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Using Historical Components in Math Lessons

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Abstract: The article discusses and substantiates the main goals of introducing and using elements of the history of mathematics in the secondary school course. The means that the history of science possesses for the development of the general culture of students are analyzed. The forms of using historical material and forms of conducting in the classroom and in extracurricular activities are given; the famous Russian scientists who worked on this topic and some collections of historical problems are listed.

Key words: history of mathematics, teaching at school, goals of introduction, forms of conduct.

Introduction

The question of the use of elements of history in teaching mathematics is not new. At the end of the 19th century, it was discussed at congresses of mathematics teachers. Special works of domestic and foreign scientists and methodologists were devoted to him.

From the analysis of school textbooks on mathematics and educational and methodological literature, it follows that modern students have some opportunities to get acquainted with the history of the emergence of basic mathematical concepts, with the life and work of great scientists-mathematicians.

However, school graduates hardly realize that mathematics as a science is a constantly developing sphere of human activity, that it is closely related to practice and other sciences.

Main part

In this regard, it is very important to organize the educational process so that students, acquiring knowledge, have the opportunity to become witnesses and accomplices of the emergence and development of many mathematical concepts and ideas, see the various connections of mathematics and look at this science as a phenomenon of common human culture.

For this, it is necessary to carry out a thoughtful systematic use by the teacher of facts from the history of science and their close interweaving with a systematic presentation of program material.

Familiarization of students with the history of mathematics should be carried out both in the classroom and in extracurricular activities. The key to success lies in the skillful use of elements of the history of mathematics in such a way that they organically merge with the factual material presented. If you start such work from grade 6 and carry it out systematically, then over time, the historical element will become a necessary part of the lesson for the students themselves.

At first glance, it seems difficult to decide how to find the necessary time. However, the question of time is almost completely subordinate - the connection of mathematics studied at school with its history. Whatever the form of communication of information from the history of the subject, the time used in the lesson cannot be considered lost if only the teacher is able to present the historical fact in close connection with the theoretical material presented in the lesson. As a result of this connection, students' cognitive interest in mathematics will increase.

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The main methodological difficulty is the question of how, in practice, to combine the study of a certain section of the mathematics program with the presentation of the corresponding historical material. This difficulty can be overcome only gradually, in the course of systematic and meticulous work.

Thus, the problem of using the elements of historicism in teaching mathematics is of great importance and is an effective means of increasing the cognitive interest of students in mathematics, which indicates its relevance in the theory and practice of teaching mathematics.

The communication of information on the history of mathematics at school should be used in the form of systematized knowledge. Historical facts serve as a means of enriching the content of the school course and have a positive effect on the emergence and development of interest in the subject. With the correct formulation of the matter, information from the history of science can play an important positive educational role. First, they can be used to show that science arises and develops under the influence of human practical activity. Secondly, the life and work of many mathematicians can serve as an example of selfless service to their work, love for their homeland and contribute to the education of these qualities in schoolchildren. Thirdly, stories about the role of domestic mathematicians in the development of science serve as the basis for instilling a sense of national pride in students, and stories about foreign mathematicians - for fostering respect for people of science in other countries.

Information on the history of mathematics is reported either in the form of brief facts (like those footnotes that are placed on the pages in a textbook after studying each chapter), or in the form of historical references, which can take 5-10 minutes to report in a lesson. More detailed generalizing information on history (15-20 minutes) is permissible in the final lessons, when the study of the program material is completed, the marks are given.

Excursions into the historical past revive the lesson, give relaxation to mental tension, raise interest in the material being studied and contribute to its lasting assimilation. The use of elements of the history of mathematics in the lessons of consolidation of the passed material helps to increase the interest of students in such lessons.

In order to avoid oversaturation of information, it is enough to restrict oneself to the initial information from the history of mathematics related to the program material. At first glance, it seems difficult to find the time necessary to familiarize yourself with the historical material in the lesson. The question of the forms of using elements of the history of mathematics in the classroom is almost completely subordinated to the main question - the connection of mathematics studied at school with the history of science.

In the lessons, you can conduct conversations with historical content, which are recommended to be used along the way with the study of program material. On average, there is one conversation for every six lessons. Conversations should not be carried out in every lesson, as the material may seem redundant and tedious. The term "conversation" should be understood as a message of some fact from the history of mathematics, which can be presented to students in the form of a teacher's story, accompanied by historical information.

Historical material can be used at any stage of the lesson. Sometimes it is useful to give this information before explaining the new material, sometimes to organically link it with certain questions of the lesson topic, and sometimes to give it as a generalization or the result of studying a section, a topic of a mathematics course.

In the first case, historical information will help to better motivate the importance of the new topic and the new section, which will generate interest of students in their study. However, in order to

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make deeper generalizations and conclusions of a worldview nature, it is necessary to report historical information when consolidating or repeating the topic or chapter covered.

At the same time, it is possible to single out the stages of the historical development of the theory and provide information about the works and activities of scientists who took the first steps in the development of the theory, and about those who, having summarized the works of their predecessors, created this theory. When reporting historical material, a problematic approach can also be used. The explanation of the new material can begin with the formulation of a problem that logically follows from the previously covered and leads to the need for a higher level of cognition. This approach to the presentation of historical material arouses great interest among students in mathematics.

During the lesson, the students themselves can be involved to communicate the biographical data and creative activities of a particular scientist. Experience shows that even students who are not particularly keen on mathematics are happy to take up the preparation of messages on historical topics.

At the same time, in order to accustom students to independence, the material of the messages needs to be gradually complicated. So, first, the student can be offered a ready-made text of the speech, then you can tell him the topic of the message and the recommended literature with an indication of the pages in it, so that he writes the text on his own. After the teacher checks the written text, the student can deliver the prepared message in the classroom.

When selecting historical material, it is necessary to be guided by the program in mathematics. The selected material should reflect the basic information about the development of mathematics as a science. When presenting historical material, the age of students, the level of development of their thinking and preparation for the perception of the knowledge presented should be taken into account.

Historical material should not be retold, but skillfully woven into the program material and used for educational and educational purposes. The historical material used in the lessons should not be large in volume, so as not to turn math lessons into history lessons.

The most difficult task is to compile brief historical references. They should arouse interest in schoolchildren and serve educational purposes, at the same time they should be extremely brief.

Conclusion

The systematic use of elements of the history of science in the school mathematics course contributes to the development of students' interest in the subject, a deeper and simpler assimilation of mathematics, and the formation of a dialectical and mathematical worldview in schoolchildren. Students should know that mathematics is a product of the creative activity of human genius for thousands of years, and not a cunning invention of "wise men."

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