Triangles Ex 4.6 Q9

Answer :

In the given figure, we have DE || BC.

In ΔADE and ΔABC

$\angle ADE = \angle B$ (Corresponding angles)

$\angle DAE = \angle BAC$ (Common)

So, $\Delta ADE \sim \Delta ABC$ (AA Similarity)

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

Hence

$$\frac{Ar(\Delta ADE)}{Ar(\Delta ABC)} = \frac{DE^2}{BC^2}$$

$$\frac{16}{Ar(\Delta ABC)} = \frac{4^2}{6^2}$$

$$Ar(\Delta ABC) = \frac{6^2 \times 16}{4^2}$$

$$\boxed{Ar(\Delta ABC) = 36 \text{ cm}^2}$$

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

Hence,

$$\frac{Ar(\Delta ADE)}{Ar(\Delta ABC)} = \frac{DE^2}{BC^2}$$

$$\frac{25}{Ar(\Delta ABC)} = \frac{4^2}{8^2}$$

$$Ar(\Delta ABC) = \frac{8^2 \times 25}{4^2}$$

$$\boxed{Ar(\Delta ABC) = 100 \text{ cm}^2}$$

(iii) We know that

$$\frac{Ar(\Delta ADE)}{Ar(\Delta ABC)} = \frac{DE^2}{BC^2}$$

$$\frac{Ar(\Delta ADE)}{Ar(\Delta ABC)} = \frac{3^2}{5^2}$$

$$\frac{Ar(\Delta ADE)}{Ar(\Delta ABC)} = \frac{9}{25}$$

Let Area of $\Delta ADE = 9x$ sq. units and Area of $\Delta ABC = 25x$ sq. units

$$\begin{aligned} Ar[\text{trapBCED}] &= Ar(\Delta ABC) - Ar(\Delta ADE) \\ &= 25x - 9x \\ &= 16x \text{ sq units} \end{aligned}$$

Now,

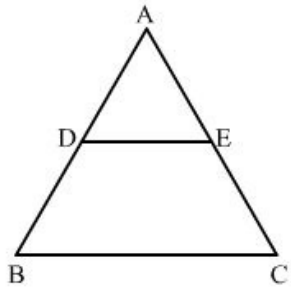
$$\frac{Ar(\Delta ADE)}{Ar(\text{trapBCED})} = \frac{9x}{16x}$$

$$\boxed{\frac{Ar(\Delta ADE)}{Ar(\text{trapBCED})} = \frac{9}{16}}$$

Triangles Ex 4.6 Q10

Answer :

Given: In ΔABC, D and E are the midpoints of AB and AC respectively.
To find: Ratio of the areas of ΔADE and ΔABC.



Since it is given that D and E are the midpoints of AB and AC, respectively.
Therefore, DE || BC (Converse of mid-point theorem)

Also, $\mathbf{DE} = \frac{1}{2}\mathbf{BC}$
In ΔADE and ΔABC
$\angle \mathbf{ADE} = \angle \mathbf{B}$ **(Corresponding angles)**

$\angle \mathbf{DAE} = \angle \mathbf{BAC}$ **(Common)**

So, $\Delta \mathbf{ADE} \sim \Delta \mathbf{ABC}$ (AA Similarity)
We know that the ratio of areas of two similar triangles is equal to the ratio of squares of their corresponding sides.

$$\frac{\mathrm{ar}(\Delta \mathrm{ADE})}{\mathrm{ar}(\Delta \mathrm{ABC})} = \left(\frac{\mathrm{AD}}{\mathrm{AB}}\right)^2$$

$$\frac{\mathrm{ar}(\Delta \mathrm{ADE})}{\mathrm{ar}(\Delta \mathrm{ABC})} = \left(\frac{1}{2}\right)^2$$

$$\boxed{\frac{\mathrm{ar}(\Delta \mathrm{ADE})}{\mathrm{ar}(\Delta \mathrm{ABC})} = \left(\frac{1}{4}\right)}$$

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