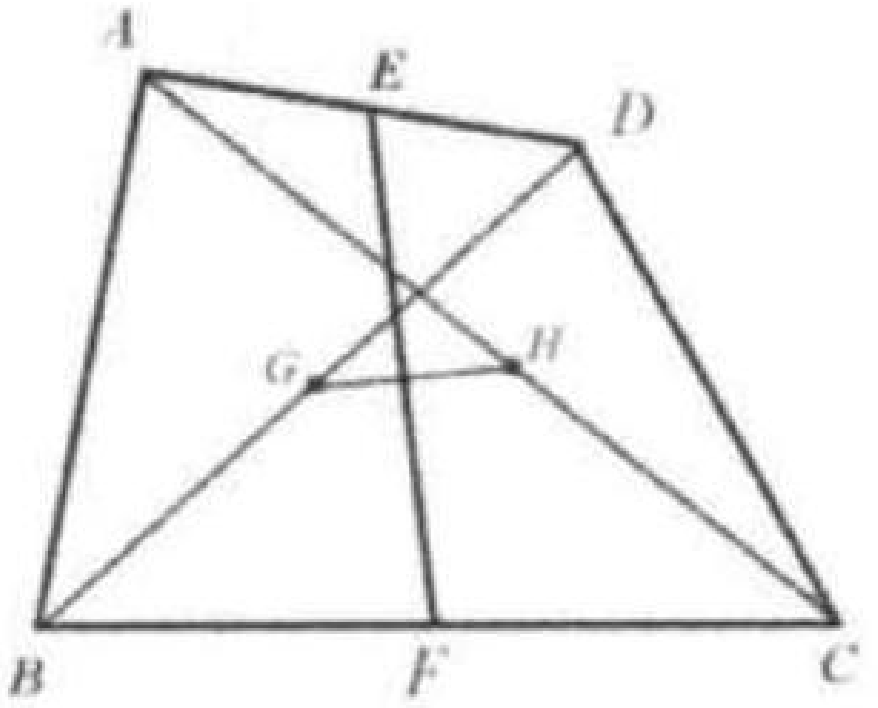
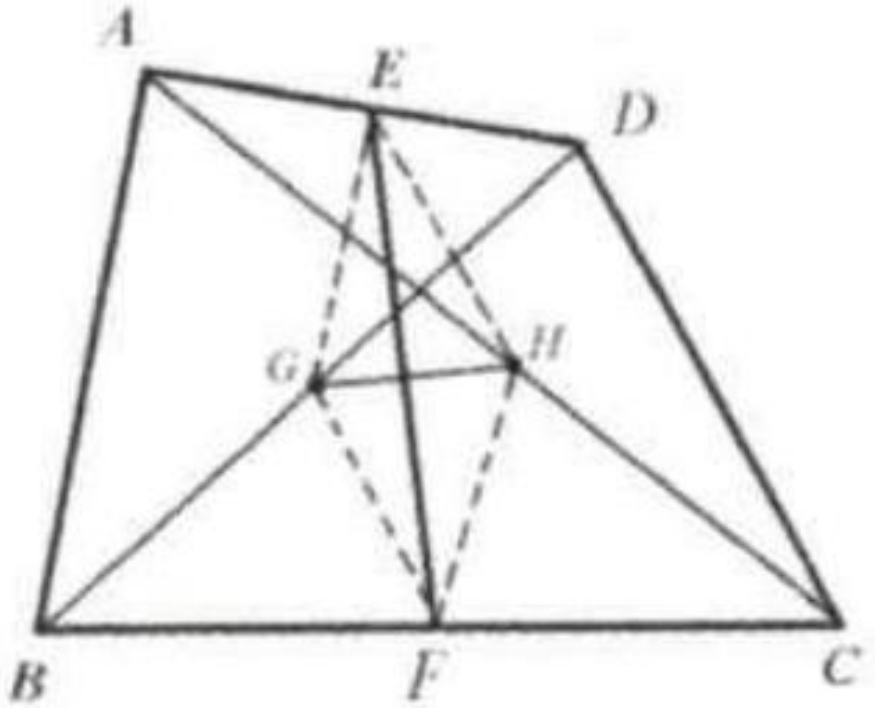
Example 11

$ABCD$ is a convex quadrilateral. E and F are midpoints of AD, BC, respectively. G and H are midpoints of diagonals BD, AC, respectively. Show that EF and GH bisect each other.

Solution: Connect the midpoints of EG, and HF, respectively.



By Theorem 2.1, in triangle $ABD, EG//AB, EG = \frac{1}{2}AB$, and in triangle $ABC, HF//AB, HF = \frac{1}{2}AB$.
Thus $EG//HF$ and $EG = HF$.
So $EGFH$ is a parallelogram. EF and GH bisect each other.


A
E
D
G
H
B
F
C