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by ATimo, parmenides51

P1 ABC is a triangle with $A=90$ and $C=30$. Let M be the midpoint of BC . Let W be a circle passing through A tangent in M to BC . Let P be the circumcircle of ABC . W is intersecting AC in N and P in M . prove that MN is perpendicular to BC .

P2 The inscribed circle of $\triangle ABC$ touches BC, AC and AB at D, E and F respectively. Denote the perpendicular feet from F, E to BC by K, L respectively. Let the second intersection of these perpendiculars with the incircle be M, N respectively. Show that $\frac{S_{\triangle BMD}}{S_{\triangle CND}} = \frac{DK}{DL}$

by Mahdi Etesami Fard

P3 Each of Mahdi and Morteza has drawn an inscribed 93-gon. Denote the first one by $A_1A_2A_{93}$ and the second by $B_1B_2B_{93}$. It is known that $A_iA_{i+1} // B_iB_{i+1}$ for $1 \leq i \leq 93$ ($A_{93} = A_1, B_{93} = B_1$). Show that $\frac{A_iA_{i+1}}{B_iB_{i+1}}$ is a constant number independent of i .

by Morteza Saghafian

P4 In a triangle ABC we have $\angle C = \angle A + 90^\circ$. The point D on the continuation of BC is given such that $AC = AD$. A point E in the side of BC in which A doesn't lie is chosen such that $\angle EBC = \angle A, \angle EDC = \frac{1}{2}\angle A$. Prove that $\angle CED = \angle ABC$.

by Morteza Saghafian

P5 Two points X, Y lie on the arc BC of the circumcircle of $\triangle ABC$ (this arc does not contain A) such that $\angle BAX = \angle CAY$. Let M denotes the midpoint of the chord AX . Show that $BM + CM > AY$.

by Mahan Tajrobekar