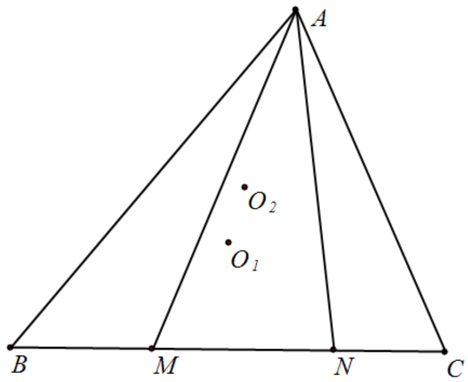
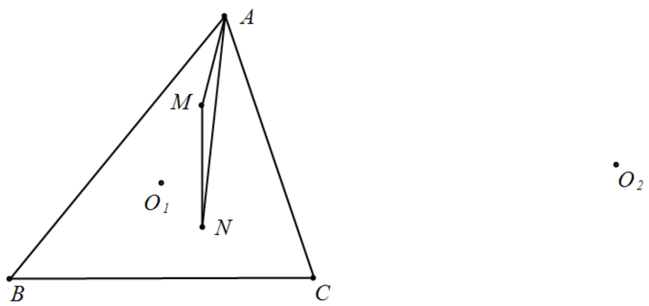


figure 1

Example 99 : As shown in Figure 1 , in the acute angle $\triangle ABC$, $AB > AC$, M, N are two different points on the side of BC, *so that* $\angle BAM = \angle CAN$. Let the circumcenters of $\triangle ABC$ and $\triangle AMN$ be O_1, O_2 respectively , to prove: O_1, O_2, A three points are collinear. (Additional test questions for the 2012 National High School Mathematics League)

$$\frac{A-O_1}{A-O_2}=\frac{\frac{A-C}{A-N}}{\frac{A-M}{A-B}}\left(\frac{C-B}{C-A}\frac{A-O_1}{A-B}\right)/\left(\frac{N-M}{N-A}\frac{A-O_2}{A-M}\right)\frac{M-N}{B-C},$$



As shown in Figure 2 , in the acute angle $\triangle ABC$, $AB >$ AC, M, N are two points inside $\triangle ABC$, so that $\angle BAM = \angle CAN$ and $MN \perp BC$. Let the circumcenters of $\triangle ABC$ and $\triangle AMN$ *be* O_1, O_2 respectively , Prove: $AO_1 \perp AO_2$.

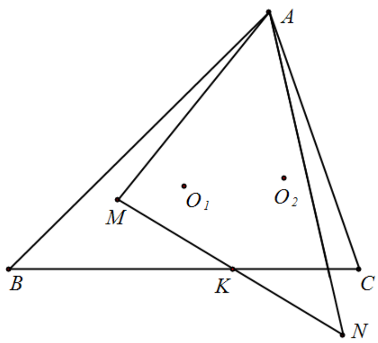


Figure 3