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The Fundamental Theorem of Arithmetic

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Abstract

In this article, the basic concepts of the science of arithmetic are described in detail, and the basic theorem of arithmetic is written in detail.

Keywords*: arithmetic, theorem, mathematical property, addition, proof, etc.*

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The Fundamental Theorem of Arithmetic states that any natural number greater than 1 can be factored as a product of prime numbers—some may be repeated—and this form is unique to that number, but the order of the factors may be different. As we mentioned before, prime numbers represent the atoms of numbers, their basic constituents, if you will. Thus, the fundamental theorem of arithmetic has many applications, the most obvious being that we can work with larger numbers more easily if we express them as derivatives of smaller numbers. In the same way, we can find the greatest common multiple (LCM) and the greatest common divisor (GCF), which makes it easier for us to sum fractions, find large roots or work with radicals, rationalize and helps to solve. program problems of a very different nature. Remember that the prime number p It only accepts itself and 1 as positive divisors, the following numbers are prime numbers: 2, 3, 5, 7, 11, 13, etc., because there are infinities. 1 is not considered a prime number because it has only one divisor.

Arithmetic is the science of numbers with which any individual begins to get acquainted with the wonderful world of mathematics. In the words of M.V. Lomonosov, arithmetic is the gateway to knowledge, opening the way for us. But is it true that the knowledge of the world can be divided into letters and numbers, mathematics and vocabulary? Maybe not in the old days, but the rapid development of science and technology makes its laws in the modern world, too. The word "arithmetic" is of Greek origin (GK. "Arifmos"), meaning "number". It checks the number and all that can be related to them. This is the world of numbers: numbers, related to various operations on numerical rules, such as multiplication, subtraction, and tasks. Our introduction to mathematics begins with arithmetic, considered the science of numbers. One of the first Russian arithmetic textbooks, written by L.F. Magnitsky in 1703, began with the following words: "Arithmetic, or counter, is the most ancient, most useful and most praiseworthy, honest, unenviable and understandable to all. and is the most famous art. Invented and explained by the best arithmeticians who lived in different eras. With arithmetic, we enter the "gates of learning", as M.V. Lomonosov said, and begin our long and arduous but fascinating journey to know the world let's start. The word "arithmetic" is derived from the Greek arithmos, which means "number". This science studies operation on numbers, various rules for working with them, adding, subtracting, multiplying and Arithmetic is often thought of as the first step in mathematics, from which more complex branches such as algebra, mathematical analysis, etc. more can be learned. Even whole numbers, the main object of arithmetic, are considered. General features and patterns, to higher arithmetic or number theory. This view of arithmetic, of course, has its foundations - it really remains a "counting alphabet", but the alphabet is considered "the most useful" and "convenient".

Arithmetic and geometry are ancient companions of man. These disciplines arose when there was a need to count and measure objects, divide the prey, and track time. Arithmetic appeared in the countries of the ancient east: Babylon, China, India, and Egypt. For example, the Egyptian papyrus Rinda (named after its owner G. Rinda) dates to the 20th century. BC. Among other things, it includes the expansion of a fraction into a sum of fractions with a numerator equal to one, for example:

$$2/73 = 1/60 + 1/219 + 1/292 + 1/365.$$

The treasures of mathematical knowledge collected in the countries of the ancient East were developed and continued by scientists. Ancient Greece. The names of many scientists who worked on arithmetic in the ancient world, history has been preserved for us - Anaxagoras and Zeno, Euclid (see: Euclid and his "Beginnings"), Archimedes, Eratosthenes and Diophantus. The

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name of Pythagoras (6th century BC) shines here as a bright star. The Pythagoreans (students and followers of Pythagoras) worshiped numbers, believing that they embodied all the harmony of the world. Odd numbers and even numbers have been given special properties. The numbers 7 and 36 were highly respected, while attention was paid to perfect numbers, friendly numbers, and more. The development of arithmetic in the middle Ages is also related to the East: India, the countries of the Arab world and Central Asia. From the Indians came the system of numerals, zeros, and positions that we use; Ulugbek from al-Koshi (15th century), who worked at the Samarkand observatory, - decimal places. Due to the development of trade and the influence of eastern culture from the 13th century. Interest in arithmetic is growing in Europe. The name of the Italian scientist Leonardo of Pisa (Fibonacci) should be remembered, whose work "The Book of Abacus" introduced Europeans to the main achievements of Eastern mathematics and was the beginning of many studies in arithmetic and algebra. With the invention of the printing press (mid-15th century), the first printed math books appeared. The first printed book on arithmetic was published in Italy in 1478. The German mathematician M. Stiefel's Complete Arithmetic (early 16th century) already includes negative numbers and even the idea of taking logarithms. Around the 16th century, the development of purely arithmetical questions flowed into the mainstream of algebra - as an important stage, one can note the appearance of the works of the French scientist F. Vieta, in which numbers are represented by letters. From that moment on, the basic arithmetic rules are fully understood in terms of algebra.

The main object of arithmetic is number. Natural numbers, that is. The numbers 1, 2, 3, 4, ... etc. are derived from counting certain things. Many thousands of years passed before mankind knew two pheasants, two hands, two people, etc. the same word can be called "two". An important task of arithmetic is to overcome the specific meaning of the names of calculated objects, to learn to abstract from their shape, size, color, etc. Fibonacci has already been given a task: "Seven old women are going to Rome. There are 7 mules in each, 7 sacks in each mule, 7 loaves in each sack, 7 knives in each loaf, and 7 sheaths in each knife. How many pieces? To solve the problem, you will need to collect old women, mules, bags and bread. The development of the concept of number - the appearance of zero and negative numbers, simple and decimal fractions, ways of writing numbers (numbers, symbols, number systems) - all this has a rich and interesting history. In arithmetic, numbers are added, subtracted, multiplied and divided. The art of performing these operations quickly and accurately on any number has long been considered the most important task of arithmetic. Now we perform only the simplest calculations in our minds or on paper, entrusting more and more complex calculations to microcalculators, which gradually replace devices such as abacus, adding machine (see Calculation), slide rule. However, the operation of all computers - simple and complex - is based on the simplest operation - addition of natural numbers. It turns out that the most complex calculations can be reduced to addition, only this operation needs to be performed millions of times. But here we get into another branch of mathematics that originates from arithmetic - computational mathematics.

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