ACTIVE AND INTERACTIVE LEARNING METHODS IN MATHEMATICS LESSONS

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Abstract: The purpose of the study: to develop guidelines for the use of active and interactive teaching methods in mathematics lessons.
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The main tasks of the teacher's innovative activity in mathematics lessons are to optimize the educational process, increase the efficiency of mastering knowledge, skills and abilities, develop algorithmic thinking, and abilities for mathematical creativity. The effectiveness of the learning process depends on the application of teaching methods. Recently, active and interactive teaching methods have become widespread in the education system.

The following distinguishing features of active teaching methods are distinguished: activation of thinking, long-term involvement of students in the educational process, independent decision-making, increased motivation, interactive nature [1].

Depending on the presence of imitated activity, active learning methods are divided into two types: imitative and non-imitative. There are two types of simulation methods: game and non-game [1].

Interactive learning is one of the modern trends in the development of active learning. The use of interactive methods is associated with the use of information and communication technologies.

The following possibilities of information and communication technologies in education are distinguished: fast feedback between the user and the means of information and communication technologies, visualization of educational information, modeling, automation of computing processes, etc. [2].

Forms and methods of interactive learning are divided into the following groups: discussion, gaming, organizational and activity games, training forms of conducting classes [3].

In the process of teaching mathematics, various types of active and interactive teaching methods can be used, in particular, the method of projects and cases.

Cases have some features: the case is based on a specific situation, when analyzing a case, it is necessary to determine the main problem, the case may not have an unambiguous solution [1].

There are five stages of working with a case.

1. At the first stage, there is an introduction to the case.
2. At the second stage, an analysis of the situation is carried out.
3. The third stage is the stage of presentation of the results.
4. At the fourth stage, a general discussion is held.
5. At the fifth stage, the results are summed up [5].

Let us consider as an example the project for students of the 11th grade "Pyramid", which is a mono-project, it is practice-oriented, with open coordination, internal, group, medium duration.

The purpose of this project is to create conditions for the generalization and deepening of knowledge on the topic "Pyramid". The objectives of this project: to generalize and systematize the definitions of concepts, the properties of concepts on the topic under consideration, to compose or select tasks with practical content, and to study historical information.

Pupils work in groups: the first group collects historical facts related to the topic; the second group generalizes and systematizes the definitions and properties of concepts on the topic under consideration; the third group carries out the selection of practical problems or makes practical problems on the given topic. Then the presentation of the results of each group is carried out and the results are summed up.

As an example, consider a case that can be used in a 6th grade math lesson.

Case. A family of three (parents and a child aged five), who lives in Omsk, is planning a seaside vacation in the city of Adler. Possible travel options: by plane, by train, by car. Using the relevant sites, it is necessary to determine the cost for each option, as well as the time that will be spent on the road. What is the best travel option for this family?

Students are divided into three groups, each group considers one travel option. Time is given for discussion, ideas are put forward. Students get acquainted with the information that is presented on the sites, and choose the most profitable option for this family. The use of cases in mathematics lessons helps to increase motivation, activates the thinking of students.

Currently, the issue of using information and communication technologies in teaching mathematics in order to increase the efficiency of mastering knowledge, skills and abilities is relevant. To obtain formulations of the properties of concepts, students can independently use information technology tools to construct various graphs of functions, geometric shapes, measure the lengths of sides, degree measures of angles, and perform various calculations. This helps to save time in the lesson, the educational material becomes more visual.

In mathematics lessons, you can use the Advanced Grapher software tool, with which students can plot linear, quadratic or other functions, transform graphs, solve equations and systems of equations graphically.

Consider an example. At the stage of consolidating knowledge on the topic "Linear function", students can be asked to complete the following tasks.

Task 1. Find the intersection points of function graphs analytically and using the Advanced Grapher program: $y = x + 3$ and $y = 2x + 6$.

The result of completing the task using the Advanced Grapher program is shown in Figure 1.

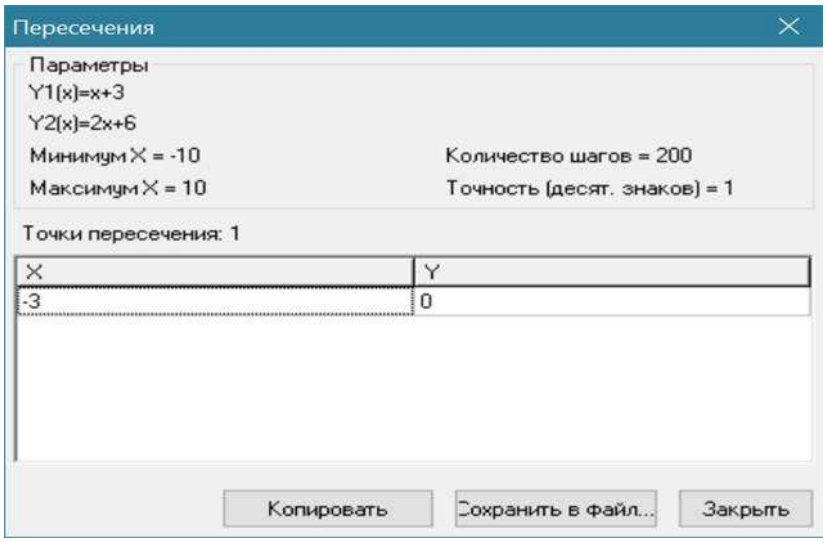

Figure. 1. The result of task 1.

Task 2. Equations of lines are given: y = 3x – 4, y = 6 – 2x, y = 2x – 2. Do these lines have a common point? The result of completing the task using the Advanced Grapher program is shown in Figure 2.

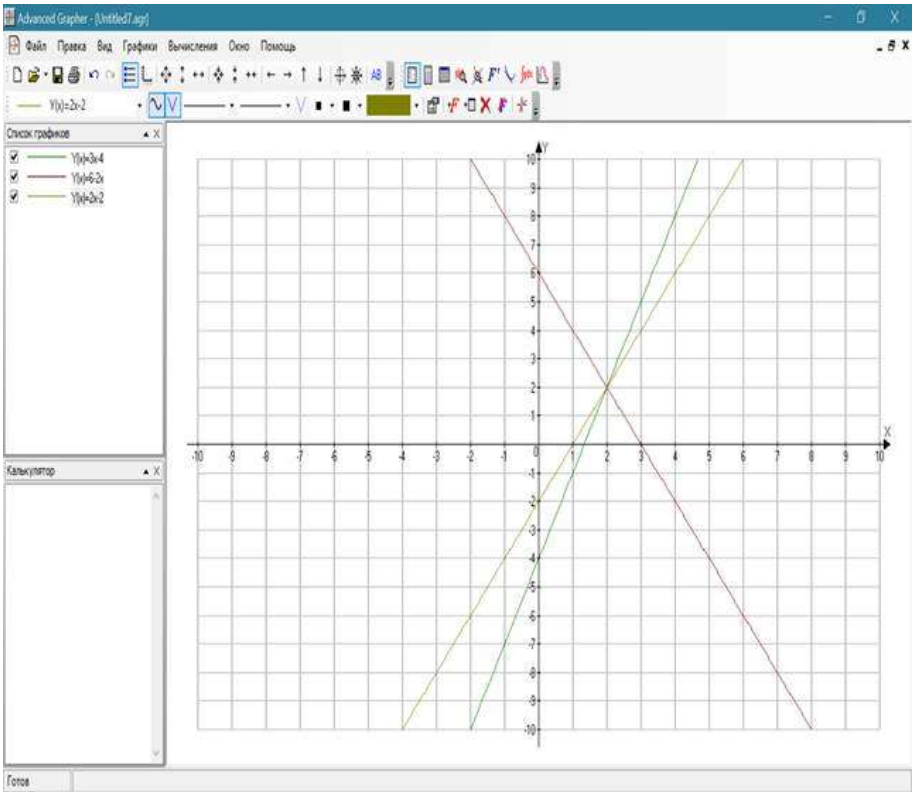

Figure. 2. The result of task 2.

When teaching geometry to students, you can use the Live Geometry software tool, with which students can build segments, circles, lines (perpendicular and parallel); measure the length of segments, degree measures of angles and perform other actions.

Thus, the use of active and interactive methods in the process of teaching mathematics contributes to the optimization of the educational process, increasing the informative capacity

of the studied material, as well as increasing the efficiency of mastering mathematical knowledge.

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