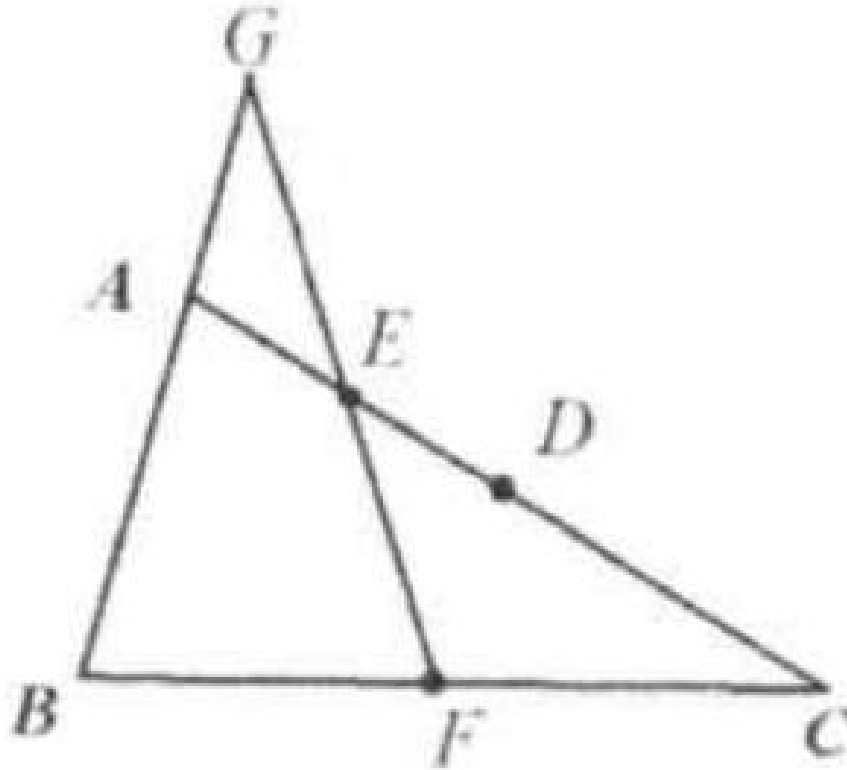


Problem 6

Problem

In $\triangle ABC$, $AC > AB$. D is on AC such that $CD = AB$. E and F are the midpoints of AD , BC , respectively. Connect EF and extend it to meet the extension of BA at G . Prove: $AE = AG$.



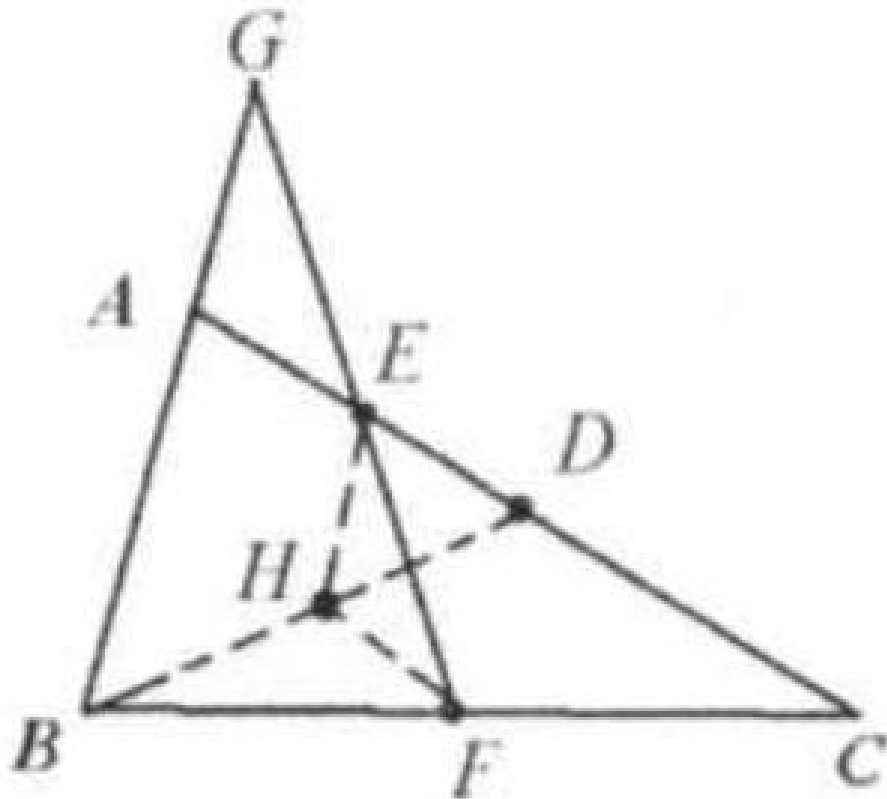
Solution

Take H , the midpoint of BD .
Connect EH , FH .

Since E and H are midpoints of AD, BD , respectively, by Theorem 2.1, $EH \parallel$

$$AB, EH = \frac{1}{2}AB$$

Since F and H are midpoints of BC, BD , respectively, by Theorem 2.1, $HF \parallel CD, HF = \frac{1}{2}DC$



Since $CD = AB, EH = HF. \angle HEF = \angle HFE$.
 Since $KF \parallel AC, \angle AEG = \angle KFG$ or $\angle AEG = \angle HFE$.
 Since $EH \parallel GK, \angle G = \angle HEF$
 Thus $\angle G = \angle AEG, AE = AG$.