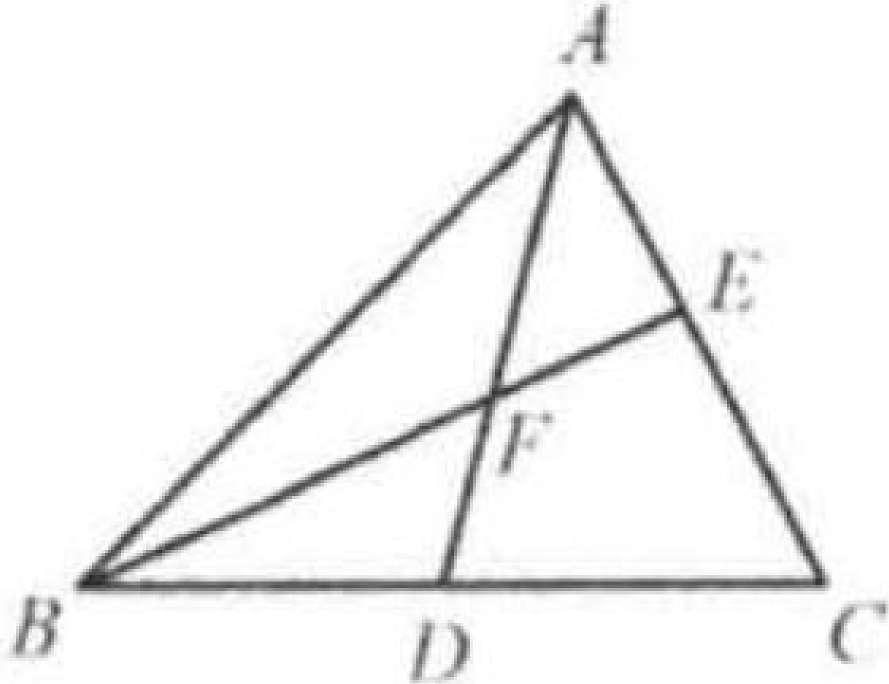
Example 6

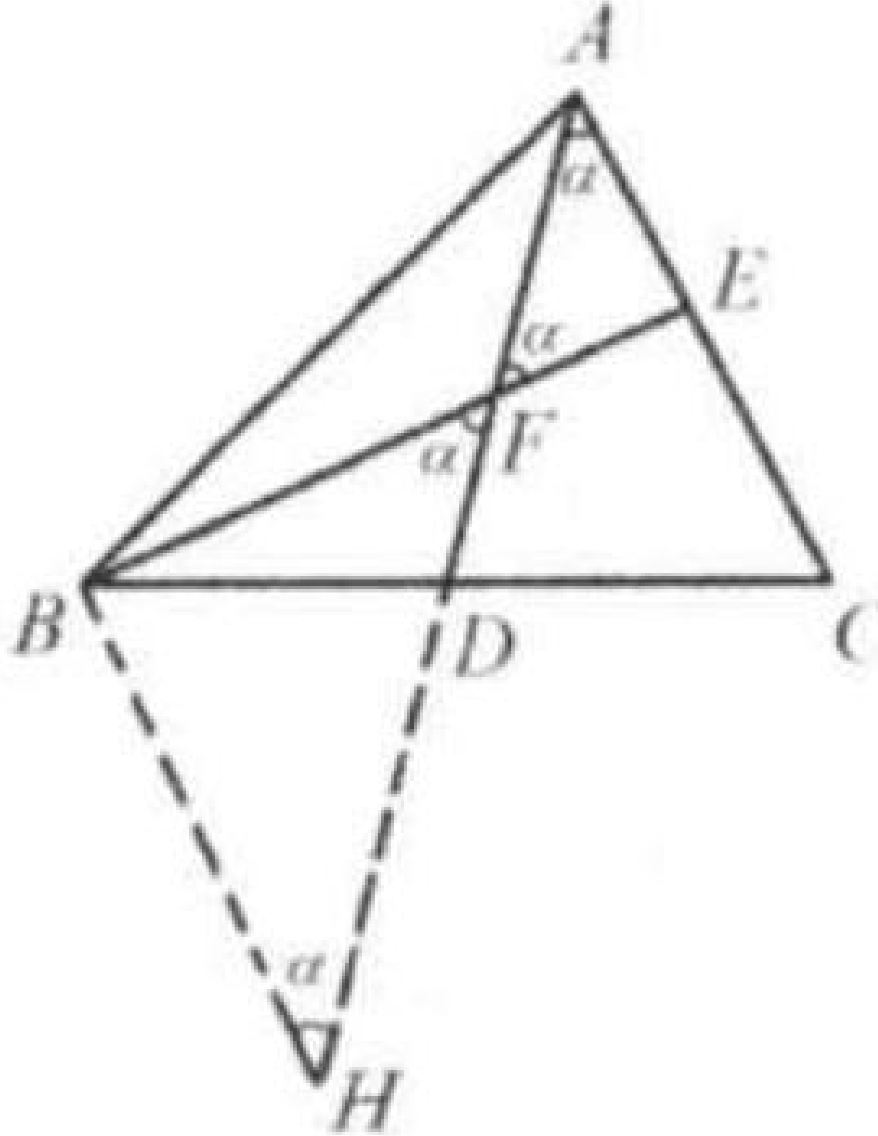
In $\triangle ABC, AD$ is the median. BE and AC meet at $E.BE$ and AD meet at F. If $AE = EF$, show that $AC = BF$.

Proof: Extend AD to H such that $DH = AD$.



Since $BD = CD$ and $\angle BDH = \angle ADC$, then $\triangle ACD \cong \triangle HBD$, $AC = BH$, and $\angle DAC = \angle H = \alpha$.

We are given that $AE = EF$, so $\angle AFE = \angle EAF = \angle BFH = \alpha$. Therefore in $\triangle BFH, BF = BH = AC$.


A
α
E
α
F
α
B
D
C
α
H