

**Russian Teachers' Geometry Olympiad from the Republic of Adygea**

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by parmenides51

- 1 In planimetry, criteria of congruence of triangles with two sides and a larger angle, with two sides and the median drawn to the third side are known. Is it true that two triangles are congruent if they have two sides equal and the height drawn to the third side?

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- 2 The square  $ABCD$  is inscribed in a circle. Points  $E$  and  $F$  are located on the side of the square, and points  $G$  and  $H$  are located on the smaller arc  $AB$  of the circle so that the  $EF GH$  is a square. Find the area ratio of these squares.

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- 3 Is it true that of the four heights of an arbitrary tetrahedron, three can be selected from which a triangle can be made?

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- 4 A circle is inscribed in an angle with vertex  $O$ , touching its sides at points  $M$  and  $N$ . On an arc  $MN$  nearest to point  $O$ , an arbitrary point  $P$  is selected. At point  $P$ , a tangent is drawn to the circle  $P$ , intersecting the sides of the angle at points  $A$  and  $B$ . Prove that that the length of the segment  $AB$  is the smallest when  $P$  is its midpoint.