

1. Let the inscribed circle c of $\triangle ABC$ meet BC at the point D . Let the *escribed* circle, which touches BC and the extensions of the sides AB and AC meet BC at the point E . Prove that AE meets c at a point D_1 diametrically opposite to D .

2. On the sides of arbitrary triangle $\triangle ABC$, exterior to it, are constructed equilateral triangles $\triangle ABC_1$, $\triangle AB_1C$ and $\triangle A_1BC$. Prove that:

- a) $|AA_1| = |BB_1| = |CC_1|$.
- b) AA_1 , BB_1 and CC_1 intersect in one point.
- c) The centers O_1 , O_2 and O_3 of $\triangle ABC_1$, $\triangle AB_1C$ and $\triangle A_1BC$ form the vertices of an equilateral triangle.