Исторически сложилось, что тригонометрическим уравнениям и неравенствам

Педагогические науки/1. Современные методы преподавания

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Some of the advantages of teaching mathematics in a modern school

Abstract

The process of teaching mathematics at school is the main source of systematic influence on the student's mathematical thinking. It is on the combination of classical studies and extracurricular activities on the subject that a deep interest in knowledge develops. Of great importance in the development of interest in enhancing the cognitive activity of students are solutions to problematic issues that introduce elements of entertainment into the educational process. Obviously, extracurricular work is important in the formation of the mathematical culture of students. If you carry out extracurricular work in accordance with the methodology for conducting the basic forms, then the interest of students in the process of teaching mathematics increases. But the restructuring of the school mathematics course requires time and a single methodological system for all levels of schooling. This article shows the influence of pedagogical capabilities on improving the methods of studying

mathematics, on the compliance of knowledge with modern requirements, on the introduction of new cognitive means into the learning process, and on solving some problems in combining classical lessons with extracurricular activities.

Keywords: educational process, teaching methods, mathematical culture.

In recent years, our school has been experiencing a period of improvement in mathematical education. During this time, new sections were added to the content of school mathematics, the mutual arrangement of some topics that were traditionally included in the school course changed, and therefore the method of their presentation changed. The modern school course of mathematics will require a lot of efforts of scientists, methodologists and teachers before it will finally take shape.

In the process of restructuring the school mathematics education, many questions that were previously included in the optional courses or extracurricular activities are now included in the required mathematics course.

In this regard, some topics that served as the content of extracurricular classes in mathematics are no longer used in such classes or the methodology of their study has changed significantly, for example: limits, derivative, integral, geometric transformations, vectors, etc.

There is a problem of updating the topic of extracurricular work inт mathematics. To do this, new topics must pass the corresponding- This is called "methodical processing".

The right way sedentems to be a reasonable combination of independent work of learners with teaching them techniques and methods of solving problems under the guidance of a teacher, and preference should be given to general methods and approaches. And the learning process itself should be organized in such a way that it develops learners ' independence to a greater extent, awakens their curiosity, and stimulates their creative activity.

Although there are materials in the mathematical literature for working with learners on the study of elementary functions, but teachers usually find them with questions related to higher mathematics, or in separate isolated problems of elementary mathematics.

We find it very useful to organize a detailed study of the question of the function and the equation associated with it in such a way that learners consider the question not so much in breadth, but penetrate deep into the idea of the function.

The fact is that the functional thinking of learners develops in higher, and even more so in secondary school on some primary standards, in which the function is often given by one formula, and the equation is considered as the equality of two functions given by the corresponding formulas.

It is well known that learners have difficulties with operations with irrational functions, and also with functions that are modules from the corresponding functions without a module.

It should be noted that already irrational functions largely carry the properties of functions from the module, and it would be more correct to go from them to functions from the module.

A teacher in his practice has to meet with such cases when the sign of the absolute value, not left explicitly, is included in this expression in a hidden form in the form of a functional double-valuedness square root.

In this case, the functional double-valuedness of the square root can serve as a powerful tool for the formation of functions given by a single formula, but which will be expressed by completely different laws at different intervals of change in the variable x.

There are some examples that we worked through in the order of classroom or circle work, and some important generalizations from the point of view of the teacher are made.

Let us have an irrational equation:

$$\sqrt{x+4\cdot\sqrt{x-4}}=4+\sqrt{x-4\cdot\sqrt{x-4}}$$

Solving this equation by squaring both of its parts, we obtain an identically fair equality:

$$x+4\cdot\sqrt{x-4}=16+8\cdot\sqrt{x-4\cdot\sqrt{x-4}}+x-4\cdot\sqrt{x-4};$$

$$\sqrt{x-4}-2=\sqrt{x-4\cdot\sqrt{x-4}};$$

$$x-4-4\cdot\sqrt{x-4}+4=x-4\cdot\sqrt{x-4};$$

$$x-4\cdot\sqrt{x-4}=x-4\cdot\sqrt{x-4}.$$

In this case, learners are quite unreasonably inclined to believe that the initial equation is also an equality that is identically just. It is easy, however, to see that the initial equation is true for every $x\geq 8$ and unfair for $4\leq x<8$. To do this, we give the initial equation the form:

$$\sqrt{x+4\cdot\sqrt{x-4}}-\sqrt{x-4\cdot\sqrt{x-4}}=4$$

and consider the function

$$f(x)=\sqrt{x+4\cdot\sqrt{x-4}}-\sqrt{x-4\cdot\sqrt{x-4}}=f_1(x)-f_2(x)$$

This function has a real value for every $x\geq 4$.

Consider a function in this domain of its real values.

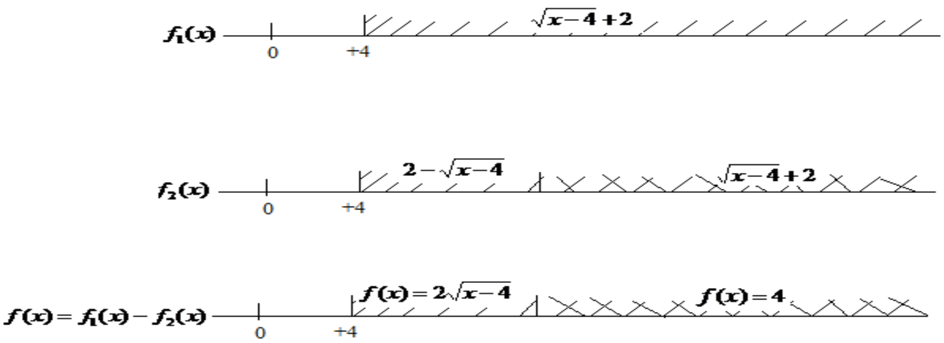
It is easy to see that

$$\sqrt{x+4\cdot\sqrt{x-4}}=\pm(\sqrt{x-4}+2)=f_1(x);$$

$$\sqrt{x-4\cdot\sqrt{x-4}}=\pm(\sqrt{x-4}-2)=f_2(x);$$

Limiting ourselves, as is usually done in the practice of computing, to the arithmetic value of the numerical value of the square root, we must take $f_1(x)=\sqrt{x-4}+2$ for every $x\geq 4$, $f_2(x)=2-\sqrt{x-4}$ at $4\leq x<8$ and $f_2(x)=\sqrt{x-4}-2$ at $x\geq 8$.

This can be schematically represented as follows:



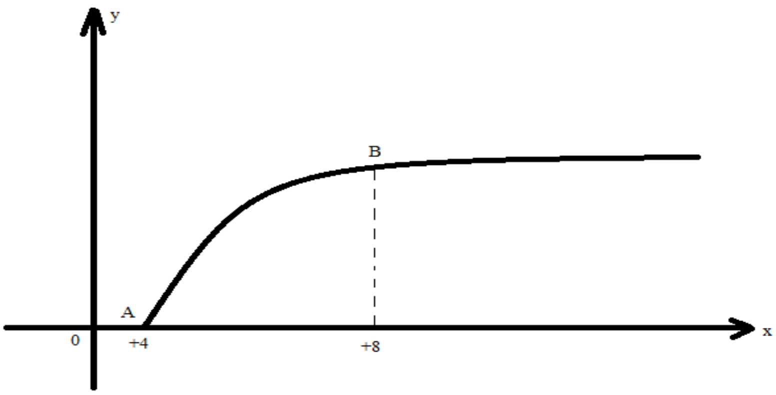
Obviously, for different intervals of values of the variable *x*, the function *f(x)* will be expressed by two different laws:

$$4 \le x < 8 \; f(x) = \sqrt{x-4} + 2 - (2 - \sqrt{x-4}) = 2\sqrt{x-4}$$

$$8 \le x < +\infty \; f(x) = \sqrt{x-4} + 2 - (2 - \sqrt{x-4}) = 4.$$

Thus, it is clear that there are innumerable values of $x \ge 8$ for which *f(x)*=4 and which therefore satisfy the initial equation.

Graphically, the function *f(x)* is represented as shown in Figure 1.



At $4 \le x \le 8$, the branch of the function *AB* is a parabola $x = \frac{1}{4}y^2 + 4$, for which O is the axis of symmetry, and the vertex is located at the point *A*(4;0).

Hence it is clear that the given initial algebraic equation $f(x) = 4$, being satisfied with an innumerable set of values of the numerical domain $x \ge 8$, in fact represents a bounded identity.

In this case $f(x) \equiv 4$ for every $x \ge 8$ and $f(x) \ne 4$ for every $4 \le x < 8$, i.e., is not an identity in such a part in which the function *f(x)* exists and has a real value [1-6].

The mathematical education of learners is based on purely mathematical methods and approaches.

In order for the learners to easily solve the problem that has arisen, it is necessary to use the latest achievements of pedagogy, psychology, methods of teaching subjects, in particular mathematics. Rational use of pedagogical technologies in the process of teaching mathematics contributes to the development of the following functions in learners:

1. Combine basic education and extracurricular activities self-education;

2. Working in a team;
3. Self-education;
4. Ability to analyze the results of their activities;
5. Improving the ability to learn;
6. Improving learners ' cognitive activity, etc.

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