

4th series

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Problem G4. Let M be an arbitrary point on the side BC of a triangle ABC . Let k be the circle that touches lines AB, BM and the circumcircle of triangle AMC at points T, K and P , respectively. Prove that if $TK \parallel AM$, then the circumcircles of APT and KPC are tangent to each other.

Problem N4. Find all pairs of integers (x, y) such that

$$x^6 + x^3y = y^3 + 2y^2.$$

Problem C4. Find all real numbers $k \geq 1$, for which we cannot divide the rectangle $k \times 1$ into two similar non-congruent polygons.

Problem A4. A polynomial $P(x)$ of degree n with real coefficients has n distinct real roots. What is the maximum number of its coefficients which can be equal to zero?