiles or ships.

A circle is a closed plane curve, all points of which are equidistant from apoint within, called the centre. Congruent or equal circles are circles that can be made to coincide. If two circles coincide, their centre coincide.A radius of circle is a line segment connecting the centre with any point on the circle. A chord is a line segment connecting any two points on the circle.A diameter is a chord passing through the centre of the circle. A secant is a line which is obtained by intersecting a circle in two points. A tangent is a line touching a circle at one point and only one. This point is called the point of tangency or point of contact. The line of centres of the circles is the straight line determined by the centre of two circles. An arc of a circle is the part of a circle included between two of its points.An arc is usually named by its end points or by a small letter near it.From definitions and a study of the circle we can state the following assumptions relating to a circle:

a) circles having equal radii are equal and conversely.

b) a point is within on or outside a circle if its distance from the centre is less than, equal to or greater than the radius and conversely.

c) two minor arcs or two major arcs coincide if their end points and centres coincide and conversely.

### New words and expressions

| | |
|---|---|
| Plane – yuza | line segment – segment chizig'i |
| Figure – figura | chord – xo'rd (vatar) |
| Diameter – diametr | to intersect – kesishmoq |
| To rotate – aylanmoq | tangent – tangens, urinma |
| To hatmonize – mos tushmoq | arc – yoy |
| To coincide – bir xil bo'lmoq | radius (radii) – radius (radiuslar) |

### Questions for the discussion

1. What is a circle?
2. What is a radius of a circle?
3. What is a chord?
4. What is a diameter?
5. What is a secant?
6. What is a tangent?
7. What is called the point of tangency?
8. By what determined the line of centres of 2 circles the straight line?
9. What is an arc of a circle?
10. By what is usually named an arc?

## Text 28. POINT, LINE AND PLANE

We concern with sets of points in geometry. What is the meaning of this basic mathematical term "set"? We are familiar with such finite collections of objects and motions in our everyday life as: a tea – set, a shaving set or a T.V. set, an outset, etc. In mathematics it is a precise concept: a "set" is a well – defined collection (aggregate, class, group, family) of objects. This definition is notrigorous and unless, otherwise stated "set" is a primary and undefined term in mathematics. The concept of a set is used particularly in the various branches of mathematics. For instance, in calculus, we examine sets of members and functions;in algebra, sets of polynomials and equations; in geometry contain an unlimited number of points. Even though our sets are very large we are very able to representthe ideas of geometry, i. e. they picture geometric ideas. We always refer to a drawing as a geometric object, but you should keep in mind that it only representsan idea. In geometry the set of all points is called space. Certain special sets of points are called planes and a line is a part, fraction or a subset of a plane to see clearly the relationship between these sets. Let us consider models which can be used to illustrate these ideas.

The idea of a point is suggested by a pin point, a dot on paper or a corner where two walls and the floor of a room meet. A flat surface of a desktop, a wall or a plane of glass may suggest the idea of a plane. The idea of a line may be suggested by a path of a light ray and when we say "line", we mean a straight line. While these objects are about the best illustrations of points, planes and lines, they are inaccurate and misleading. The points of geometry have no size and no dimension, planes have no boundaries and we think of them as extending on and on without end and lines are endless in both directions. Is there anything in the physical world like these? No, there is nothing in the world, which illustrates these geometric concepts with complete accuracy.

Another mathematical idea which has no adequate illustration is the idea of betweenness. Our first step in describing the sets of points we called lines is to discuss the idea of betweenness. Make a drawing of point C, locate it between the points A and B and try to describe in words what it means that one point is between two other points. In geometry it means that all the given points lie on one line. We call the sets of points which consist of points. A and B and all the points between them a line segment and indicate it is AB. The set of points consisting of three points not all on one line and all the points between them on the segments (sides, arms, legs) is called a triangle.

### New words and expressions

Point – nuqta
Plane – tekislik
To set – qo'ymoq, joylashtirmoq, kelishmoq
To pin –dalil keltirmoq
Accuracy – aniqlik, to'g'rilik
Line – chiziq
Concern – qiziqish
To illustrate – ifodalamoq
Boundary – chegara

### Questions for the discussion

1. Are we concern with sets of points in geometry?
2. What is called space in geometry?
3. What are called planes?
4. What are called points?
5. Have the planes boundaries?
6. What is called a triangle?

## Text 29. COMPUTER

Problems occur in science which would take now several years to solve in the ordinary way, but a computer can solve problem in a matter of hours. For example,a computer can add up one hundred thousand units a second, whereas our brain takes several seconds just to add two five-figure numbers together. Predictions on the position, course and speed of missiles within flight would be impossible without the aid of computers.

The device used to speed up these calculations is called a digital computer. It has electronic valves that can be switched on and off in one thousand millionth of a second. The numbers which make up the problem have to be translated info asimplified form before the computer can deal with them. We count in tens-that is,all of our numbers are made up from the figures 0, 1, 2, 3, 4, 5, 6, 7, 8, 9, which we call digits. An electrical circuit, however, has only two states; it is either on or off.That is way the numbers used by electronic computers have to be in a binary system, made up from the digits 0 and 1 only.

The problem (in binary code) is fed into the computer from either a punchedcard or a magnetic tape like that of the domestic type recorder. Information stored on the card or tare controls a train of electrical pulses (in binary code), which switch on the valve circuits.

Numbers can be added and subtracted by the computer. Using the principle of the slide rule (i.e. logarithms), the digital computer can be made to multiply and divide as well. The results of these processes appear again as punched cards or recorded cards or recorded tapes ready to be translated back into our system of numbering.

### New words and expressions

Problem – masala　　Number – son
Logarithm –logarifm　　Electronic computer – elektron kompyuter
To switch on (off) – yoqmoq (o'chirmoq)
Digital computer – raqamli kompyuter

### Questions for the discussion

1. What is a computer?
2. Can a computer solve the problems in a matter of hours?
3. What is digital computer?
4. Has it electronic valves that can be switched on and switched off in one those and million of a second?
5. What is digits?
6. Has an electrical circuit only 2 starts?
7. What are electrical pulses?
8. By what numbers can be added& subtracted?
9. What is the role of valve?
10. Can you use computer?

## Text 30. DEFINITION AND NOTATION

A unit or an aggregate of units is called a whole number or an Integer: a part of a unit is called a fractional number.Such numbers are called arithmetical numbers and represented by symbols called numerals, as the Arabic figures. 1, 2. 3. etc.. and the Roman I, V, X. etc.

It is convenient in solving problems to use letters for the numbers whose values are sought. Also in stating rules letters are used to represent not only the numbers whose values are to be found, but also the numbers that must be given whenever the rule is applied.For example, the volume of any rectangular prism is equal to the area of the base multiplied by the height. By using V for volume. A for area of base and h forheight. This rule is stated in symbols, thus:

V = A x H when A=60 and h = 5 V = 60x5 = 300, etc.

An equation that states a rule in brief form is called a formula.A number whose value is to be found is called an unknown number.In 3x=21, x is *an* unknown number; in the formula for volume. V = A x H, Vis an unknown number; but when this formula is changed to the formula for height, h = V/A, the V and A are known numbers and h is an unknown number.

### New words and expressions

| | |
|---|---|
| To represent – ifodalamoq | Value – baho, narh, qiymat, ahamiyat |
| Volume – hajm,jild | Height – balandlik |
| Known number – ma'lum son | Unknown number – noma'lum son |
| Formula – formula | |

### Questions for the discussion

1. What is the whole number?
2. What is called a fractional number?
3. What is called a formula?
4. Do you know the formula of Viet?
5. Can you say formulas?

## Text 31. QUADRATIC EQUATION

An equation that contains both the second and the first powers ofone unknown number is called a complete or affected quadratic equation. There are many properties of quadratic equations. Every quadratic equation may be reduced to the form a is positive and bc are positive or negative Denote the roots by r1 and r2. Then in any quadratic equation, (ax2+bx+c = 0, when a,b, and c represent real and rational numbers:

If b2 – 4ac is positive the roots are real and unequal.

If b2 – 4ac equals zero the roots are real and equal.

If b2 – 4ac is negative the roots are imaginary.

Relation of roots and coefficients. Any quadratic equation, as ax2+bx+c= 0, maybe reduced by dividing both members by the coefficient of x2 to the form x2+px+q = 0, whose roots are found to be:

Adding the roots

Multiplying the roots

Hence, we have the following:

The sum of the roots of a quadratic equation of the form x2+px+q=0 is equal to the coefficient of x with its sign changed, and their product is equal to the absolute form.

**New words and expressions**

Contain – ichiga olmoq
To denote – ifodalamoq
Quadrate – kvadrat
Equation – tenglama
Hence – shu erdan, hozirdan
absolute – mutlaq, aniq
imaginary – hayol qilmoq
rational – haqiqiy
to reduce – kamaytirmoq

**Questions for the discussion**

1. What is a quadrate?
2. What is an equation?
3. What is the quadratic equation?
4. Will you find the roots of the quadratic equation?
5. Do you know the theorem "Viet"?

## Text 32. DIGITAL COMPUTER

The digital computer is a device for performing. Mathematical operations with numbers expressed in the form of digits. Such devices stem from the abacus, the mathematical extention of the idea of finger counting. Computational aids that may be included in this family are Napier's rods and the calculating machines of Pascal and Leibnitz. The modern electronic digital computer is of course the most highly developed and useful member of this family. The first suggestion for an automatic machine to do mathematical computation came from Charles Babbage.

The first programmed computer to operate successfully was built in 1939 by N. N. Aiken professor of Harvard University. It was the first machine designed to use the principles of the analytical engine as they were conceived by Babbage. The machine added, subtracted, multiplied, divided, compared quantities, consulted its memory of past operations when necessary, and referred to stored mathematical tables. It could be arranged to perform a series of mathematical steps necessary to solve logarithmic problems ,computer various mathematicalformulas, evaluate integrals and solve differential equations.

The Electronic Numerical Integrator and Calculator completed in 1946 represented a considerable advance in computing-building technology, since it was entirely electronic in its internal operation and was much faster than any previous machine. The basic electronic device in this computer was the vacuum tube which acted in the same manner as a relay. The vacuum tube was turned off or on by electric current entering the tube. The sequence control operated by means of many external wires running between plug boards aired by external switches.

The first theoretical advance in computer design resulted from the work of John von Neumann. No radically new ideas of the magnitude of the stored programmer principle have appeared in many computers designed since these early models. A great many advances, however, have been made in speed, reliability and ease of use. Modern electronic digital computers have many attributes in common. They are usually built in several units , only one of them is a computer or ''processor''. The other units are control, storage and input-output devices. The modern machine is more often called a computing system. These systems are semi conductors and include magnetic core and magnetic type storage. Almost every digital computer has been found capable of doing more than it was originally designed to do.

### New words and expressions

a digital computer – raqamli kompyuter, to stem from – mansub bo'lmoq
abacus – abak , sanoq computational aids – hisoblash maqsadlari
a programmed computer – programmalashtirilgan kompyuter
an analytical engine – analitik mashina to conceive – tushunmoq
a vacuum tube – electron lampa relay – rele
plug board – shtepselli kommutator advance – ilgarilash
reliability – mustahkamlik ease of use – foydalanish
storage – to'plagich, xotirlovchi qurilma

### Questions for the discussion

1. What is a digital computer?
2. What was Charles Babbage?
3. What was N.N.Alken?
4. Can you say about the devices of the machine?
5. When was built the first programmed computer to operate successfully?
6. When did complete the electronic Numerical Integrator and Calculator?
7. What was turned off or on by electric current entering the tube?
8. Have modern electronic digital computers many attributes in common?
9. Are they usually built in several units?
10. What is called a computing system?

### Text 33. RAMANUJAN AND HARDY

Srinivasa Ramanujan was the greatest Indian mathematician. He was born on December 22, 1887 in Erode, Tamil Nadu, India. His father K.Srinivasa Iyengar worked as a clerk in a sari shop. His mother Komal Ammal was a housewife and also a singer at a local temple. They lived in Sarangapani Street in the town of Kumbakonam. When he was a year and a half old , his mother gave birth to a son named Sadagopan. He made substantial contributions to mathematical analysis, number theory, infinite series and continued fractions. Srinivasa Ramanujan made amazing discoveries about natural numbers. When he graduated from Town Highin 1904, he was awarded the K. Ranganatha Rao prize for mathematics by the school's headmaster. He was married to a nine year old bride, Janaki Ammal on14th July, 1909. In 1913 Ramanujan wrote to the great English mathematician C. Hardy at

Cambridge University describing his work. Hardy immediately recognized that Ramanujan was a unique jewel in the world of mathematics, because Ramanujan had not been taught the standard ways to think about numbers and thus was not based by the rigid structure of a traditional cducation: yet he was clearly a mathematical genius. Since the pure nature of mathematics transcends languages, customs and even formal training, Ramanujan wrote his 1st formal paper for the Journal on the properties of Bernoulli numbers. One property he discovered that the denominators of the fractions of Bernoulli numbers were always divisible by six. He also devised a method of calculating Bn based on previous Bernoulli numbers. One of these methods went as follows: It will be observed that if n is even but not equal to zero. Bn/n. 1. Bn is a fraction and the numerator of n in its lowest terms is a prime number.2. the denominator of Bn contains each of the factors 2 and 3 once and only once. 3. 2n (2n -1) Bn/n n is anInteger and 2 ( 2n – 1) Bn consequently is an add integer. Ramanujan loved numbers as his friends and found each to be a distinct wonder. A famous illustration of Ramanujan's deep connection with numbers is the story of Hardy's visit to Ramanujan in a hospital. Hardy later recounted the incident: (remember once going to see him when he was lying ill at Putney. I had ridden in taxi cab number 1729 and remarked that the number seemed to me rather a dull one and that I hoped it was not an unfavorable omen. 'No.' he replied, 'it is avery interesting number; it is the smallest number expressible as the sum of two cubes in two different ways." Notice that, indeed. 1729 = 12* 13 and also 1729-103+93. Ramanujan was diagnosed with tuberculosis and a severe vitamin deficiency and was confined to a sanatorium. He returned to Kumbakonam(India)in 1919. He died when he was 32 years old. His wife lived in Chennai until her death in 1994.

**New words and expressions**

| | |
|---|---|
| To explore – kuzatmoq, o'rganmoq | Jewel – qimmatbaho tosh |
| Rigid – shafqatsiz, engilmaydigan | To distinct – puflamoq |
| To remark – mulohaza, ko'rmoq | To reply – javob bermoq |
| Incident – tasodif, ko'ngilsiz hodisa | |

**Questions for the discussion**

1. What was C. H. Hardy?
2. Where was he born?
3. When did he make his discovery?
4. Did Romanujan love numbers as his friends?
5. Can you describe the following portrait?

## Text 34. TRIGONOMETRY

The word "trigonometry" is derived from the Greek word "trigonon" (triangle), "metron" (measure). Trigonometry is a branch of mathematics which deals with the relations among the angles and sides of triangles and the relations among the trigonometric function of these angles. It has applications in both pure mathematics and in applied mathematics, where it is essential in many branches of science and technology.

Trigonometry is not a new subject. It was known even before the Greeks developed geometry. The earliest investigations in trigonometry are believed to have appeared about 2000 B.C. Some scientists consider Hipparchus (born about160 B.C.) to have been the father of trigonometry as a science. He prepared a table of chords of circles. Ptolemy, who lived about 150 A.D, developed the subject by extending the table of chords.

In the past the main thing in trigonometry was the measuring of the parts of triangles. The modern trigonometry is not so much interested in solving triangles as in its being applied to sciences. It includes all kinds of investigations of trigonometric functions of angles and numbers. It also includes the relations among functions the meaning and the use of vectors, complex numbers and solutions of triangles.

Trigonometric functions were among the earliest uses for mathematical tables. Such tables were incorporated into mathematics textbooks. Slide rules had special scales for trigonometric functions. Today scientific calculators have buttons for calculating the main trigonometric functions: sin, cos, tan and their inverses. The main formula of trigonometry is cos1x +sin2x = 1.

In the first century B.C. the great mathematician hero introduced the tangent function when he was making a study of the areas of polygons. The Hindus and Arabs have contributed to trigonometry too. The Hindus, for example, replaced the table of chords by a table of half chords (a table of sines).The Arabs were the first to discover the law of sine and the law of cosines for spherical triangles. The trigonometry of the Arabs came to Europe in XIV century.

The first book of trigonometry was written in 1464 A.D. by Johann Mueller.Isaac Newton (1642-1727), one of the greatest mathematicians, developed mathematical series by which the value of sin and could be determined. He also made improvements in the tables. Among later mathematicians who succeeded in developing trigonometry the name of Lenard Euler (18th century) may be mentioned.In the early stages trigonometry was used in measuring heights and distances, Later it was used in studying and developing astronomy. Since the 20th century trigonometry has become a study of the properties of the trigonometric functions and their use in science and mathematics.

**New words and expressions**

| | |
|---|---|
| Trigonometry –trigonometriya | Angle –burchak |
| Triangle – uchburchak | Polygon – ko'p burchak |
| A table – jadval | A.D. – yangi(bizning) asr |

**Questions for the discussion**

1. Will you explain the word "trigonometry"?
2. Is "trigonometry" a branch of mathematics?
3. When did the earliest investigations in trigonometry appear?
4. Does trigonometry includes all kinds of investigations of trigonometric functions of angles & numbers?

5. When did introduced the tangent function?
6. When did the Hindus do to contribute to trigonometry?
7. When did the trigonometry of the Arabs come to Europe?
8. When was the first book on trigonometry written?
9. What did I. Newton develop?
10. Where was trigonometry used in the early stages of its development & where is it used now?

## Text 35. TRIGONOMETRIC EQUATION

A trigonometric equation is an expression of equality involving trigonometric functions of one or more unknown angles or numbers. Any value of the angle for which the equality is true is a solution of the equation. A trigonometric equationhas an unlimited number of solutions.

There is no unified method that can be used to solve every equation with trigonometric functions. But the main thing is to transform the trigonometric expressions in the equation in such a way that the equation is reduced to one elementary form. The student must find the suitable way of transformation for each example. Sometimes it is necessary to try different transformations and ideas before the right approach to the solution can be found. The student should have a good knowledge of the trigonometric transformations and to be able to perform trigonometric transformations in order to find this approach.

Many trigonometric equations can be solved in several ways. The form notation of the roots often depends on the chosen way of solution and if we wish to prove the equivalence of two different notations, we shall have to perform supplementary transformations. Students should remember that, when trigonometric equations have different solutions, they can obtain answers which may look different though they are identical. But it is better to dispense with transformations of the answer into other forms.

In the process of solving equations students should observe equivalence so as to avoid any loss of roots or the introduction of extraneous roots. It is also necessary to see whether all the resulting roots lie in the domain of the variable of the given equation.

Many trigonometric equations which involve a sine, cosine and tangent are often solved by reducing them to a single function . The equation can be simplified by means of universal substitution, that is, the replacement of all trigonometric functions in terms of the tangent of half an angle. But this transformation can lead to a loss of roots. That is why, universal substitution must be followed by an additional investigation.

### New words and expressions

Solution – yechish
To involve – o'ramoq, chigallashtirmoq
Domain –viloyat
To dispense – tayyorlamoq
To avoid – qochmoq, o'zini olmoq

### Questions for the discussion

1. What is a trigonometric equation?
2. How many solutions has a trigonometric equation?
3. When shall we have to perform supplementary transformations?
4. What should observe the students in the process of solving equations?
5. In what way can simplified the equation?
6. By what must be followed universal substitution?
7. Can many trigonometric equations be solved in several ways?
8. Will you use computer?

## Text 36. PROGRESSION

A seccession of numbers, each of which after the first is derived from the preceding number or numbers according to some fixed law is called series. The successive numbers are called the terms of the series. The first and the last term are called the extremes and all the others – the means.

A series, each term of which after the first is derived from the preceding by the addition od a constant number ia called an arithmetical series or arithmetical progression. The number that is added to product the next term is called the common difference. 2,4,6,8, … … and 15, 12, 9, 6, … … are arithmetical progressions. In the first , the common difference is 2 and the series is ascending; in the second, the common difference is three and the series is descending. To find the "n"th or last, term of a series (l) a, a+вb a+2в, a +3d, … , we use the formula l = a + ( n - l)d.

Geometrical progression. A series of numbers each of which after the first is derived by multiplying the preceding number by some constant multiplier is called a geometrical series or a geometrical progression. 2, 4, 8, 16, 32 and a4, a3, a2, are geometrical progressions. In the first series the constant multiplier is 2; in the second it is 1/a. The constant multiplier is called the ratio.

To find the "n" th or last term of a geometrical series. Let a represent the first term of a geometrical progression, r – the ratio, n – the number of terms and l – the last or nth term. Then the series is a, ar, ar2, ar3, ar4, … . The formula is then: l = ar n – 1 (l is equal the n minus 1 degree of ar).

### New words and expressions

Arithmetical – arifmetik
To add – qo'shmoq
Multiply – ko'paytirmoq
Progression – progressiya
Ratio – nisbat
Multiple – karrali son

### Questions for the discussion

1. What is called the series?
2. What is called the terms of the series?
3. Will you say about the extremes?
4. What will you say about the arithmetical progression?
5. What is called the common difference?
6. What is called the geometrical progression?

# Mathematical terms

**A**

acute angle – o'tkir burchak
abacus – cho't
add – qo'shmoq
addition – qo'shish
algebra – algebra
amount – miqdor
angle – burchak
angular – burchakli
ansine – arksinus
anticosine – arkkosinus
arc – yoy
arithmetic – arifmetika
axsiom – aksioma

**B**

base – asos
bisector – bissektrisa
braces – figurali qavs
brackets – kvadrat qavs

**C**

calculate – hisoblamoq
calculation – hisoblash
coefficient – koiffitsient
conus – konus
computer – kompyuter
to count – sanamoq
cosine – kosinus
cotangent – kotangens
cosecant – kosekant
cipher – no'l
circle – aylana
cube – kub
curve line – egri chiziq
cylinder – silindr

**D**

degree – daraja, gradus
decimal – o'nlik kasr
denominate – bo'lmoq
denominator – mahraj
diameter – diametr
distance – masofa
destruction – ayirma
devision – bo'lish

differ – ayirmoq
difference – farq
dodecahedron – to'qqiz yoqli burchak
dynamic – dinamik

**E**

element – element
enominator – bo'luvchi
equal – teng
equality – tenglik
equation – tenglama
expression – ifoda

**F**

factor – ko'paytma
figure – figura
form – shakl
formula – formula
fraction – kasr
function – funksiya

**G**

geometry – geometriya

**H**

height – balandlik
hexahedron – olti yoqli burchak
horizontal – gorizontal
hyperbole – giperbola
hypotenuse – gipotenuza

**I**

icosahedron – o'n ikki yoqli burchak
infirity – cheksiz
integral – butun miqdor
interval – oraliq

**L**

length – uzunlik
limit – limit, chegara
line – chiziq
logarithm – logarifm

**M**

mathematics – matematika
mathematician – matematik
measure – o'lchov
measurable function – o'lchash funksiyasi
minus – minus
multiply – ko'paytirmoq
multiplication – ko'paytirish

multiplication table – ko'paytirish jadvali
multiple – karrali son

**N**

naught – no'l
notation – ifodalash
number – son
numerator – surat

**O**

obtuse angle – o'tmas burchak
octahedron – sakkiz yoqli burchak
operation – amal

**P**

parallel – parallel
parallelogram – parallelogram
percent – prosent
perpendicular – perpendikulyar
plane – tekislik, yuza
plus – plyus
polyhedron – ko'pyoq
polyhedral – ko'pyoqli
polygon – ko'p burchak
position – vaziyat, holat
positive term – isbotsiz
postulate – isbotsiz
principle – asos, negiz
prism – prizma
proportion – proporsiya
pyramid – piramida

**Q**

quantity – miqdor son

**R**

radical – radikal
radius – radius
ratio – nisbat
real number – real son
rectangle – to'rtburchak
revolution– to'liq aylana
right angle – to'g'ri burchak
rule – qoida

**S**

secant – kesuvchi chiziq
shape – forma
side – tomon, yon
similar – ekvivalent

sine – sinus
size – o'lcham
solution – yechish
sphere – sfera
square – kvadrat, maydon
subtraction – ayirish
sum – yig'indi
surface – yuza, ust, sirt
symbol – belgi, ishora

**T**

tangent – tangens
tetrahedron – tetraedr
triangle – uchburchak
theorem – teorema
trigonometry – trigonometriya

**V**

vertical – vertical
volume – hajm, ko'lam, miqdor

**W**

weight – og'irlik
width – enlik

**Z**

Zero – nol
Zeta – zeta

# TEST

1. The sign of equality ( =) was invented by the English scholar….
A. R.Record.
B. Ch.Dickens.
C. W.Shakespeare.
D. A.Al-FarghonI
2. Choose the appropriate word.
The 1st computing machine that might be called the prototype of that in use today was invented by ... in 1642.
A. Newton.B. Leibnitz. C. B.Pascal. D. Neumann.
3. Choose the appropriate word.
B. Pascal's machine was designed to do ...and subtraction.
A. multiplication. B.addition. C. division. D. plus.
4. Leibnitz, another genius, designed a computing machine in ... and completed it in...
A.1625/1744 B.1622/1745
C.1671/1694 D.1672/1695
5. In... it was invented a machine that printed figures sorted cards.
A.1777 B.1999 C.1666 D.1888
6. Choose the appropriate answer for the following question.
Do you know the derivation of the word "calculate"?
A. Yes,I do.It derived from the Latin calculus".
B. Yes , I do . It derived from the Greek "calculus".
C. Yes , I do . It derived from the German "calculus".
D. Yes,I do . It derived from the French "calculus".
7. Choose the appropriate word.
A number represented by algebraic symbols is called an …
A. equation
B. addition
C. formula
D. algebraic expression.
8. In… two numbers are given and there product is to be found.
A. multiplication.
B. division.
C. subtraction.
D. addition.
9. The inverse process , finding one of the two numbers when their product and the other number are given is called…
A. multiplication.
B. subtraction.
C. division.

D. addition.
10. The sign of addition is read….
A. minus
B. equal
C. plus
D. brackets
11. The signs of aggregation are; ..
A. the parentheses
B. the brackets
C. the braces of roots
D. A,B,C
12. N. Scotchman was the inventor of…
A.mathematical formulas
B.numbers
C. factors
D. logarithms
13.Each of two or more numbers whose product is a given number is called …of the given number.
A. root
B. power
C. degree
D. factor
14. An angle which is greater than two right angle is called a….angle.
A. reflex
B.right
C. triangle
D. fixed
15. The inclination of a plane to a plane is called a….angle.
A.obtuse
B.acute
C.dihedral
D fixed
16. A…angle is formed by three of more which meet at one point.
A. dihedral
B. right
C. polyhedral
D. trihedral
17. A polyhedral angle formed by three planes is a ….angle.
A. polyhedral
B. dihedral
C. rectangular

D. trihedral
18. Ramanujan made amazing discoveries about .... numbers.
A. natural
B. mixed
C. fixed
D. decimal
19.If the plane has the same inclination as the edge of the cone , the boundary will form a...
A. hyperbola
B. parabola
C. ellipse
D. point
20. When the plane is not parallel to the base or a side and cuts only one nappe, the resulting curve is an....
A. point
B. edge
C. ellipse
D. equation
21. An equation that states a rule in brief form is called a...
A. volume
B. surface
C. fraction
D. formula
22. A number whose value is to be found is called an .... number.
A. unknown
B. known
C. decimal.
D. natural.
23. An equation that contains both the second and the first powers of one unknown number is called a complete or affected....
A. equal
B. quadratic equation
C. decimal
D. natural number
24.A polyhedron bounded by four planes is a .....
A. dodecahedron
B. hexahedron
C. tetrahedron
D. pentagon
25. A prism is regular when it is right and its bases are regular....
A. altitude

B. similar
C. rectangle
D. polygon
26. A …is a rectangular parallelepiped, all of whose faces are square.
A. cube
B. limit
C. radius
D. circle
27. Choose the appropriate word.
… is a geometric form.
A. naught
B addition
C. size
D figure
28. Naught is also called …
A. enominator
B. conus
C. divisor
D. cipher
29. Choose the appropriate word.
The top figure of the fraction is called the ….
A. denominator
B. equal
C. numerator
D. point
30. Ahmad Al- Farghoni lived in ….
A. 661-764
B.418-501
C. 787-841
D.797-861
31. A. Al- Farghoni spend…childhood in …own country.
A. his/his
B. his/it
C. a/his
D. his/himself
32.During the reign of Khorezm shah – Mamurun …. city was the centre of science and culture.
A. Samarkand
B. Urgench
C. Bukhara
D. Tashkent

33. A.Al-Farghoni's first book was printed in ….in 493.
A. Iraq
B. China
C. Italy
D. England
34. A.Al-Farghoni measured and described … stars.
A.1010
B.243
C.7643
D.1022
35. The arithmetic symbols were derived from the… .
A. Russian
B. China.
C. Latin
D. Arabs and the Hindus.
36. Astronomer, geographist and philosophist A.Al- Farghoni proved the round of the … .
A. earth
B. sun
C. star
D. moon
37. We use such terms as triangle, bisector, perpendicular and circle in ….
A. mathematics
B. geometry
C. history
D. chemistry
38. Pierre de Ferma was an outstanding … mathematician of the 17 century.
A. Greek
B. English
C. French
D. Indian
39. One of Ferma's outstanding contributions to mathematics is the founding of the modern theory of …
A. size
B. length
C. square
D. numbers
40. The computational work which is necessary in solving these problems is simplified by using …
A. formulas

B. figures
C. tables
D. blueprints
41. The formula has been called a ... to knowledge.
A. pattern
B. key
C. number
D root
42. Mathematician is a kind of human....
A. shape
B. computer
C. size
D. idea
43. Arithmetic is the study of ....
A. facts
B. imagine
C. number
D. animals
44..... Is the study of shape, size and position.
A. arithmetic
B. mathematics
C. history
D. geometry
45. Mathematics is related to a very .....of important human activities.
A. large number
B. system
C. practically
D. modern life
46.Mathematics is a truly .... machine of mankind.
A. antiquity
B. universal
C. symbol
D. gradually
47. Algebra developed slowly in comparison with arithmetic and ...
A. mathematics
B. history
C. geometry
D. chemistry
48. These tables are now preserved in the ... leading museums.
A. museum's
B. library's

C. mathematics
D. world's
49.Archimed ... the greatest mathematician of antiquity.
A. was
B. has
C. had
D are
50.Archimed was born in the Greek city of Syracuse on the island of Sicily about ....
A. 190 B.C.
B. 287 B.C.
C. 420 B.C.
D. 123 B.C
51. Roman historians ... related many stories about Archimed.
A. has
B. had
C. have
D. were
52. When Syracuse .... ... by the Romans a soldier commanded Archimeds to go to the Roman general , who admired his genius.
A. taken
B. was taken
C. took
D. will take
53.Archimed refused to fulfill the command and ... killed by the soldier.
A. was
B. is
C. were
D. have
54. Archimed died in ...
A. 214 B.C.
B. 212 B. C.-
C. 124 B. C .
D. 342 B.C.
55. The most famous book ''Elements'' was written ... Euclid.
A. from
B. by
C. around
D. near
56. Choose the author of the following sentence.
''There is no royal road to geometry''.

A. Euclid
B. Archimed
C. A.Al- Farghoni
D. Newton
57. Choose the appropriate answer of the following question.
When did appeared the 1st printed edition of Euclid's book.
A. in the 17th century
B. in the15th century
C. in the 12th century
D. in the 19th century
58. A ... is a solid contained between the faces of a polyhedral angle and a plane which meets all these faces.
A. polygon
B. pyramid
C. pentagon
D. cube
59. If all three sides of a triangle are of equal length, the triangle is called ...
A. right angle
B. triangle
C. equilateral
D rectangle
60. If two sides are of equal length ,the triangle is an ... triangle.
A. polygon
B. pyramid
C. cylinder
D. isoseeles
61. If two angle is a right or 90 degree angle, the triangle is a right or a... triangle.
A. right angled
B. equilateral
C. oblique-angle
D obtuse-angled
62. The side opposite the right angle is called the ....
A. acute angled
B. hypotenuse
C. integral
D. prism
63. If all the angles are less than 90 degrees, the triangle is called an acute or ... triangle.
A. obtuse-angled
B. oblique-angled

C. acute-angled
D. rectangle
64. If one of the angles is larger than 90 degrees, the triangle is called an ... triangle.
A. acute-angled
B. rectangle
C. oblique-angled
D. obtuse-angled
65. Both acute and obtuse-angled triangles are known under the common name of... triangles.
A. oblique-angled
B. obtuse-angled
C. acute-angled
D. rectangle
66. The device used to speed up these calculations is called a ... computer.
A. electron
B. digital
C. personal
D. calculation
67. Numbers can be added and subtracted by the .... .
A problem
B. altitude
C. computer
D. machine
68. The word '' trigonometry'' is derived from the ... word , meaning treeangle measurement.
A. Latin
B. English
C. German
D. Greek
69. Who was the father of trigonometry?
A. Hipparchus
B. Euclid
C. P.de Ferma
D. Archimed
70......were the 1st to discover the sine and the law of cosines for spherical triangles .
A. the Hindus B. the Arabs
C. the Uzbek D. the Tadjik
71. The 1st book on trigonometry was written in ....A. D by .... .
A. 1516/ W. Shakespeare
B. 1323/ Euclid
C. 1464/ Johann Mueller

D. 1453/ Archimed

72. Trigonometric equation is an expression of equality involving trigonometric functions of one or more unknown .... or numbers.

A. circles

B. triangles

C. tables

D. angles

# KEY

| | | | |
|---|---|---|---|
| 1. | B | 37. | B |
| 2. | C | 38. | C |
| 3. | D | 39. | D |
| 4. | A | 40. | A |
| 5. | B | 41. | B |
| 6. | C | 42. | B |
| 7. | B | 43. | C |
| 8. | A | 44. | D |
| 9. | B | 45. | A |
| 10. | B | 46. | B |
| 11. | A | 47. | C |
| 12. | B | 48. | D |
| 13. | B | 49. | A |
| 14. | C | 50. | B |
| 15. | D | 51. | B |
| 16. | A | 52. | B |
| 17. | B | 53. | A |
| 18. | C | 54. | B |
| 19. | D | 55. | B |
| 20. | A | 56. | A |
| 21. | B | 57. | B |
| 22. | C | 58. | B |
| 23. | D | 59. | C |
| 24. | A | 60. | D |
| 25. | B | 61. | A |
| 26. | C | 62. | B |
| 27. | C | 63. | C |
| 28. | C | 64. | D |
| 29. | C | 65. | A |
| 30. | D | 66. | B |
| 31. | A | 67. | C |
| 32. | B | 68. | D |
| 33. | C | 69. | A |
| 34. | D | 70. | B |
| 35. | D | 71. | C |
| 36. | A | 72. | D |

## USED LITERATURES


1. Abduazizov.A.A Ingliz tili amaliy fonetikasi. Toshkent – O'qituvchi – 1992.
2. Abdalina E. A. Xoshimova R. J, Sharer N. A. Ingliz tili. Toshkent – O'zbekiston –1996.
3. Axmedov S.A, Axmedova N.S. O'rta Osiyoda arifmetikaning taraqqiyoti va uning o'qitilish tarixi. Toshkent – O'qituvchi – 1991.
4. A'zamov.A, Fozilov.T. Yosh matematik (qomusiy lug'at). Qomuslar tahririyati, 1991.
5. BuranovJ.J, Rakhmanberdiyev K.R and others. English Grammar. Tashkent.
6. Buranov J.J. Hoshimov U, Muminov O. Exercises in English Grammar. Tashkent – O'qituvchi – 1980.
7. Chernukhin Technical English Textbook. Moscow – Высшая школа – 1970.
8. Grizulina A.P. Контрольно-тренировочное упражнения и тексты по английскому языку. Москва – Просвещение – 1986.
9. Hasanov H. Sayyoh olimlar. Toshkent – O'zbekiston – 1981.
10. Irisov A, Nosirov A, Nizomiddinov I. O'rta Osiyolik 40 olim Toshkent – Fan-1961.
11. Jalolov J. J. Chet til o'qitish metodikasi. Toshkent – O'qituvchi – 1996.
12. Mark Warschauer. Internet for English Teaching. Washington 2002.
13. Potapova I.A. Краткий словарь синонимов английского языка. Leningrad – Uchpedgiz – 1957.
14. Sokolova M.A., Gintovt K. and others. Практическая фонетика английского языка. Moscow – Vlados – 1997.
15. Tojiev and others. A.Al-Farg'oniyning hayoti va ijodi". Toshkent – Fan – 1998.
16. Zaripova R.A and others. English.Tashkent – O'qituvchi – 1992.

# CONTENTS

# ENGLISH FOR SPECIFIC PURPOSES (MATHEMATICS)

**Oliy o'quv muassasalarining matematika yo'nalishi talabalari uchun ingliz tilidan uslubiy qo'llanma**


Муҳаррир: Ш.Салом

Тех. муҳаррир: А.Султонов

Босишга рухсат этилди 15.05. 2017 й.

Бичими 84x108 1/32. "Times" гарнитураси.

Шартли босма табоғи 3,8. Адади 50 нусха.

"Brook Class servis" МЧЖ босмахонасида чоп этилди.

Манзил: Тошкент шаҳар, Заргарлик Сегизбоева, 10а-уй.