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GEOMETRICAL INEQUALITIES

Studying mathematics we often deal with solving of inequalities. One of the most difficult types of inequalities is geometrical.

The topicality of the paper is due to the fact that a theme "Geometrical inequalities" has no large theoretical base, but has the applied character. Solving of tasks in geometrical inequalities needs neither complex mathematical knowledge, nor difficult technique, but it requires creative and logical thinking. Geometrical inequalities deal with non-standard tasks, which are useful because they do not contain a unified solution algorithm, they always need search of new approaches, that stimulate students' cognitive interest.

Therefore geometrical inequalities are the subject of this research.

Let's consider some methods, which can be applied at inequalities proving that are related to the figures on a plane.

- Triangle inequality

It is known that for three arbitrary points of A, B and C inequality is executed (inequality is strict, if a point does not lie between two other points). As a result, the length of the broken line is not more than the distance between its ends. These elementary reasonings often turn to be key ones while proving inequalities for distances [2, p.85].

Example 1.

Task. In the triangle lengths of two sides are equal accordingly 3,14 and 0,67. Find length of the third side, if it is known that it is expressed by an integer.

Solving. If this length equals a, then a<3,14 + 0,67 and a>3,14-0,67. So, a=3. [1].

- Vectorial method

Sometimes inequality grounding for distances is comfortable to conduct, using vectors. The vectorial analogue of triangle inequality can be used. Thus: $\left|\vec{a}+\vec{b}\right| \le |\vec{a}| + \left|\vec{b}\right|$. In a vectorial type triangle inequality can be formulated like this: sum of vectors length does not exceed the sum of their lengths [2, p.87-88].

Example 2.

Task. Two segments of AB and CD are given on a plane. Prove that length of the segment, which connects their midpoints, does not exceed half-sum of lengths of AC and BD segments.

Solving. The points of K and L are the midpoints of AB and CD accordingly (Fig. 1).

The vectorial equalities are executed: $\overrightarrow{KL} = \overrightarrow{KB} + \overrightarrow{BC} + \overrightarrow{CL}$ and $\overrightarrow{KL} = \overrightarrow{KA} + \overrightarrow{AD} + \overrightarrow{DL}$. By adding them, we get equality $2\overrightarrow{KL} = \overrightarrow{BC} + \overrightarrow{AD}$, from where passing to vectors lengths, we obtain $2|\overrightarrow{KL}| \leq |\overrightarrow{BC}| + |\overrightarrow{AD}|$. This proves the statement set in the task. Sign of equality is possible if $BC \| AD$, i.e. when the set quadrangle is a trapezoid or parallelogram.

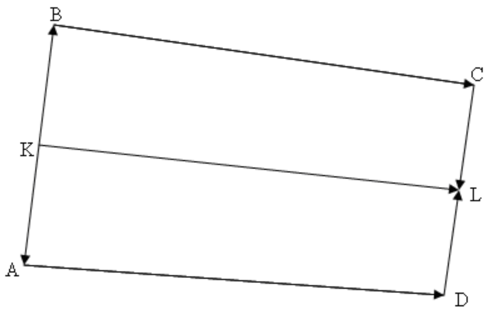

Рис.1

Thus, the paper studies two methods that can be applied at proving of inequalities related to the figures on a plane. The perspective of the further work is studying other methods of inequalities proof.

LITERATURE

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