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THINKING OF STUDENTS IN THE PROCESS OF PROBLEM-SOLVING ACTIVITY FORMATION

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Annotation.

This article describes the process by which students formulate and solve problems, which is the most basic means of forming independent thinking that directs general secondary school students to acquire knowledge in order to achieve their goals. There is also information on problem-solving, checking the results, ie problem-solving, analysis of students' problem-solving activities, methods and rules of problem-solving in the development of their independent thinking.

Keywords: independent thinking, figure, body, space, plane, heuristic method, problem solving, proof.

Introduction

The main task of the school is to thoroughly equip students with the basics of science, to prepare young people for life, to consciously choose a profession. The main tasks of general secondary schools are to provide students with general secondary education that meets the modern requirements of social and scientific-technical development, to ensure that students acquire a thorough knowledge of the basics of science and be able to supplement this knowledge independently. Therefore, it is necessary to develop teaching methods that increase students' interest in learning mathematics, help them to consciously master mathematical concepts, increase their activity.

We all know well from school that geometry studies the geometric properties of flat figures or spatial objects, whereas a figure or object is understood as a set of points in a plane (or space).

The most basic means of shaping students' independent thinking, which directs students to acquire knowledge to achieve a goal, is the process by which students formulate problems

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and solve them. Usually, the new knowledge gained is expressed in the form of an issue prepared for proof.

Problem-solving is a problematic heuristic method, the main stages of which are:

1) understanding and perception of the problematic process;
2) problem statement, its analysis;
3) formulation of issues;
4) Solve a structured problem.

Here are the types of problem-solving:

1) selection of inquiries on the terms of the case;
2) selection of conditions for interrogation;
3) compose questions on pictures, stories and articles;
4) drawing up questions on the terms of the summary;
5) drawing up questions on the writing of the solution of problems;
6) drawing up issues related to specific actions or several specific actions;
7) formulation of issues similar to those given;
8) drawing up issues contrary to the data;
9) formulation of issues with the generalization of other issues;
10) composing negative questions - composing affirmative exercises.

The problem-solving process begins with the selection of the purpose and subject of the test, first of all by the need to create examples. This is followed by an analysis of emerging needs. Necessity checking is found to be interrelated with subjects. The laws of necessity are sought. The result is shaped by the appearance of an issue that needs to be proven, allowing for new knowledge to be gained. At this stage, the problem formulation is complete. It then remains to verify the results obtained, i.e. to solve the problem. The following methods and rules of problem-solving are important in the analysis of students' problem-solving activities, the development of their independent thinking

1) create proof-of-concept issues;
2) drawing up issues that are contrary to the data;

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3) drawing up questions on pictures and on the brief description of the condition;

4) formulate problems using the method of similarity.

Let's look at one of these ways of creating problems separately.

Creating proof-of-concept issues.

In general, the mechanism for formulating evidence-based issues can be formulated using the following sequence of actions:

1) selection of the subject and purpose of the issues;

2) analysis of the circumstances that give rise to the formation of problems;

3) the choice of the object of new knowledge of the subject;

4) formulate the obtained information in a way that helps to prove it;

5) solve the structured problem.

There are two ways to analyze the status of a case:

1) on the basis of constructions and measurements;

2) using logical results and conclusions of selected conditions.

In the first case, the manifestation of an idea that gives new knowledge only after proof is analyzed. In the second case, the new knowledge obtained and its validity will need additional proof, so it is also necessary to determine whether the structured problem is set correctly. In order to master the methods of constructing proof-based problems, students must have mastered the operations of thinking: analysis, synthesis, induction, deduction, comparison, determination, generalization. Students are given learning assignments to formulate the method under consideration. The purpose of giving these tasks is to understand the need to create problems, what ideas lie in the problems to be created, what theoretical materials are needed. Here are some examples of such assignments.

1) **Issue** Prove that the ratio of the smallest height in a triangle to the smallest bisector is not less than.. $\sqrt{\frac{2}{2}}$

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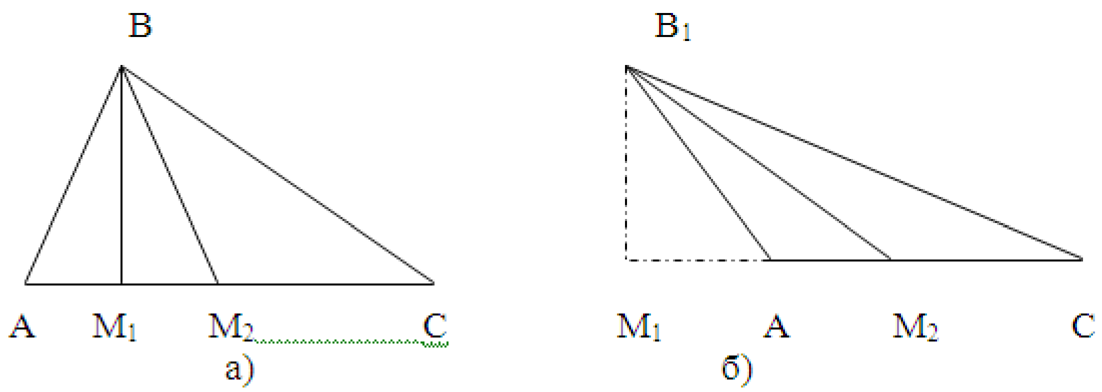
2) The object of the problem: a triangle; large angle bisector; the height lowered to the largest side; the angle between the smallest height and the smallest bisector.

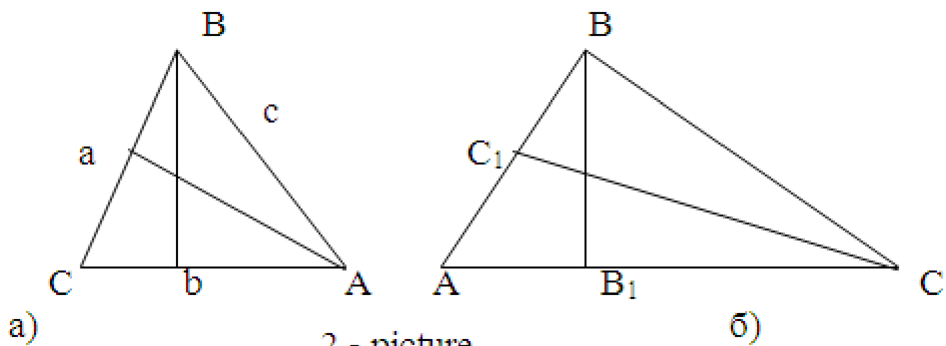


1-picture

Properties of the object:

$\angle AM_1B = \angle CM_1B = 90^0$; $\angle ABM_2 = \angle CBM_2$ (1-picture)

3) Complementary theoretical materials: AC – large side; $\angle ABC$ – largest angle; $BM_1 = h$ – minimum height; BM_2 – smallest bisector (picture 1a)



2 - picture

One of the students draws (Figure 2a).

$$S_{\Delta ABC} = \frac{1}{2} a \cdot h_a = \frac{1}{2} b \cdot h_b$$

feels that. From this $\frac{h_b}{h_a} = \frac{a}{b}$ takes place. As you know,AC>BC,

therefore $h_a > h_b$ will be. Such a natural question arises: Why (Figure 2b) is BB1 - the smallest bisector? Because in this case AB> BS can be for the triangle. If BC>AB if so $B_1C > AB_1$, will be. Known for bisectors

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$$\frac{B_1C}{B_1A}=\frac{BC}{BA}>1 \quad \text{will be.}$$

We look at both cases and establish complementary connections between them.

1-side. $\angle A=90°(½\angle B-\alpha)$, $\angle C=90°(½\angle B+\alpha)$,

$\angle A-\angle C=2\alpha$, $\alpha=½|\angle A-\angle C|$.

2-side. $\Delta BM_2A \Rightarrow ½\angle B-\alpha+\angle A=90°$ similar to being

$\Delta BM_1C \Rightarrow ½\alpha+\angle B+\angle C=90°$ stems from

If $\alpha>45°$ if so $\angle A=\angle C+2\alpha>90°$, $\angle B>\angle C>90°$ will be. Thus, two angles of a triangle cannot be greater than 90% at the same time (Fig. 1b).

Thus, the given problem can be constructed as follows: Prove that the angle between the height and the bisector of any triangle is equal to half the difference of the angles adjacent to the largest side.

After solving this problem, the process of solving the next more complex generalized problem will be easier in class or in extracurricular activities.

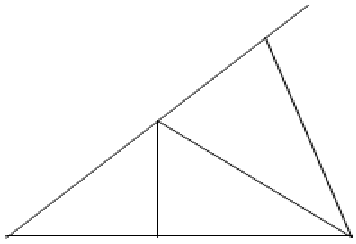
For example: Prove that the bisector passing through the large side of any triangle is not greater than the height drawn on its smaller side.

Proof. While completing the drawing, students move on to the discussion. To prove what is required $h \geq \ell$ In this case, you need to prove that ℓ=CL, h=AD. How can this be proved?

One of the students is from the drawing ABC in a triangle $\angle BAC$ – says it will be the largest angle.. AC > BC get

Let's assume ΔABC in AD – let the height be lowered to the BC side, and CL AB let the bisector transferred to the side. BC=a,

AC=b get



3 - picture

In this case b≥a, AD=h, CL=ℓ, ∠ACB=2φ.

One of the students suggests finding the face of a triangle as follows.

$$\frac{1}{2}a\cdot h = S_{\Delta ABC} = S_{\Delta ACL} + S_{\Delta BCL} = \frac{1}{2}AC\cdot CL\sin\varphi + \frac{1}{2}BC\cdot CL\sin\varphi = \frac{1}{2}b\ell\cdot\sin\varphi + \frac{1}{2}a\ell\sin\varphi$$

The recommendation is acceptable because the reader saw that it was possible to pave the way for the next consideration. Now many students in the class

$$h = \ell\cdot\frac{a+b}{a}\sin\varphi \geq \ell\cdot\frac{a+a}{a}\cdot\sin\varphi = 2\ell\sin\varphi$$

they see that. According to the terms of the case ∠ABC=2φ<180° and the largest angle of the triangle. In this case 180°>2φ≥60°, 90°>φ≥30°. From this $\sin\varphi \geq \sin 30° = \frac{1}{2}$ stems from.

Therefore h ≥ 2ℓ sinφ ≥ 2ℓ · ½ =ℓ, that is h ≥ ℓ. That was to be proved.

By gradually complicating such a series of issues, it is possible to develop the ability to get a number of results faster from students. Works with such content arouse students' interest in mathematics.

References

1. Ikramov J., Levenburg L. "Activation of students' learning activities in mathematics lessons" T .: "Teacher" - 1988, 192 p.

2. Pogorelov A.V. Resheniya and otvet. Geometry. 8 klass. To uchebniku A. V. Pogorelova "Geometry. 7-11 klass". Date of issue: 2002 Publishing house: «AST, Olimp», 154 pages.