

Power Question #2

by Titu Andreescu

Illinois Mathematics and Science Academy

Let K_{XYZ} be the area of triangle XYZ .

I. Determine the locus of points, M , in plane ABC , such that $K_{MAB} = K_{MAC}$.

II. For what points, N , lying in this plane:

$$K_{NAB} = K_{NAC} = K_{NBC} \quad ?$$

III. Triangles PAB , PAC , PBC have the same perimeter and the same area.

Prove that:

- a) If P is in the interior of triangle ABC , then ABC is equilateral.
- b) If P is not in the interior of ABC , then ABC is a right triangle.

Possible extensions in the three-dimensional space. 🍷