



NCERT Solutions For Class 10 Chapter 6 Triangles Exercise 6.4

1. Let $\triangle ABC \sim \triangle DEF$ and their areas be, respectively, 64 cm^2 and 121 cm^2 . If $EF = 15.4 \text{ cm}$, find BC .

Ans. We have, $\frac{\text{Area}(\triangle ABC)}{\text{Area}(\triangle DEF)} = \frac{BC^2}{EF^2}$

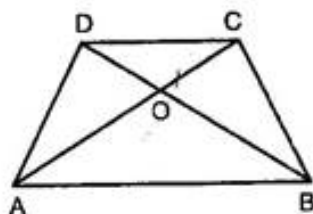
$$\Rightarrow \frac{64}{121} = \frac{BC^2}{(15.4)^2}$$

$$\Rightarrow \frac{8}{11} = \frac{BC}{15.4}$$

$$\Rightarrow BC = \left(\frac{8}{11} \times 15.4 \right) \text{ cm} = 11.2 \text{ cm}$$

2. Diagonals of a trapezium $ABCD$ with $AB \parallel DC$ intersect each other at the point O . If $AB = 2CD$, find the ratio of the areas of triangles AOB and COD .

Ans. In \triangle s AOB and COD , we have,



$$\angle AOB = \angle COD [\text{Vertically opposite angles}]$$

$$\angle OAB = \angle OCD [\text{Alternate angles}]$$

By AA-criterion of similarity,

$$\therefore \triangle AOB \sim \triangle COD$$

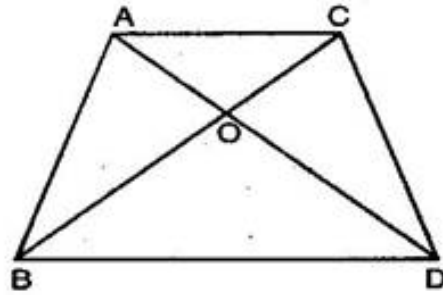
$$\therefore \frac{\text{Area}(\triangle AOB)}{\text{Area}(\triangle COD)} = \frac{AB^2}{DC^2}$$

$$\Rightarrow \frac{\text{Area}(\triangle AOB)}{\text{Area}(\triangle COD)} = \frac{(2DC)^2}{DC^2} = \frac{4}{1}$$

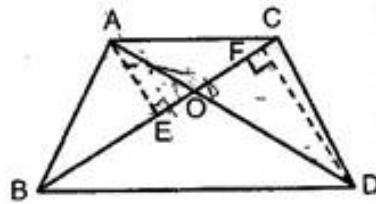
Hence, $\text{Area}(\triangle AOB) : \text{Area}(\triangle COD) = 4 : 1$

3. In figure, ABC and DBC are two triangles on the same base BC. If AD intersects BC at O,

show that $\frac{\text{ar}(\triangle ABC)}{\text{ar}(\triangle DBC)} = \frac{AO}{DO}$.



Ans. Given: Two \triangle s ABC and DBC which stand on the same base but on the opposite sides of BC.



To Prove: $\frac{\text{Area}(\triangle ABC)}{\text{Area}(\triangle DBC)} = \frac{AO}{DO}$

Construction: Draw $AE \perp BC$ and $DF \perp BC$.

Proof: In \triangle s AOE and DOF, we have, $\angle AEO = \angle DFO = 90^\circ$

and $\angle AOE = \angle DOF$ [Vertically opposite]

$\therefore \triangle AOE \sim \triangle DOF$ [By AA-criterion]

$$\therefore \frac{AE}{DF} = \frac{AO}{OD} \dots\dots\dots(i)$$

$$\frac{\text{Area}(\triangle ABC)}{\text{Area}(\triangle DBC)} = \frac{\frac{1}{2} \times BC \times AE}{\frac{1}{2} \times BC \times DF}$$

Now,

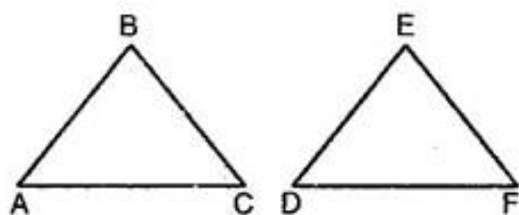
$$\Rightarrow \frac{\text{Area}(\triangle ABC)}{\text{Area}(\triangle DBC)} = \frac{AE}{DF}$$

$$\Rightarrow \frac{\text{Area}(\triangle ABC)}{\text{Area}(\triangle DBC)} = \frac{AO}{OD} \text{ [using eq. (i)]}$$

4. If the areas of two similar triangles are equal, prove that they are congruent.

Ans. Given: Two \triangle s ABC and DEF such that $\triangle ABC \sim \triangle DEF$

And $\text{Area}(\triangle ABC) = \text{Area}(\triangle DEF)$



To Prove: $\triangle ABC \cong \triangle DEF$

Proof: $\triangle ABC \sim \triangle DEF$

$$\therefore \angle A = \angle D, \angle B = \angle E, \angle C = \angle F$$

$$\text{And } \frac{AB}{DE} = \frac{BC}{EF} = \frac{AC}{DF}$$

To establish $\triangle ABC \cong \triangle DEF$, it is sufficient to prove that, $AB = DE$, $BC = EF$ and $AC = DF$

Now, $\text{Area}(\triangle ABC) = \text{Area}(\triangle DEF)$

$$\therefore \frac{\text{Area}(\triangle ABC)}{\text{Area}(\triangle DEF)} = 1$$

$$\Rightarrow \frac{AB^2}{DE^2} = \frac{BC^2}{EF^2} = \frac{AC^2}{DF^2} = 1$$

$$\Rightarrow \frac{AB}{DE} = \frac{BC}{EF} = \frac{AC}{DF} = 1$$

$$\Rightarrow AB = DE, BC = EF, AC = DF$$

Hence, $\triangle ABC \cong \triangle DEF$

5. D, E and F are respectively the mid-points of sides AB, BC and CA of $\triangle ABC$. Find the ratio of the areas of $\triangle DEF$ and $\triangle ABC$.

Ans. Since, D and E are the mid-points of the sides BC and CA of $\triangle ABC$ respectively.

$\therefore DE \parallel BA \Rightarrow DE \parallel FA$ (i)

Since, D and F are the mid-points of the sides BC and AB of $\triangle ABC$ respectively.

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