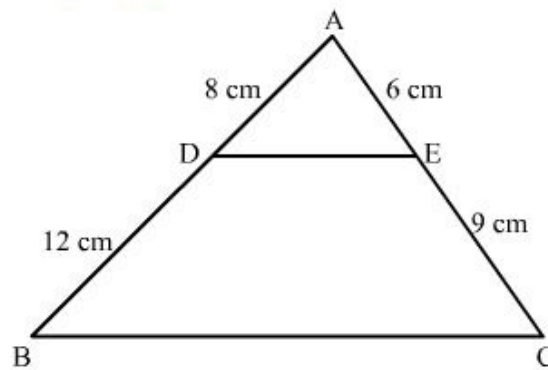




Triangles Ex 4.5 Q13

Answer :

It is given that $AD = 8\text{ cm}$, $DB = 12\text{ cm}$, $AE = 6\text{ cm}$ and $CE = 9\text{ cm}$.



We have to prove that $BC = \frac{5}{2} DE$

Since clearly $\frac{AD}{AB} = \frac{AE}{AC} = \frac{2}{5}$

Also, $\angle A$ is common in $\triangle ABC$ and $\triangle ADE$

So $\triangle ADE \sim \triangle ABC$ (SAS Similarity)

$$\Rightarrow \frac{BC}{DE} = \frac{AB}{AD}$$

$$\Rightarrow \frac{BC}{DE} = \frac{1}{\left(\frac{AD}{AB}\right)}$$

$$\Rightarrow \frac{BC}{DE} = \frac{1}{\left(\frac{2}{5}\right)} \qquad \left(\frac{AD}{AB} = \frac{2}{5}\right)$$

$$\Rightarrow \frac{BC}{DE} = \frac{5}{2}$$

$$\Rightarrow \boxed{BC = \frac{5}{2} DE}$$

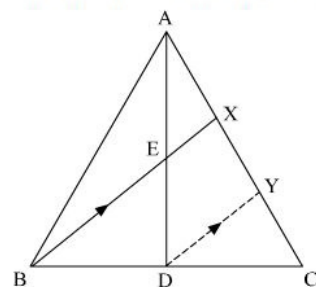
Triangles Ex 4.5 Q14

Answer :

Given: ABC is a triangle in which D is the mid point of BC, E is the mid point of AD. BE produced meets AC at X.

To Prove: BE : EX = 3:1.

Construction: We draw a line DY parallel to BX.



Proof:

In $\triangle BCX$ and $\triangle DCY$,

$\angle CBX = \angle CDY$ (Corresponding angles)

$\angle CXB = \angle CYD$ (Corresponding angles)

$\triangle BCX \sim \triangle DCY$ (AA similarity)

We know that corresponding sides of similar triangles are proportional.

Thus, $\frac{BC}{DC} = \frac{BX}{DY} = \frac{CX}{CY}$

$$\Rightarrow \frac{BX}{DY} = \frac{BC}{DC}$$

$$\Rightarrow \frac{BX}{DY} = \frac{2DC}{DC} \quad (\text{As D is the mid point of BC})$$

$$\Rightarrow \frac{BX}{DY} = \frac{2}{1} \quad \dots (1)$$

In $\triangle AEX$ and $\triangle ADY$,

$\angle AEX = \angle ADY$ (Corresponding angles)

$\angle AXE = \angle AYD$ (Corresponding angles)

$\triangle AEX \sim \triangle ADY$ (AA similarity)

We know that corresponding sides of similar triangles are proportional.

Thus, $\frac{AE}{AD} = \frac{EX}{DY} = \frac{AX}{AY}$

$$\Rightarrow \frac{EX}{DY} = \frac{AE}{AD}$$

$$\Rightarrow \frac{EX}{DY} = \frac{AE}{2AE} \quad (\text{As D is the mid point of BC})$$

$$\Rightarrow \frac{EX}{DY} = \frac{1}{2} \quad \dots (2)$$

Dividing (1) by (2), we get

$$\frac{BX}{EX} = 4$$

$$\Rightarrow BX = 4EX$$

$$\Rightarrow BE + EX = 4EX$$

$$\Rightarrow BE = 3EX$$

$$\Rightarrow BE : EX = 3 : 1$$

***** END *****