

Two interesting triangle geometrical problems

Vladimir Baltić

*ATUSS – VIŠER, School of Electrical and Computer Engineering, Belgrade, Vojvode Stepe 283
e-mail: balticvladimir@gmail.com*

Predrag Vilotić

*School of Electrical Engineering, Belgrade, Bulevar kralja Aleksandra 73
e-mail: viloticpedja@yahoo.com*

Abstract. First problem statement: Let ABC be the triangle with angle at the vertex A equal to 60° . Let H be the orthocenter of that triangle, P and Q centers of length BH and CH , respectively, M the intersection of the normal on BH at point P with line AB and N intersection of the normal on CH at point Q with line AC . Prove that the points M, H, N, O belongs to the same line.

Second problem statement: The bisector of the interior angle at vertex A of triangle ABC intersects BC at point D . If $AD = AB$ and AD is perpendicular to OH , where O is the centre of the circumscribed circle and H is the orthocentre of that triangle, calculate triangle angles.

Both problems were on Serbian mathematical competitions, and appeared to be not so easy but with nice pure geometrical solutions. In solutions we used simple geometrical properties: triangle congruencies, central and peripheral angle in the circle, simple angle chase, bisector of isosceles triangle.

Keywords: triangle, orthocenter, bisector, circumscribed circle.

References

- [1] **V. Dragović, Dj. Dugošija, P. Mladenović.** The republic and federal competitions 1990–2001. *Serbian mathematical society*, 2002.
- [2] **A. Pejčev.** Circle – preparing materials for high school competitions. 2023.