Example 5
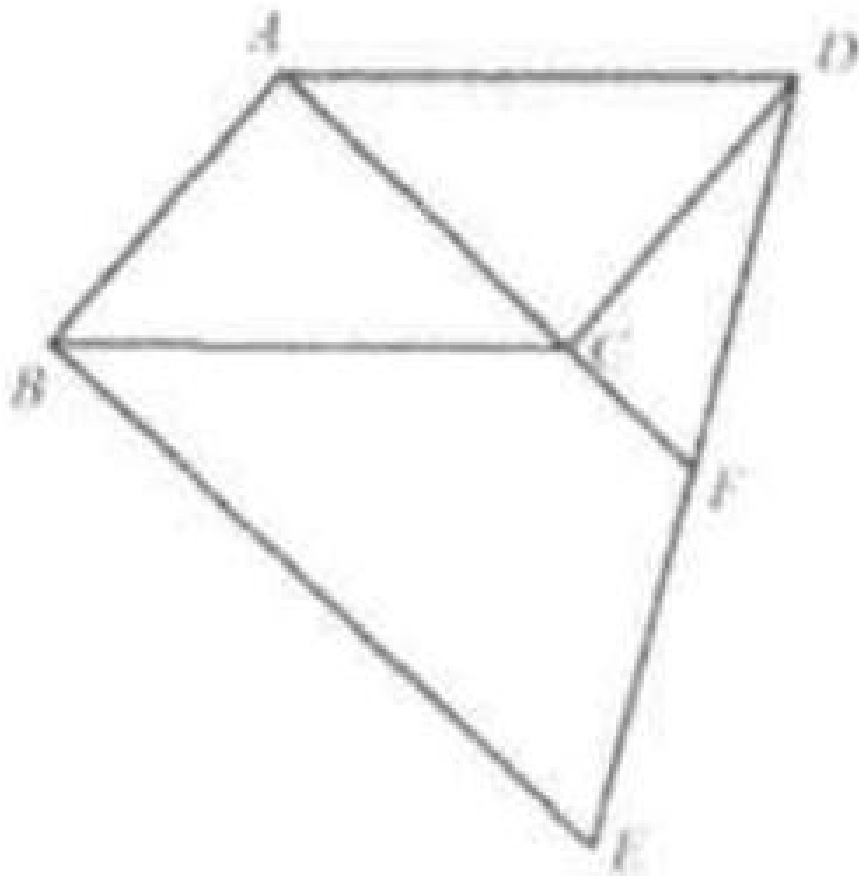
As shown in the figure, $ABCD$ is a parallelogram with $AC//BE.DE$ meets the extension of AC at F; meets BE at E. Prove: $DF = $ FE.
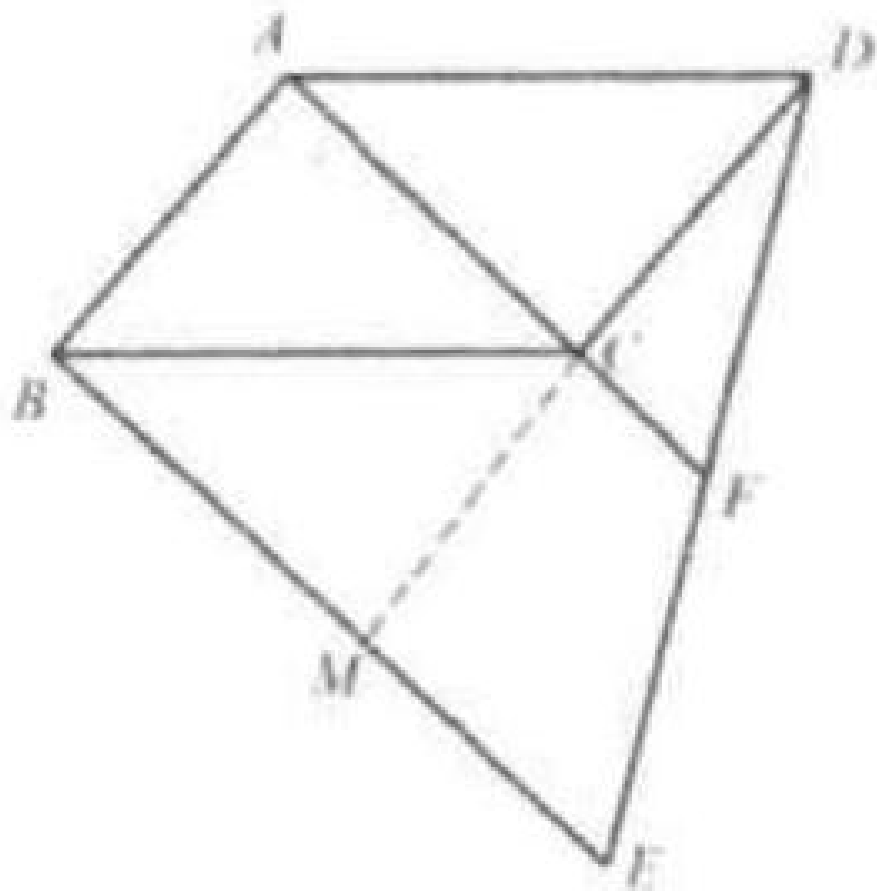
Solution: Extend DC to meet AE at M.

Since $AB//DC, AB//CM$.
We know that $AC//BE$, so $AC//BM$.
Therefore, $ABMC$ is a parallelogram with $AB = CM$.
Since $ABCD$ is a parallelogram, $AB = CD$.
Thus $DC = CM$ and C is the midpoint of DM.

Since $CF // ME$, it divides the line segment DE such that $DF = FE$.