

WHO CONTRIBUTED TO THE DEVELOPMENT OF MATHEMATICS

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Abstract. This article discusses the scientific research, discoveries and innovations of ancient and later Eastern and Western scientists who made a significant contribution to the development of mathematics. The mathematical schools of ancient Egypt, Babylon, India and China and their scientific heritage are analyzed in detail. The contribution of medieval Eastern scientists to the development of algebra, arithmetic, geometry and trigonometry, their influence on modern mathematics are also discussed. The role of Western scientists in the formation of mathematical thinking, the theories and scientific developments developed by them are also considered. The relationship between Eastern and Western mathematical schools, their role in the development of science, their influence on the development of scientific thinking and their influence on modern mathematics are discussed. This article, based on historical evidence, extensively covers the formation of mathematical thinking and its role in the development of modern science.

Keywords: History of mathematics, ancient Eastern mathematics, Egyptian and Babylonian mathematics, Indian and Chinese mathematics, development of algebra, foundations of geometry, trigonometry and arithmetic, Eastern scientists, Western scientists, scientific heritage, mathematical thought, influence on modern mathematics, scientific discoveries, mathematical laws, activities of scientists.

ТРУДЫ ДРЕВНИХ И БОЛЕЕ ПОЗДНИХ ВОСТОЧНЫХ И ЗАПАДНЫХ УЧЁНЫХ, ВНЕСШИХ ВКЛАД В РАЗВИТИЕ МАТЕМАТИКИ.

Аннотация. В данной статье рассматриваются научные исследования, открытия и инновации древних и более поздних восточных и западных ученых, внесших значительный вклад в развитие математики. Подробно анализируются математические школы Древнего Египта, Вавилона, Индии и Китая и их научное наследие. Также обсуждается вклад средневековых восточных ученых в развитие алгебры, арифметики, геометрии и тригонометрии, их влияние на современную математику. Также рассматривается роль западных ученых в формировании математического мышления, теории и научные разработки, разработанные ими. Обсуждается взаимосвязь между восточными и западными математическими школами, их роль в развитии науки, их влияние на развитие научного мышления и их влияние на современную математику. В данной статье на основе

исторических свидетельств широко освещается формирование математического мышления и его роль в развитии современной науки.

Ключевые слова: История математики, древневосточная математика, египетская и вавилонская математика, индийская и китайская математика, развитие алгебры, основы геометрии, тригонометрия и арифметика, восточные ученые, западные ученые, научное наследие, математическая мысль, влияние на современную математику, научные открытия, математические законы, деятельность ученых.

INTRODUCTION

Modern sciences are divided into three parts (social, natural and technical sciences) depending on their content. Each of these forms a whole system, covering many related sciences.

Mathematics forms an important field in the system of sciences and means "Science, Science" in Greek. Mathematics is also one of the ancient sciences, and it gradually formed and improved other sciences such as arithmetic, geometry, and later algebra, mathematical analysis, and analytical geometry. Below are the scientists who made discoveries in mathematics we organize our activities. We know that one of the oldest centers of science in the West is Greece.

Since there were many people interested in science in ancient Greece, real scientists emerged from there, and one of them is the mathematician of this ancient era, Pythagoras.

Pythagoras (approximately 580-500 BC) is an ancient Greek scientist, mathematician, and philosopher. Pythagoras, according to some legends, was religious. Mathematics is the basis of Pythagoras' religious views.

LITERATURE ANALYSIS AND METHODOLOGY

In his opinion, God created number to order the universe. One number represented the unity of God, and all the other numbers together represented the universe. He said that these two together form a divine numerical harmony. According to the teachings of Pythagoras, number is the mystical essence of things, mathematical abstractions establish a certain order in the universe and govern it invisibly. In short, the universe is made up of numbers and a harmonious system of relationships created from them. This idea forms the basis of Pythagorean philosophy. He put forward the mystical idea that whoever organizes this divine numerical harmony will also become divine and live forever. On the basis of such religious views of Pythagoras, his true mathematical ideas arose. Pythagoras wrote down many important innovations. In particular, the theorem on the sum of the interior angles of a triangle, the problems of dividing a plane into regular polygons (triangle, square, hexagon) were discovered by Pythagoras. Geometry was founded as a science by the Pythagorean school. They connected geometry with arithmetic and solved problems that led to quadratic equations geometrically.

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Pythagoras was the first to introduce a systematic method of proof into the geometry course, raising it to the level of an abstract science. He established the harmony of linear shapes and created the doctrine of similarity. In particular, he proved a theorem that, if it is practically impossible to measure the length of one side of a right-angled triangle, then it can be determined by the lengths of the other two sides. This theorem is named after Pythagoras and spread its popularity throughout the world. In the meantime, I would like to mention that in ancient Greece, when a scientist made some innovation or discovery, a bull was sacrificed for his discovery and this discovery was made known to the people, but when Pythagoras created his above theorem, 40 bulls were sacrificed for him. It can be seen that Pythagoras made one of the greatest discoveries of ancient times. Later, this theorem led to the discovery of Fermat's last theorem. Another great encyclopedist is Al-Khwarizmi. Al-Khwarizmi made many achievements in the field of mathematics by conducting research. Al-Khwarizmi Abu Abdullah Muhammad ibn Musa (783-850) - a great mathematician, astronomer, geographer. Despite the dominance of idealistic ideals in his time, Al-Khwarizmi walked the difficult paths of science, opened a wide path for advanced social and philosophical thinking, and made significant contributions to mathematics made immortal discoveries. He devoted his creativity to the development of science and sought to convey advanced ideas to the peoples of the world. Ten of the works written by Al-Khwarizmi have survived to our time. Two of them are devoted to algebra and arithmetic, and played an important role in the history of science.

In the words of the famous researcher D. Sarton, he was: "The greatest mathematician of his time and, taking into account many cases, one of the greatest mathematicians of all times," and became an innumerable torch in the history of science with his important discoveries. Al-Khwarizmi's work "Arithmetic" ("Kitab filhisob al hind"), translated into Latin in the 12th century, introduced Europeans to Indian numerals, the positional decimal number system, and demonstrated its advantages over other number systems. He introduced the method of performing operations on whole and fractional numbers and finding square roots. Al-Khwarizmi says: Imam Ma'mun's interest in science and his qualities of helping scientists in their work with difficulties in this field prompted me to write a short work on arithmetic. He wrote that in writing this work, I aimed to make it understandable, easy, useful for readers and to facilitate the work of arithmetic in problems between people, especially in the distribution of inheritance, concluding agreements, trade, land surveying and other similar calculations. In his works such as "Treatises on Arithmetic", "Algebra", "Extraction from the Astronomical Table of the Indians" - "Sadiant", "Extraction from the Corrected Ptolemy Table of the Planets", Al-Khwarizmi systematized arithmetic, algebraic and geometric materials. In short, Al-Khwarizmi deeply organized, analyzed, systematized and developed the rich heritage left by Babylonian, Greek, Indian and Egyptian mathematicians and presented it to the future generation.

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In fact, Asian and European scientists, including Beruni, Ibn Sina, Omar Khayyam and others, organized algebra from the books of Al-Khwarizmi. Another figure of Eastern science is Omar Khayyam. Omar Khayyam-Giyasiddin Abdulfath Omar Ibrahim al-Khayyam (c. 18.5, 1048-1123) - philosopher, astronomer, mathematician, Persian-Tajik poet. Khayyam organized mathematics and made a significant contribution to its development. He analyzed equations, divided them into 25 types, and thought about solving cubic equations. Dividing cubic equations into 14 classes, he solved problems such as determining the methods of solving them, the limit of their solutions, and the number of positive solutions.

DISCUSSION

Khayyam was the first to introduce into science the proof of the Indian method of extracting square and cube roots from positive integers, based on the formulas for the square and cube of the sum of two terms, the possibility of applying them to any integer exponent, the equality of irrational numbers with other numbers, the connection of geometry with algebra, the solution of algebraic problems geometrically, and other problems. He knew Newton's binomial, since his works contain examples of calculating binomial coefficients. Khayyam organized the theory of parallel lines and thought about the axiom of parallelism. His ideas were later supported by N.V. Lobachevsky. Considering the wide scope of Khayyam's knowledge, the Seljuk Sultan Malik Shah promoted him to the rank of court scientist and entrusted him with compiling a calendar. Although the calendar he compiled (1079) was practically obsolete, it was much more accurate than the Gregorian calendar, which was adopted in Europe 500 years later and is still in use today. It should not be forgotten that the role of intuition in mathematics is extremely large. There are scientists who can foresee which paths should be taken to solve a major problem posed by practice and science, and what difficulties may arise on each path. Such a wonderful quality - an important aspect of natural talent - developed intuition is characteristic of great scientists. Another scientist who possessed this quality was the famous Indian mathematician Sirinivasa Ramanujan (1887-1920). He was a brilliant mathematician with a unique talent and unique way of thinking, a deep scientific intuition.

RESULT

Ramanujan, one might say, mastered mathematics independently. The formulas he found were as beautiful as real works of art and gave a person pleasure. How he was able to find these formulas still amazes famous mathematicians... Ramanujan established contact with the famous English mathematician Hardy. He went to England and did fruitful scientific work with him. At the age of 31, Ramanujan became the first Indian to be elected to the English Academy of Sciences. He became a professor at Cambridge University. Ramanujan found amazing formulas while still at school. To sum up, mathematics has gone through many stages and developed to this day.

Up to this time, scientists from different countries of the world have made great discoveries, and such work continues today. Personally, I hear a lot of young people say that many things related to mathematics are clear, but this is not the case, because there are still many new things that we do not know, which are revealed and brightened over time. Perhaps the youth of the Middle Ages also had such views, but since those times, there have been many innovations and theories, not only in mathematics, but also in all types of science.

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CONCLUSION

Humanity never stands still, but constantly develops and does not stop seeking knowledge.

The science of mathematics has also been improving for thousands of years with the contribution of different civilizations and great scientists. The scientific heritage of Eastern and Western scientists serves as the basis for today's modern mathematics. In conclusion, I would like to recall the wise words of our esteemed First President, "Seek knowledge from the cradle to the coffin," and draw attention to the dedication of our ancestors in the path of knowledge. They traveled from Baghdad to Kashgar in order to gain knowledge, received education from famous teachers, and themselves reached the level of great scientists.

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