



**THE HISTORY OF THE EMERGENCE OF GEOMETRY, THE
RELATIONSHIP OF MATHEMATICS AND GEOMETRY**

Abdurashitov Raxmatullo Abduxamitovich

Matematika Abdurashitov Raxmatullo

Abduxamitovich Matematika

Muhammad Al-Xorazmiy nomidagi TATU akademik litseyi

ABSTRACT

This article addresses the issues of increasing the interest of primary school students in mathematics, the formation and development of logical thinking skills, increasing the effectiveness of education.

KEY WORDS

Geometric shape, exhibition, didactic games, perimeter, surface, volume concept.

Introduction

Geometry has a rich history of ancient civilizations. The concept of geometry originated in ancient Egypt and Mesopotamia around 3000 BC, where it was mainly used for practical purposes such as land surveying and construction. The ancient Greeks, in particular mathematicians such as Euclid and Pythagoras, significantly advanced the study of geometry around 300 BC.

Euclid's "elements" became a fundamental source for geometry, stating a logical system of axioms and theorems. This work influenced the development of geometry over the next centuries. Geometry played a very important role in understanding and describing the physical world, helping astronomers, architects and engineers.

During the Renaissance, geometry became the basis of scientific inquiry. Mathematicians such as René Descartes, Pierre de Fermat introduced algebraic methods into geometry, giving birth to analytic geometry. This revolutionized the study of curves and helped to lift the gap between geometry and algebra.

In modern times, geometry remains necessary for scientific disciplines such as physics, engineering, computer graphics, even teachings such as Einstein's general relativity. It provides tools for understanding forms, spatial relationships and mathematical modeling. The science of geometry continues to play a huge role in advancing the scientific worldview and solving real-world problems. Geometry, throughout history, has been of particular importance in science. Its application has been instrumental in understanding the material world, developing scientific theories. Here are a few key points to delve into the topic:

1. Ancient civilizations. Geometry first appeared in ancient Egypt and Mesopotamia as a tool for practical applications such as land surveying and construction. The Egyptians used geometry to properly measure and divide land after the annual flood of the Nile.

2. Ancient Greek contributions: the ancient Greeks, in particular mathematicians such as Euclid and Pythagoras, were major contributors to geometry. Euclid's "elements", a systematic approach to geometry, formed a logical set of axioms and theorems affecting mathematicians over the centuries. Pythagoras' theorem, connecting the sides of a right triangle, is one of the best-known results of geometry.

3. Renaissance and analytic geometry: during the Renaissance, geometry experienced a revival. Mathematicians such as René Descartes, Pierre de Fermat introduced algebraic methods into geometry, giving birth to analytic geometry. This allowed geometric problems to be solved using algebraic equations, and conversely produced a powerful means of analysis.

4. Geometry and physics. Geometry became very important in understanding the laws of physics. For example, Isaac Newton's laws of motion and his theory of gravity relied heavily on mathematical concepts derived from geometry. Albert Einstein's general doctrine of relativity also made extensive use of non-Euclidean geometry to describe the curve of cosmic time.

5. Engineering and architecture: geometry plays a necessary role in various fields of engineering and architecture. Architects use geometric principles in the design of buildings, they provide structural stability and aesthetic appeal. Experts employ geometry to analyze and design constructs, build computer models, optimize routes for transport networks.

6. Modern applications: in modern science, geometry finds applications in various fields such as computer graphics, robotics, computer-aided design (CAD), and 3D modeling. Geometric algorithms and geometric transformations are integral components of these fields.

The historical development of geometry and its application in the scientific Sciences demonstrate its continuing importance in solving the mysteries of the natural world and allowing advances in technology.

Geometry and mathematics have a strong relationship, since geometry is a branch of mathematics that focuses on the study of shape, size and spatial relationships. The main directions of their interconnection are as follows:

1. Mathematical language. In geometry, mathematical language and notation are used in the representation and analysis of form and spatial concepts. Mathematical symbols, equations and proofs are necessary tools in the perception and informatization of geometric ideas.

2. Logical deduction: in geometry, logical deduction is worked, which is the main focus of mathematics. With the help of axioms, terms and theorems, geometric arguments are structured in a logical and rigorous way, adhering to the principles of mathematical reasoning.

3. Geometric constructions. Geometry consists in the construction of geometric figures using specific mathematical methods. These constructions often rely on mathematical concepts such as perpendicular lines, angular bisectors, parallels. Geometry provides a practical application of mathematics when creating accurate and correct schemes and models.

4. Mathematical modeling. Geometry plays a very important role in mathematical modeling. Where real - world phenomena or abstract concepts are expressed using mathematical constructions. Geometric shapes and constructions are often used when modeling and solving problems in various fields, such as physics, engineering, computer graphics.

5. Spatial visualization. Geometry develops spatial visualization skills. These skills are very important in understanding mathematical concepts and solving problems. Geometric figures and their

transformations help to form the ability to consciously master forms and visualize their relationship in space.

6. Analytical Geometry. Analytic geometry, also known as Coordinate Geometry, generalizes algebra and geometry. It uses algebraic methods such as equations, coordinate systems to represent and analyze geometric figures. Analytic geometry provides a bridge between geometry and algebra, allowing geometric problems to be solved using algebraic methods.

In general, geometry and mathematics are closely related, and geometry provides a concrete visual concept for many mathematical concepts and principles. The application of mathematical reasoning and techniques enriches the study and application of geometry, while geometry contributes to the development and understanding of mathematical concepts.

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