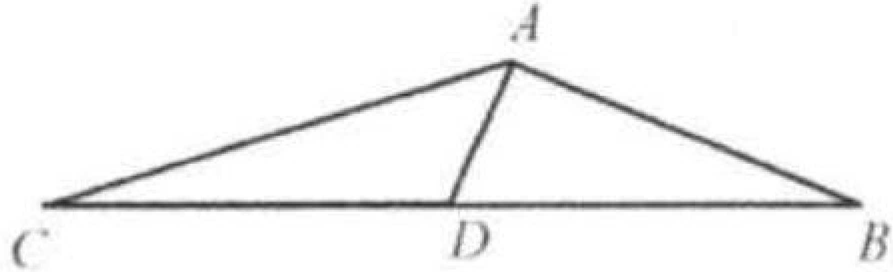
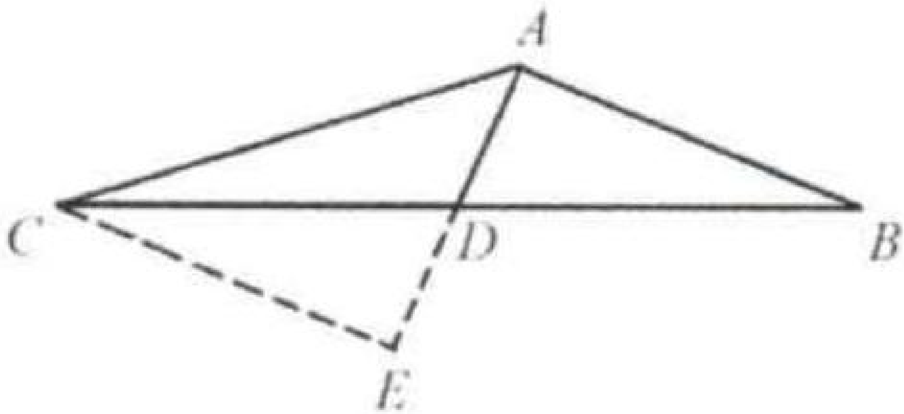
Problem

In $\triangle ABC, \angle BAD = 90°. \angle DAC = 45°. AD$ is the median. Prove: $AB = 2AD$.



Solution

Extend AD to E such that $AD = DE$.
Connect CE.
Since $DE = AD, \angle CDE = \angle BDA. CD = DB$.
Thus $\triangle CDE \cong \triangle BDA, CE = AB$, and $\angle E = \angle DAB = 90°$.
Since $\angle CAD = 45°$, in right triangle $AEC, \angle ACE = 45°$.



Thus, $CE = AE = 2AD$.
Since $CE = AB, AB = 2AD$.