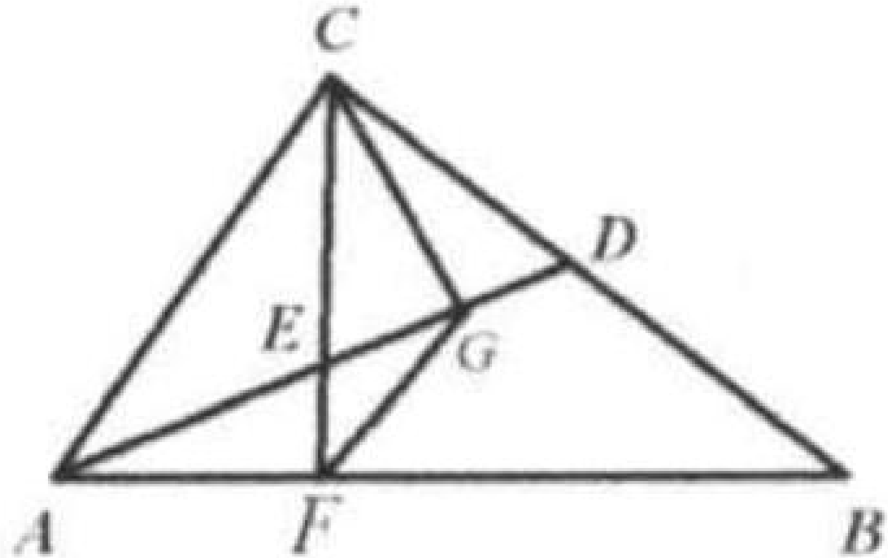
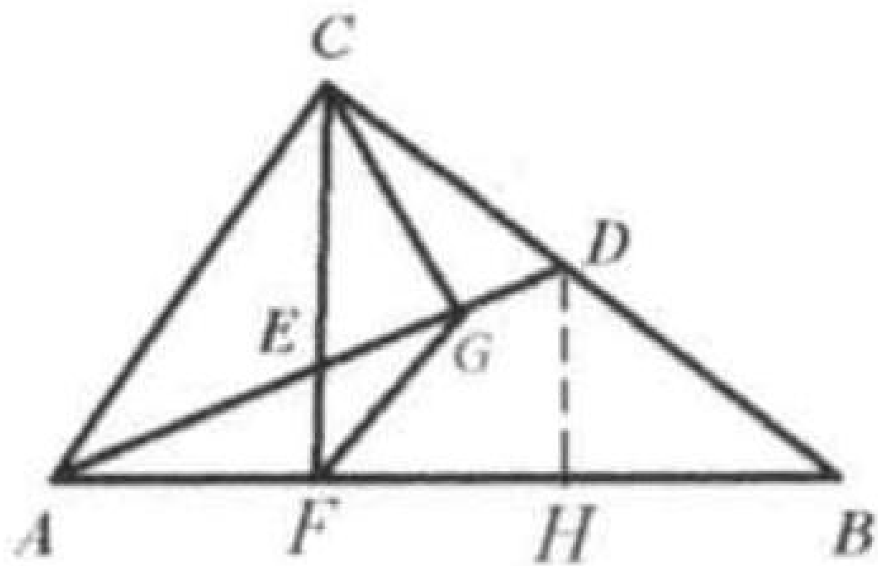
Example 9

In $\triangle ABC, \angle ACB = 90° D$ is the midpoint of BC. E is the midpoint of AD. Extend CE to meet AB at $F.FG//AC$ and meet AD at G.. Prove: $FB = 2CG$.
Solution: Take H, the midpoint of BF.



Connect DH.
Since point D is the midpoint of BC, by Theorem 2.1, $DH//CF//EF$. Since E is the midpoint of AD, by
Theorem 2.2. F is the midpoint of AH.
So $AF = FH = HB$.
Note that CE is the median of right triangle ACD. So CE



$= AE$.

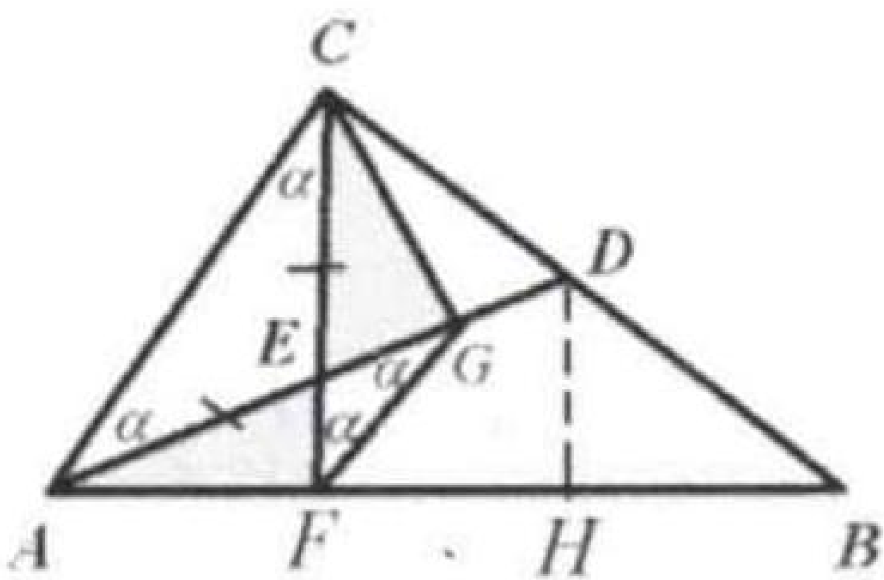
Therefore, $\triangle AEC$ is an isosceles triangle with

$\angle ACE = \angle CAE = \alpha$.

Since $FG//AC, \angle GFE = \angle ACE = \alpha$.

$\angle FGE = \angle CAE = \alpha$.

Therefore, $\triangle FGE$ is an isosceles triangle with $EG = EF$.



We also know that $\angle AEF = \angle CEG$.

Thus $\triangle AEF \cong \triangle CEG$. $CG = AF = FH = HB$, or $FB = 2CG$.