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The Purpose, Function and History Of The Development Of Mathematical Science

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Abstract: *First of all, it should be noted that the history of mathematics is part of the mathematical sciences. It is well known that although the fields of mathematical sciences are diverse, they are grouped into a single subject under the sign of commonality. This sign of generality can be clearly seen in the definition given to mathematics below. "Mathematics is the quantitative relationship and spatial forms of real being."*

Different branches of mathematics deal with these quantitative relations and some special cases of spatial forms.

Keywords: Facts gathered during the development of mathematics , Hypotheses, that is, facts based on scientific hypothesis, which are then tested in practice, Generalized and grounded materials, i.e. mathematical theory and rules.

INTRODUCTION

The structure of the subject of mathematics is as follows:

Facts gathered during the development of mathematics.

Hypotheses, that is, facts based on scientific hypothesis, which are then tested in practice.

Generalized and grounded materials, i.e. mathematical theory and rules.

Mathematical methodology is a general method of explaining mathematical laws and theories that characterize the approach to the study of the subject of mathematics.

The listed elements of the subject of mathematics are interrelated and evolving. It is the subject of the history of mathematics to study how this development took place in a particular period, and what this development will look like later, and, as a result, to explain their causes.

So the history of mathematics is the science of the objective laws of the development of mathematics. This is why the history of mathematics has to deal with very big problems.

It is a difficult task to list these tasks, but it is possible to list what future math teachers need to know from the history of mathematics.

The main part

Firstly, the future mathematics teacher should know the stages of development of mathematics, how mathematical concepts were formed in ancient times, secondly, to know how mathematics as a science was formed, thirdly, with the history of development of geometry as a science and as a subject to be acquainted, fourthly, to know the history of trigonometry, fifthly, to know the origin, development, current state of algebra, sixthly, to know the subject of mathematical analysis, its initial history.

In addition, in the study of the history of mathematics, the historical nature of modern logical structures, the dialectic of their development should be studied systematically, which helps to understand the ratio of mathematical fields and the prospects for their development.

The subject of the history of mathematics is related to a large number of other disciplines and their history, which further expands the scope of its problems and increases the role of historical-mathematical research methods.

The main stages of the development of mathematics

Many mathematical historians prefer the periodicity of mathematical development proposed by AN Kolmogorov. The main reason for this is that Kolmogorov's period was based on important methods, ideas and results of mathematics, that is, the evaluation of the content of mathematics. Dividing the development of mathematics into such special periods does not completely solve the essence of the history of mathematics, but will be an additional tool for a better understanding of the objective laws of the development of mathematics. In his opinion, it is expedient to divide the development of mathematics into the following four periods:

1. The emergence of mathematics. This period lasted until the VI-Y centuries BC, during which time mathematics became an independent science with its own subject and methods. The beginning of the period dates back to the oldest period — the primitive community system. A characteristic feature of this period is the collection of mathematical facts.

2. The period of elementary mathematics (the period of mathematics of variables). U er.avv. It lasted from the VI-V centuries to the XVII century. During this period great strides were made in the study of fixed quantities. One can give some idea of these achievements in the mathematics courses currently taught in high schools. It should be noted that the Uzbek scientist Muhammad ibn Musa al-Khwarizmi (780-850) created the science of algebra, R. Descartes created analytical geometry, and infinitely small quantities began to develop. In general, it is difficult to define the concept of elementary mathematics, there is no clear definition of it, but it is correct to distinguish such a period in the history of mathematics, and it makes it easier to study history.

3. The period of mathematics of variables. This period was marked by the complete creation of analytical geometry by R. Descartes (1596-1650), differential and integral by I. Newton (1642-1727) and Leibniz (1646-1716). begins with the formation of the sob. The end of the period goes back to the middle of the XIX century. During this period, mathematics became modern. At the same time, all the scientific foundations of mathematics, called classical mathematics, were formed.

4. The era of modern mathematics. It dates back to the middle of the 19th century. This period is characterized by an increase in the role of mathematical abstraction, the widespread use of mathematical modeling in mathematics. It was during this period that mathematics, known as classical mathematics, became much narrower in its application to other fields of mathematics. The reason is that mathematics has been divided into many branches, in which the axiomatic method has been widely developed, resulting in the emergence of a new mathematical concept-mathematical structure. The concept of mathematical structure helps to teach the unity of mathematical facts and methods that at first glance seem too far apart.

It is well known that the elements of mathematics work on arbitrary sets and look at different relationships. The elements of sets form different mathematical structures depending on the axioms that govern them. In recent times, various branches of mathematics, and even some mathematical subjects, have begun to be interpreted as models of those structures. Therefore, modern mathematics can be described as a science of mathematical structures and their models.

Mathematics, like all other sciences, is constantly evolving. There are two reasons for this: first, its development is required by daily life and practice; second, development is required by mathematics's own internal need.

The rapid development of mathematics has a great influence on the development of technology, economics, production management, as well as the development of other neighboring sciences.

The use of historical information in the process of mathematics lessons makes it more interesting, increases the interest of students in the material studied, helps them to acquire knowledge.

Arithmetic material is the main content of the course. The core of the elementary course is the arithmetic of natural numbers and basic quantities. In addition, this course combines the basic concepts of geometry and algebra.

Elementary math is an integral part of school math. The most basic and age-appropriate concepts of mathematics taught in grades V-XI are given. In the upper grades, these concepts are taught in an expanded, deepened, and enriched way. So the content of elementary school math also determines the content of high school math. The structure of elementary mathematics has its own characteristics:

1. Arithmetic material is the main content of the course. It teaches arithmetic of natural numbers, basic quantities, propaedeutic courses of elements of algebra and geometry in combination with arithmetic material without teaching in the form of the main section.

2. Elementary school material is concentric. For example, if you first learn to number I-decimal, then you learn to number 100 and do arithmetic. Then do the arithmetic in 1000, then in multi-digit numbers.

These include numbers, quantities, fractions, algebraic and geometric materials.

3. Theoretical and practical issues are organically interconnected.

4. Mathematical concepts, properties, and the discovery of legal connections are interrelated in the course.

5. Each concept is explained in a developed way.

For example, before teaching arithmetic, its essence is revealed, then the properties of the operation, then the relationship between the components, then the result of the operation, and finally the relationship between the operations.

6. The basic concepts and the resulting concepts are given in the interrelationship.

For example, multiplication is based on addition.

The elementary math course includes parts of arithmetic, algebraic, and geometric material that are structured.

The concentric arrangement of arithmetic material is maintained in the elementary math course.

However, the current program reduces the number of concentrates: decimals, hundreds, thousands, multi-digit numbers. It should also be noted that the material is so largely grouped that it is time-bound to look at interconnected concepts, actions, and issues.

Simultaneously with the study of the properties of arithmetic operations and appropriate calculation methods, the relationship between the results of arithmetic operations and their components is revealed. (For example, if one of the components is subtracted from the sum, a second component is formed.) A change in one of the components results in a change in the results of arithmetic operations.

Introducing elements of algebra, deep, understood and generalized o Meets the objectives of ‘equation’: the concepts of equality, inequality, equation, variable are explained on a concrete basis.

Numerical equations and inequalities from 1st grade (4 = 4, 6 = 1 + 5,

2 <3, 6 + 1> 5, 8-3 <8-2, etc.) are considered.

Their study is linked to the study of arithmetic and helps to unravel it.

From class 2 onwards, equations of the form (x + 6) -3 = 2, etc. are considered.

Solving equations is done first by the method of selection, and then by knowing the relationship between the results of operations and their components.

Practical testing with variables allows students to gain functional insights.

Geometric material serves the purpose of introducing children to the simplest geometric figures, developing their spatial imagination, as well as demonstrating arithmetic laws and connections. (For example, the representation of a rectangle divided into equal squares is used to explain the relationship between the displacement property of multiplication ...).

From Grade 1, straight and curved lines, sections, polygons and their elements, right angles, etc. are included.

Students should be able to imagine geometric shapes, their names, and make them simple on checkered paper. They also need to be able to find the length of a cross-section and a broken line, the perimeter of a polygon, a rectangle, a square, and the face of any figure in general (using a palette).

The objectives of teaching mathematics in the primary grades are: general purpose, educational purpose, practical purpose. These goals are inextricably linked and complementary.

1. Learning objectives require the teacher to:

a) to provide students with knowledge, skills and knowledge from the system of mathematical knowledge;

b) study the real world by mathematical methods;

(c) Ensuring the development and quality of students' oral and written communication;

(g) To provide students with knowledge of mathematics in such a way that, through this knowledge, through active learning activities, their knowledge, skills and abilities increase.

2. Educational purpose. Teaching mathematics requires students to have perseverance, diligence, perseverance, the ability to control their own thoughts and conclusions, and especially the fluency of reasoning based on observation. Symbols are used in mathematics to represent the relationship between quantities. This is the mathematical language that needs to be developed. The teacher's task should be to teach the mother tongue to translate mathematical ideas expressed in symbolic language.

The pursuit of knowledge must cultivate a sense of satisfaction from independent work. Teaching math itself helps students focus and concentrate.

The teacher should:

a) the student is able to understand the connections in the material world, changes in quantities, their relationship to each other;

(b) Ensuring that students have a strong interest in learning mathematics;

d) cultivate an attitude to work, homeland and people, to create an aesthetic taste;

(g) fostering a worldview of the history of the Uzbek nation, including the history of mathematics;

d) fostering students' thinking skills and mathematical culture;

3. Practical purpose. The practical purpose of teaching mathematics is to teach students to apply what they have learned. To be able to apply the acquired knowledge to numbers and mathematical expressions, operations on points, to use them in solving various problems. It is about teaching how to apply knowledge to solving problems in everyday life.

The concept of teaching method is one of the basic concepts of didactics and methodology.

Thus, teaching methods have three main functions: mastering, nurturing, and developing.In order to make a conscious choice of teaching methods that are relevant to the new content and new tasks of education, it is necessary to first study the classification of all teaching methods.

1. Information on research methods. It is impossible to develop pedagogy without studying and generalizing the experience of pedagogical education and without in-depth study of the pedagogical process. Modern education equips pedagogy with a general method of scientific knowledge, but like any other discipline, pedagogy has its own research methods.

Scientific research methods are methods of obtaining scientific information in order to establish legal connections, relationships, connections, and to formulate scientific theories. These include observation, experimentation, review of school documents, study, interviews and questionnaires, and scientific and pedagogical research methods. More recently, mathematical and cybernetic methods, as well as modeling the use of lashing methods is noted.

Elementary mathematics teaching methods use the same methods as in all pedagogical research.

2. Observation method.

The method of observation is a direct and objective perception of the pedagogical process, with the appropriate recording of the results of observation under normal conditions. The observation method is used to study the progress of work in this or that area of

education. This method allows you to collect factual material about the activities of teachers and students in a non-forced natural environment.

During the observation, the researcher does not interfere with the normal course of the learning process. The follow-up will continue for a long or short period of time, depending on the specific target plan. The progress of the observation, the facts, the events taking place, the equipment are recorded in the observation diary.

Tracking can be continuous or selective. In a continuous observation, a broader phenomenon (for example, the cognitive activities of younger students in mathematics) is observed, and in a selective observation, a smaller phenomenon (for example, independent work of students in mathematics) is observed. Writing a decision or keeping a diary is the simplest method of recording observation. But the most reliable method of recording observations is the use of technical means, video, photo and film, TV screen.

One of the methods of observation used is the study and generalization of best pedagogical practices. A prerequisite for the successful use of this method is that the description of the teacher's experience should meet the set research task (in our country a lot of work is being done to study best pedagogical practices. The generalization of this experience is the subject of scientific conferences. and is reflected in the process of application of information technology in collections of materials of pedagogical readings, monographs and journal articles).

3. Experience

Experiments are also observations that take place in a specially organized, researcher-controlled, and systematically changing environment. Pedagogical Experience is used to study the effectiveness of a particular method of teaching and education, guidelines.

Prior to conducting the experiment, the researcher should clearly state the issues to be studied, and the solution of such issues should be important for school practice and pedagogy. Prior to conducting the experiment, the researcher gets acquainted with the theory and history of the subject matter, as well as practical experience in this field. The role of scientific hypotheses in research is significant. The whole experiment is organized to test the scientific hypothesis. It allows you to determine the way the material is collected, preventing the researcher from confusing the actual material.

The results of the experiment are analyzed by the method of comparison. To do this, two or more groups will be formed, which should be as uniform as possible in terms of the level of preparation and other indicators of the composition of students in these groups. In the same classroom, work is done on experimental material specially developed by the researcher. Control classes are chosen for comparison, these classes should be approximately as strong as the experimental classes in terms of student composition, their level of knowledge, in which the methods, tools, etc. used in mathematics experimental classes are not used.

There are other ways to get objective information about the results of the experiment:

1. In the experimental class, the initial conditions are somewhat more favorable than in the control class; if good results are obtained in experimental classes under such conditions, the experimental solution of the problem is considered justified;

2. There are two classes with approximately the same student body; the new solution of the problem under study is applied in one of these classes, and then applied in the other class in other subject materials; if a new method, a method of such application, gives good results, this method, this method, will be justified.

Before beginning the experiment, at the end and at the end of the experiment, the knowledge of all students is tested. Based on the analysis of the obtained data, the method, method, etc. conclusions are drawn about the effectiveness. Conclusions are drawn based on an analysis of the qualitative and quantitative results obtained from the experimental classes. There are different ways to determine quantitative quantities (by assimilation, comparison of correct and incorrect answers, etc.). In recent times, various computational techniques and cybernetics from variational statistical methods for this purpose two tools are used. Experimental verification of some important rules is carried out through mass experiments.

4. Study school documents.

One of the most common methods of pedagogical research is the study of student work and documents. Students' work allows them to determine the level of preparation for certain sections of the program, to monitor their growth and development over a period of time. For example, special written and graphic assignments are designed to ensure that children's knowledge and skills in

mathematics are clearly visible; doing such special work over a period of time shows how well the students are moving forward and to what extent. It is important to analyze the mistakes students make in their writing. This analysis allows us to identify the complex challenges faced by students in the whole class, as well as the individual characteristics of students in their mastery of mathematics.

Curriculum documents (curriculum, syllabus, methodical work documents, reports, etc.) reflect the process and state of development of educational work.

Studying students' notebooks is important for research. Long-term review and analysis of the student body helps to unravel the system of teacher work, the characteristics of student work.

5. Conversation method.

Conversational method is also used in pedagogical research. The use of this method allows to obtain materials that complement and clarify the data obtained from the observation, to perform assignments. The key to the success of this method is the ability to communicate with children, to communicate freely with them It is important to set a goal for the interview, justify the program development, direction, and methodology. The interview method involves the inclusion of direct and indirect questions that allow to verify the reliability of the answers to the questions asked directly.

The interview method can also be aimed at teachers, parents, in which case there is no need for the above-mentioned caution, so the researcher's attitude towards the interlocutor can be clear.

6. Questionnaire survey method.

Questionnaires are used to determine opinions about an issue and to gather some facts. If the answers are given orally, then the answers will be written in full in the decision. When most people answer a question on their own, and everyone answers independently, a written questionnaire is valuable.

The following two requirements must be met when using the questionnaire:

1) the questionnaire should have fewer questions;

2) The questions should be structured in such a way that everyone understands them the same, and they require clear (unambiguous) answers.

Theoretical methods play a leading role in scientific and pedagogical research. In each study, it is necessary to first select the object of study, and on the basis of theoretical analysis, to select the leaders from them to determine and verify the facts on which the object is related. It is necessary to make a hypothesis to clearly define the goals and objectives of the research, to develop research methods accordingly, to choose methods of explaining and analyzing the facts obtained in the course of the research, and to express conclusions. To do all this work, it is necessary to study and analyze the literary sources that shed light on the past and present theories and practices of the subject under study. Theoretical methods are used, among other methods, in any study of mathematical methods. The first step in solving any scientific problem is to study all the literature on the subject and conduct theoretical research. Without it, the goal is not goal-oriented, the test is sometimes made by mistake, and it does not always lead to the full involvement of the problem. At the same time, there is no consistency in science without a study of literature and a theoretical analysis.

Other methods are also used in research on mathematical methodology. Typically, the combination of all these methods ensures that these results are reliable.

In modern didactics, there are different approaches to the classification of teaching methods. In our opinion, the most appropriate classification is one that includes a variety of methods.

From the above definition, it can be seen that teaching methods are a combination of teacher and student interaction.

Consequently, the organization of such activities involves encouragement and control, so teaching methods are also divided into three major groups: methods of organizing learning activities; methods of stimulating learning activities; study f methods of monitoring the effectiveness of the activity.

Methods of organizing learning activities can be classified into several groups.

I. Sources of knowledge for students:

Oral, visual and practical methods (explanation, conversation, storytelling, book work, etc.).

Demonstrative methods (observation of objects and events around them, looking at their models and images)

II. In terms of student feedback:

Induction, deduction and analogy.

III. In terms of pedagogical impact, level of management, level of student independence in learning:

Teacher-led teaching method;

The method of independent work of students.

IV. According to the level of independent activity of students:

Annotated-illustrative method;

Reproductive method: the method of problem-based statement of knowledge;

partial research and study method.

I. Oral, Demonstrative and Practical Methods

1) Oral methods - provide the most information in a short period of time, set problems for students, show them how to solve them.

These techniques help students develop abstract thinking.

a) Explanation. The essence of the method of explaining knowledge is that the teacher describes the material, and the students receive it, that is, the knowledge is ready.

The description of the material should be clear, concise and concise. Consistent statement of knowledge is required to address a number of issues in an elementary math course. Examples: 1. An algorithm for writing a multi-digit number into a one-digit number

(656: 4; 1896: 6) ...

2. Multiplication by 1 or 0. Knowledge of multiplication in children does not help them understand multiplication by 1 or 0. the teacher must be ready to convey the knowledge.

The teacher's method of explaining knowledge is used to guide the use of theoretical data on the data.

b) Conversation is one of the most common and leading teaching methods and can be used at different stages of the lesson, for different learning purposes, i.e. when checking homework and independent work, when explaining new material , can be used to strengthen and repeat.

Conversation is a question-and-answer method of teaching, in which the teacher asks students questions based on their knowledge and practical experience, through specially selected questions and answers to them. leads to the solution of academic and educational issues.

In the methodological literature, it is often recommended to use the conversational method in the introduction of mathematical concepts (numbers, arithmetic operations, etc.) in the introduction of knowledge-type knowledge (properties of arithmetic operations and the relationship between their components and results).

Two types of conversation are used in teaching: catechistic and heuristic.

A catechistic conversation is based on a system of questions that requires a simple recollection of previously acquired knowledge and definitions.

This conversation is mainly used to reinforce and repeat new material in the examination and assessment of knowledge.

2. Demonstrative methods.

Demonstrative teaching methods allow students to learn through observation. Observation is an active form of emotional thinking that is widely used in teaching, especially in the elementary grades. The objects of observation are the surrounding objects and events and their various models (different types of instructions). Demonstrative methods of teaching are inseparable from oral methods of teaching. Demonstrations are always accompanied by explanations from the teacher and students. According to the teacher, there are 4 main ways to share instructional materials:

1) the teacher directs students' observations using words;

2) verbal explanations provide information about the invisible aspects of the object;

3) The instructions serve as illustrations confirming or concretizing the teacher's oral explanations;

4) The teacher summarizes the students' observations and draws a general conclusion.

3. Practical methods. Methods related to the process of building and improving skills and competencies are practical teaching methods. In particular, such methods include written and oral exercises, practical and laboratory work, and some types of independent work. Exercises are mainly used as a method of consolidation and application of knowledge, skills and abilities.

Exercise is an action, this action o Repetitive performance that is systematically organized for the purpose of consolidation or consolidation. Great emphasis is placed on training, rehearsals, and creative exercises. Creative exercises include, for example, problem-solving and problem-solving in a variety of ways, expressive problem-solving, short writing, drawing problem-solving, problem-solving exercises, and more.

INDUCTION, DEDUCTION, ANALOGY

These three methods differ from each other depending on the characteristics of the conclusions underlying the acquisition of new knowledge.

The method of induction is a way of knowing, in which the student's mind grows from unity to generality, from particular to general. An inductive conclusion is a conclusion that goes from the particular to the general. Using this method, the teacher carefully selects examples, problems, and instructional materials to reveal a rule or rule.

The deduction method is also widely used in the primary school in connection with the induction method. Due to the transition of primary school students to the requirements of the new curriculum, the scope of the deduction method has expanded significantly. The usual methodology was to use the almost inductive method, limiting the use of the deductive method.

The method of deduction is a way of knowing, a way of acquiring new private knowledge on the basis of more general knowledge

consists of

1 + 2 = 3 3 - 2 = 1 3 - 1 = 2

Deduction is the transition from general rules to specific examples and specific rules.

We give examples of inductive and deductive conclusions. We bring children to the conclusion inductively to explain to first graders the connection between addition and subtraction. Using the pointer (different circles), first find the number of all the circles (1 +2 = 3)

Then 1 red circle (representing the first term) is drawn, making sure that the children have 2 blue circles, ie the second term. (3 - 2 = 1) Then if you subtract 2 blue circles (representing the second term) from 3 circles, you make sure that 1 red circle, i.e. the first term, remains (3 –1 = 2) . Then, along with other numbers and other visual aids, such exercises are performed, and the children themselves express this general conclusion: if the first additive is subtracted, the second adder remains, if the second adder is subtracted from the sum, the first 'remains slippery.

Inductive reasoning by children is use

d for deductive reasoning when considering the subtraction of numbers 5,6,7,8,9.An analogy is the inference that an object is similar in some respects to another. An analogy is a conclusion that "goes from private to private," going from one concrete fact to another.

For example, the conversion of written methods of addition and subtraction of three-digit numbers to the addition and subtraction of multi-digit numbers is based on the use of the analogy method. To this end, in the methodological literature, it is recommended to introduce examples of written addition and subtraction of multi-digit numbers in such a way that each subsequent example includes the previous one. For example:

126 4752 54752 837 6837 76837

+172 + 3246 +43246 - 425 - 2425 - 52425

After solving such examples, students themselves conclude that written addition and subtraction of multi-digit numbers is performed as written addition and subtraction of three-digit numbers.

CONCLUSION

Underlying the use of the above methods (induction, deduction, analogy) are mental operations such as analysis, synthesis, comparison, generalization and abstraction.

The method of thinking that focuses on dividing the whole into its constituent parts is called analysis.A way of thinking that seeks to make connections between objects or events is called synthesis.

Students analyze the number to answer the question of how many decimals and how many units there are in 100.

They follow these words (that is, they analyze incorrectly), and doing so often leads to error, that is, to error synthesis.

The method of comparison consists of numbers, arithmetic examples, similarities and differences of problems.

An elementary course in mathematics opens up great possibilities for the application of the method of comparison: comparison of numbers, expressions, and numbers; comparison of two expressions; comparison of issues, etc.

Children face generalizations in the construction of new mathematical concepts, laws.

Generalization is the process of separating the most important aspects from the objects under study and separating them from the less important ones.

REFERENCES

1.N.U. Bikbayeva and others. "Math in elementary school teaching methods ". Tashkent. Teacher, 1996.

2. B.Toshmurodov. "Improving Elementary Mathematics Teaching." Tashkent. The Teacher, 2000.

3. RJ Ishmuhammedov "Ways to increase the effectiveness of education through innovative technologies." Tashkent, 2009.

4. M.E. Jumayev "Methods of teaching mathematics." Tashkent. "Teacher." 2004.

5. ME Jumayev "Practicum on methods of teaching mathematics". Tashkent. Teacher. 2004.

6. M. Akhmedov and others. "Mathematics textbook for 1st grade". Tashkent, 2003.

7. M. Akhmedov and others "Textbook for mathematics teachers". Teacher. Tashkent, 2003.

8. Websites.

9. www.ziyonet.uz

10.www.referat.uz

11.www.referat.ru

12. www.5ballov.ru