



Triangles Ex 4.6 Q16

Answer :

Given: The area of two similar $\triangle ABC = 20\text{cm}^2$, $\triangle DEF = 45\text{cm}^2$ respectively and $AB = 5\text{cm}$.

To find: measure of DE

We know that the ratio of areas of two similar triangles is equal to the ratio of squares of their corresponding sides.

$$\frac{\text{ar}(\triangle ABC)}{\text{ar}(\triangle DEF)} = \left(\frac{AB}{DE}\right)^2$$

$$\frac{20}{45} = \left(\frac{5}{DE}\right)^2$$

$$\frac{20}{45} = \frac{25}{DE^2}$$

$$DE^2 = \frac{25 \times 45}{20}$$

$$DE^2 = \frac{225}{4}$$

$$DE = 7.5 \text{ cm}$$

Triangles Ex 4.6 Q17

Answer :

Given: In $\triangle ABC$, PQ is a line segment intersecting AB at P , and AC at Q such that $PQ \parallel BC$ and PQ divides $\triangle ABC$ in two parts equal in area.

To find: $\frac{BP}{AB}$

We have $PQ \parallel BC$

And

$$\text{Ar}(\triangle APQ) = \text{Ar}(\text{quad BPQC})$$

$$\text{Ar}(\triangle APQ) + \text{Ar}(\triangle APQ) = \text{Ar}(\text{quad BPQC}) + \text{Ar}(\triangle APQ)$$

$$2\text{Ar}(\triangle APQ) = \text{Ar}(\triangle ABC) \quad \dots\dots (1)$$

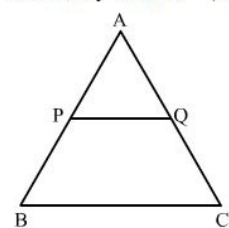
Now, $PQ \parallel BC$ and BA is a transversal.

In $\triangle APQ$ and $\triangle ABC$,

$$\angle APQ = \angle B \quad (\text{Corresponding angles})$$

$$\angle PAQ = \angle BAC \quad (\text{Common})$$

So, $\triangle APQ \sim \triangle ABC$ (AA Similarity)



We know that the ratio of areas of two similar triangles is equal to the ratio of squares of their corresponding sides.

Hence

$$\frac{Ar(\triangle APQ)}{Ar(\triangle ABC)} = \frac{AP^2}{AB^2}$$

$$\frac{Ar(\triangle APQ)}{2Ar(\triangle APQ)} = \frac{AP^2}{AB^2}$$

$$\frac{1}{2} = \frac{AP^2}{AB^2}$$

$$\sqrt{\frac{1}{2}} = \frac{AP}{AB}$$

$$AB = \sqrt{2} AP$$

$$AB = \sqrt{2} (AB - BP)$$

$$\sqrt{2} BP = \sqrt{2} AB - AB$$

$$\sqrt{2} BP = (\sqrt{2} - 1) AB$$

$$\frac{BP}{AB} = \frac{(\sqrt{2} - 1)}{\sqrt{2}}$$

Triangles Ex 4.6 Q18

Answer :

Given: The areas of two similar triangles ABC and PQR are in the ratio 9 : 16. BC = 4.5cm.

To find: length of QR

We know that the ratio of areas of two similar triangles is equal to the ratio of squares of their corresponding sides.

$$ar\triangle ABC : ar\triangle PQR = BC^2 : QR^2$$

$$\frac{9}{16} = \left(\frac{4.5}{QR} \right)^2$$

$$\frac{3}{4} = \frac{4.5}{QR}$$

$$QR = \frac{4 \times 4.5}{3}$$

$$QR = 6 \text{ cm}$$

***** END *****