ODM EDUCATIONAL GROUP
Changing your Tomorrow

TRIANGLES
PPT-7

SUBJECT : MATHEMATICS
CHAPTER NUMBER: 06
CHAPTER NAME :TRIANGLES

Website: www.odmegroup.org
Email: info@odmps.org
Toll Free: **1800 120 2316**
Sishu Vihar, Infocity Road, Patia, Bhubaneswar- 751024

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

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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.

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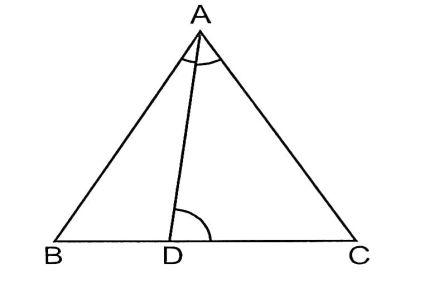
1. D is a point on the side BC of a triangle ABC such that ∠ADC = ∠ BAC. Show that CA^2 = CB.CD.



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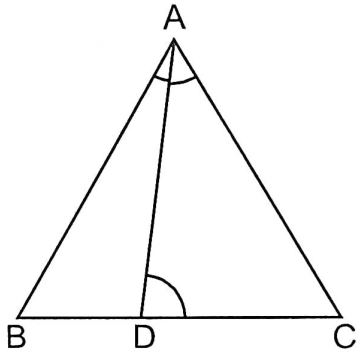

Sol. In ΔACB and ΔDCA,

$\angle BAC = \angle ADC$ [Given]

$\angle C = \angle C$ [Common]

$\Delta ACB \sim \Delta DCA$

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

[Corresponding sides of similar triangles]

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

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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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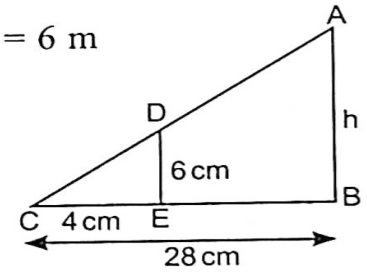
Sol. DE is vertical stick of length = 6 m

Length of shadow = 4 m

Let height of tower = h m

Length of shadow = 28 m



In ΔABC and ΔDEC,

$\angle ABC = \angle DEC$ [Each 90°]

$\angle C = \angle C$ [Common]

$\Delta ABC \sim \Delta DEC$ [AA]

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

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

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

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3. If AD and PM are medians of triangles ABC and PQR, respectively where

Δ ABC ~ Δ PQR, prove that AB /PQ = AD/PM

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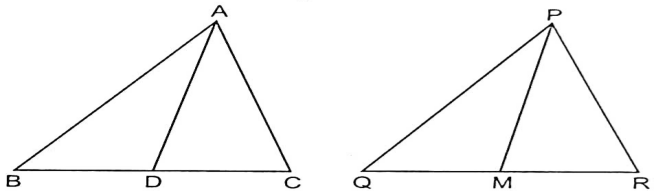
Δ ABC ~ Δ PQR, prove that AB /PQ = AD/PM

. When $\Delta ABC \sim \Delta PQR$



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

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

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

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

In ΔABD and ΔPQM,

$$\frac{AB}{PQ} = \frac{BD}{QM}$$ [As proved]

$$\angle B = \angle Q$$

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

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

[Corresponding sides of similar triangles]

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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 $AL \perp BC, DM \perp EF$

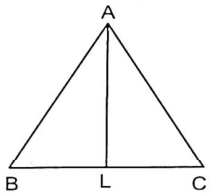

Fig. 7.151

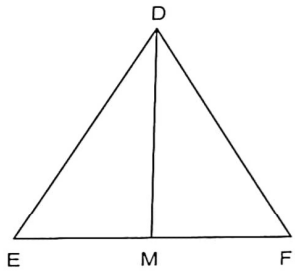

Fig. 7.152

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

PROOF Since equiangular triangles are similar.

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

$\Rightarrow \quad \frac{AB}{DE} = \frac{BC}{EF}$ …(I)

In triangle ALB and DME, we have

$\angle ALB = \angle DME$ [Each equal to 90°]

$\angle B = \angle E$ [Given]

So, by AA-criterion of similarity, we have

$\Delta ALB \sim \Delta DME$

$\Rightarrow \quad \frac{AB}{DE} = \frac{AL}{DM}$ …(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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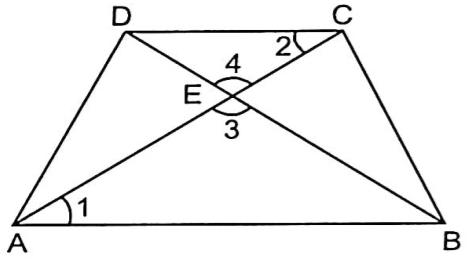
Sol. DE / EB = 1 : 3



In Δ AEB and ΔCED, $\angle 1 = \angle 2$ (alt. angles)

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

$\therefore \quad \Delta AEB \sim \Delta CED$

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

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

$\Rightarrow \quad AB = 3CD$

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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 ~ Δ PQR.

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THANKING YOU

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