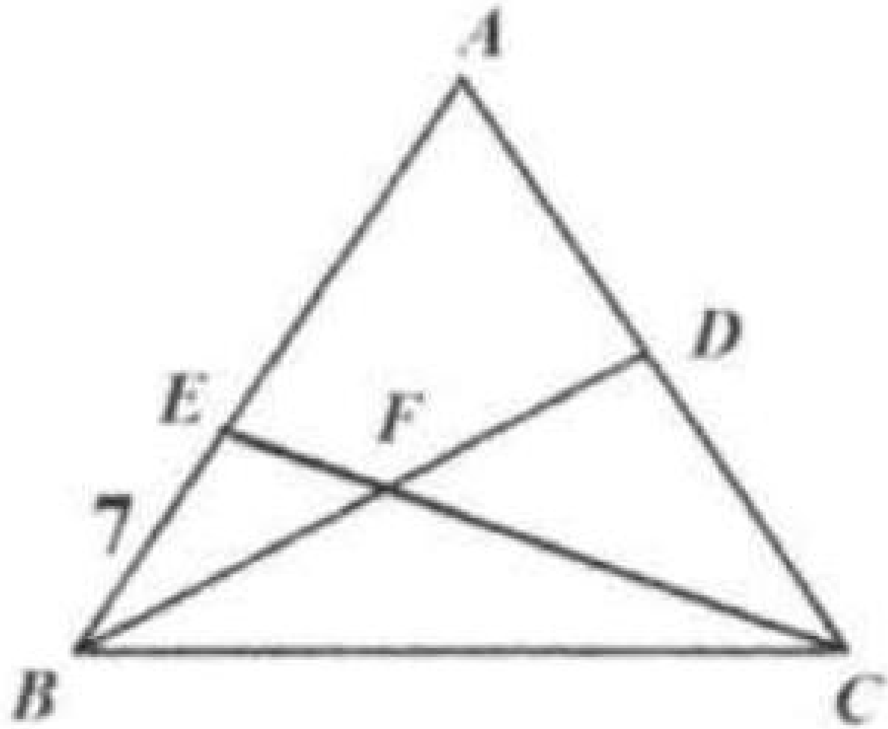
Problem

As shown in the figure, BD is a median of triangle ABC. E is a point on AB such that CE bisects BD at F. Find AB if $BE = 7$.

(A) 14
(B) 22
(C) 21
(D) 24
(E) 25

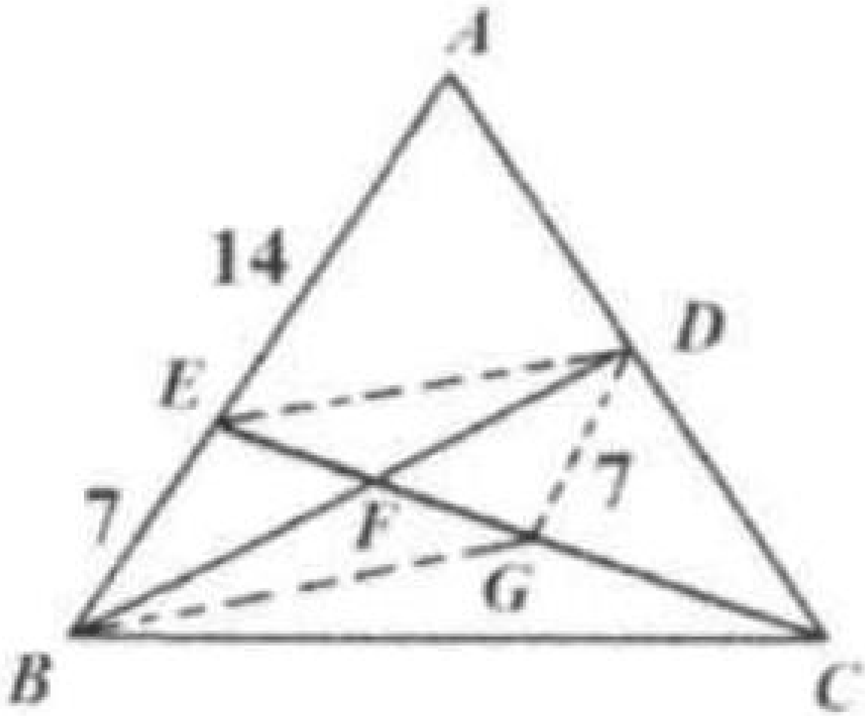


Solution

(C).

Method 1:

Pick up a point G on CF such that $EF = FG$. Connect ED, GD, and BG. Since the two diagonals of the quadrilateral $BGDE$ bisect each other, $BGDE$ is a parallelogram. It

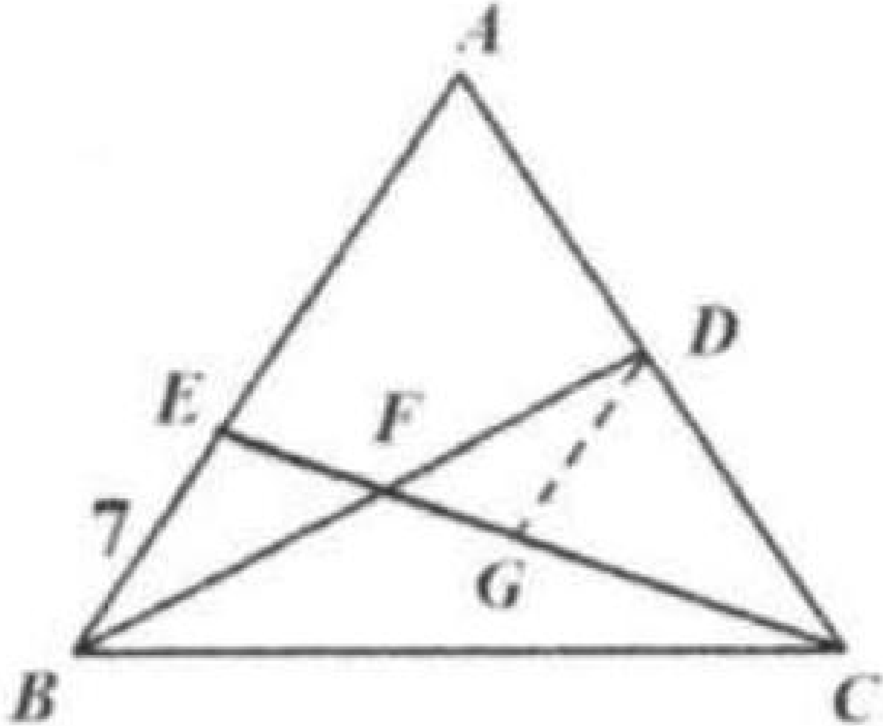


follows that $DG//BE//AB$. Since D is the midpoint of AC, G is the midpoint of CE. So $DG = 7, AE = 2 \times 7 = 14. AB = 7 + 14 = 21$.

Method 2:

Draw a parallel line to AB through D to meet EC at G . $\triangle BEF$ is congruent to $\triangle DGF(\angle EBF = \angle FDG, \angle EFB = \angle DFG, BF = FD\ )$.

So DG = BE = 7. Since $DG//BE//AB$ and D is the



midpoint of AC, G is the midpoint of CE. So $2DG = AE$.
$AE = 2 \times 7 = 14. AB = 7 + 14 = 21$.