

TRIANGLES

PPT-7

SUBJECT : MATHEMATICS
CHAPTER NUMBER: 06
CHAPTER NAME : TRIANGLES

CHANGING YOUR TOMORROW

PREVIOUS KNOWLEDGE TEST

Two triangles are similar if either of the following three criterion's are satisfied:

- 1.AAA similarity Criterion. If two triangles are equiangular, then they are similar.
- 2.Corollary(AA similarity). If two angles of one triangle are respectively equal to two angles of another triangle, then the two triangles are similar.
- 3.SSS Similarity Criterion. If the corresponding sides of two triangles are proportional, then they are similar.
- 3.SAS Similarity Criterion. If in two triangles, one pair of corresponding sides are proportional and the included angles are equal, then the two triangles are similar.

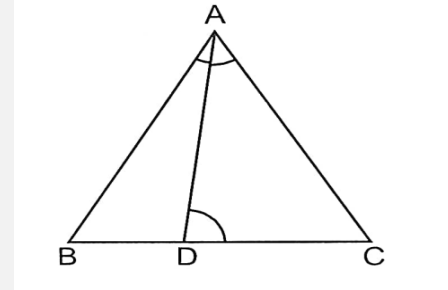
- **Results in Similar Triangles based on Similarity Criterion:**

- 1.Ratio of corresponding sides = Ratio of corresponding perimeters
- 2.Ratio of corresponding sides = Ratio of corresponding medians
- 3.Ratio of corresponding sides = Ratio of corresponding altitudes
- 4.Ratio of corresponding sides = Ratio of corresponding angle bisector segments

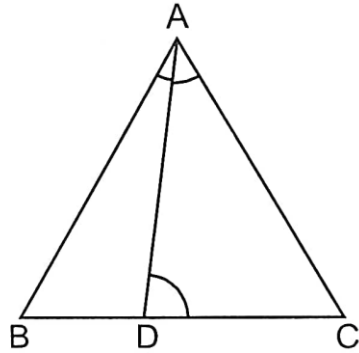
LEARNING OUTCOME

1. Students will be able to know the Criteria for similarity of triangles. (AAA, SSS, & SAS)
2. Students will be able to prove problems involving AAA, SSS, & SAS similarity criteria.
3. Students will be able to solve problems based on similarity of triangles.

1. D is a point on the side BC of a triangle ABC such that $\angle ADC = \angle BAC$. Show that $CA^2 = CB \cdot CD$.



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Sol. In $\triangle ACB$ and $\triangle DCA$,

$$\angle BAC = \angle ADC \quad \text{[Given]}$$

$$\angle C = \angle C \quad \text{[Common]}$$

$$\triangle ACB \sim \triangle DCA$$

$$\Rightarrow \frac{CB}{CA} = \frac{CA}{CD}$$

[Corresponding sides of similar triangles]

$$\Rightarrow CA^2 = CB \times CD$$

2. A vertical pole of length 6 m casts a shadow 4 m long on the ground and at the same time a tower casts a shadow 28 m long. Find the height of the tower



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Sol. DE is vertical stick of length = 6 m

Length of shadow = 4 m

Let height of tower = h m

Length of shadow = 28 m

In $\triangle ABC$ and $\triangle DEC$,

$$\angle ABC = \angle DEC$$

[Each 90°]

$$\angle C = \angle C$$

[Common]

$$\triangle ABC \sim \triangle DEC$$

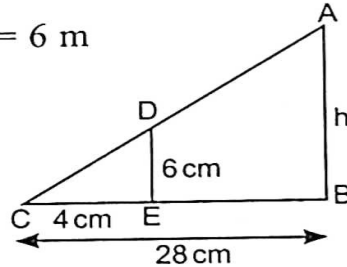
[AA]

\therefore

$$\frac{AB}{DE} = \frac{BC}{EC}$$

$$\frac{h}{6} = \frac{28}{4}$$

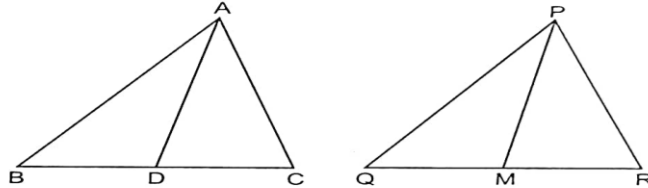
$$h = \frac{28}{4} \times 6 = 7 \times 6 = 42 \text{ m}$$



3. If AD and PM are medians of triangles ABC and PQR, respectively where $\Delta ABC \sim \Delta PQR$, prove that $AB/PQ = AD/PM$

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• When $\Delta ABC \sim \Delta PQR$



$$\Rightarrow \angle ABC = \angle PQR$$

$$\frac{AB}{PQ} = \frac{BC}{QR}$$

$$\frac{AB}{PQ} = \frac{\frac{1}{2}BC}{\frac{1}{2}QR}$$

$$\frac{AB}{PQ} = \frac{BD}{QM}$$

In ΔABD and ΔPQM ,

$$\frac{AB}{PQ} = \frac{BD}{QM}$$

[As proved]

$$\angle B = \angle Q$$

$\therefore \Delta ABD \sim \Delta PQM$

$$\frac{AB}{PQ} = \frac{AD}{PM}$$

[Corresponding sides of similar triangles]

4.If two triangles are similar, prove that the ratio of the corresponding sides is same as the ratio of the corresponding altitudes



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GIVEN Two triangles ABC and DEF in which
 $\angle A = \angle D, \angle B = \angle E, \angle C = \angle F$ and $AL \perp BC, DM \perp EF$

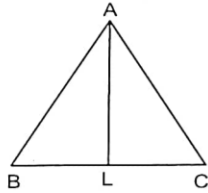


Fig. 7.151

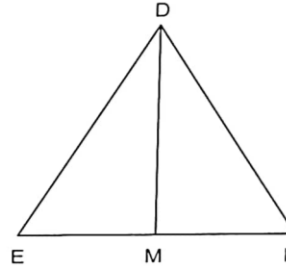


Fig. 7.152

TO PROVE $\frac{BC}{EF} = \frac{AL}{DM}$

PROOF Since equiangular triangles are similar.

$\therefore \Delta ABC \sim \Delta DEF$

$$\Rightarrow \frac{AB}{DE} = \frac{BC}{EF} \quad \dots(i)$$

In triangle ALB and DME , we have

$$\angle ALB = \angle DME$$

$$\angle B = \angle E$$

[Each equal to 90°]

[Given]

So, by AA -criterion of similarity, we have

$$\Delta ALB \sim \Delta DME$$

$$\Rightarrow \frac{AB}{DE} = \frac{AL}{DM} \quad \dots(ii)$$

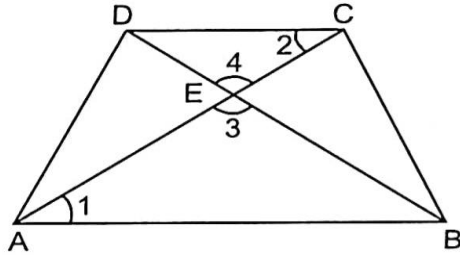
From (i) and (ii), we get : $\frac{BC}{EF} = \frac{AL}{DM}$

5. If one diagonal of a trapezium divides the other diagonal in the ratio 1:3, prove that one of the parallel sides is three times the other.



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Sol. $DE / EB = 1 : 3$



In $\triangle AEB$ and $\triangle CED$, $\angle 1 = \angle 2$ (alt. angles)

$\angle 3 = \angle 4$ (V-O-A)

$\therefore \triangle AEB \sim \triangle CED$

$$\Rightarrow \frac{AB}{CD} = \frac{BE}{DE}$$

$$\Rightarrow \frac{AB}{CD} = \frac{3}{1} \quad [\because DE : BE = 1 : 3]$$

$$\Rightarrow AB = 3CD$$

HOME ASSIGNMENT Ex. 6.3 Q: No 13 to Q16

AHA

1. Sides AB and BC and median AD of a triangle ABC are respectively proportional to sides PQ and QR and median PM of Δ PQR. Show that Δ ABC \sim Δ PQR.

THANKING YOU
ODM EDUCATIONAL GROUP