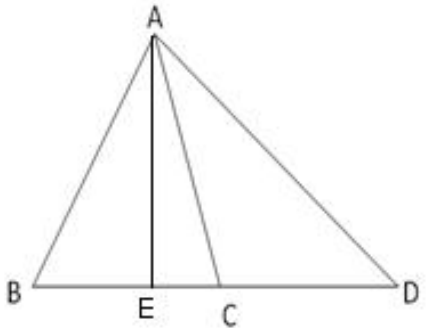
Exercise 4D

Question 18:



Const: Draw a perpendicular AE from A

Thus, $AE \perp BC$

Proof:

In ΔABC, $AB = AC$

And AE is a bisector of BC

Then, $BE = EC$

In right angle triangles ΔAED and ΔACE

$$AD^2 = AE^2 + DE^2 \quad ---(1)$$

$$AC^2 = AE^2 + CE^2 \quad ---(2)$$

Subtracting (2) from (1),

$$\Rightarrow (AD^2 - AC^2) = DE^2 - CE^2$$

$$\Rightarrow AD^2 - AC^2 = (DE + CE)(DE - CE)$$

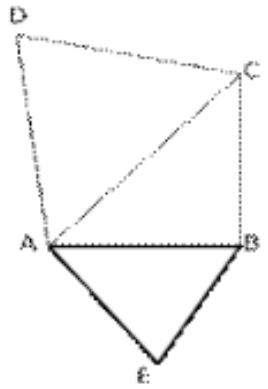
$$= (DE + BE)(DE - CE)[\because CE = BE]$$

$$\Rightarrow AD^2 - AC^2 = BD \times CD$$

Hence proved.

Question 19:

Let AB = BC = x cm



By Pythagoras theorem,

$$AC^2 = AB^2 + BC^2$$

$$= x^2 + x^2$$

$$AC^2 = 2x^2$$

$$AC = \sqrt{2}x$$

$\Delta ACD \approx \Delta ABE$ (Given)

$$\therefore \quad \frac{ar\Delta ABE}{ar\Delta ACD} = \frac{AB^2}{AC^2} = \frac{x^2}{(\sqrt{2}x)^2}$$

$$= \frac{x^2}{2x^2} = \frac{1}{2} = 1:2$$

********** END **********