

TRIANGLES

PPT-5

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.
- 4.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.

LEARNING OUTCOME

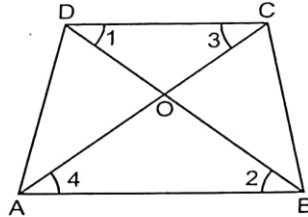
11. Students will be able to know the Criteria for similarity of triangles.
(AAA, SSS, & SAS)
2. Students will be able to prove problems involving AAA, SSS, & SAS similarity criteria.
3. Students will be able to solve problems based on similarity of triangles.

1. Diagonals AC and BD of a trapezium ABCD with $AB \parallel DC$ intersect each other at the point O. Using a similarity criterion for two triangles, show that $OA / OC = OB / OD$



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Sol. Given: Diagonals AC and BD intersect at O.



$AB \parallel DC$

To Prove: $\frac{OA}{OC} = \frac{OB}{OD}$

Proof: In $\triangle AOB$ and $\triangle COD$

$$\angle 1 = \angle 2$$

$$\angle 3 = \angle 4$$

[Alternate angles]

$\therefore \triangle AOB \sim \triangle COD$ [AA]

$$\Rightarrow \frac{OA}{OC} = \frac{OB}{OD}$$

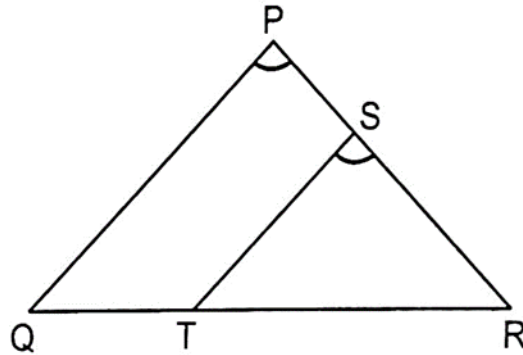
[Corresponding sides of similar triangles]

2. S and T are points on sides PR and QR of ΔPQR such that $\angle P = \angle RTS$. Show that $\Delta RPQ \sim \Delta RTS$.



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Sol. In ΔRPQ and ΔRTS ,



$$\angle P = \angle RTS$$

[Given]

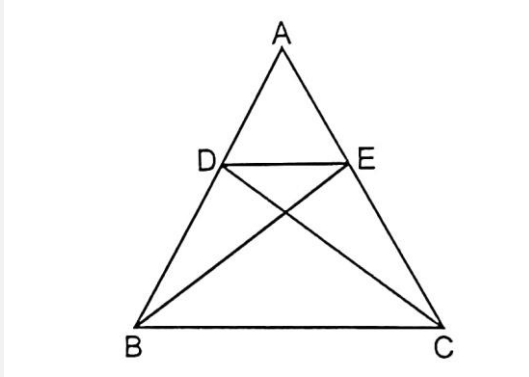
$$\angle R = \angle R$$

[Common]

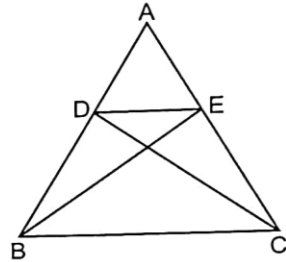
$$\therefore \Delta RPQ \sim \Delta RTS$$

[AA]

3. if $\triangle ABE \cong \triangle ACD$, show that $\triangle ADE \sim \triangle ABC$.



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Sol. Given: $\triangle ABE \cong \triangle ACD$

To Prove: $\triangle ADE \sim \triangle ABC$

Proof: $\triangle ABE \cong \triangle ACD$

$$AB = AC \text{ and } AE = AD$$

$$\Rightarrow \frac{BA}{AC} = 1, \frac{AD}{AE} = 1$$

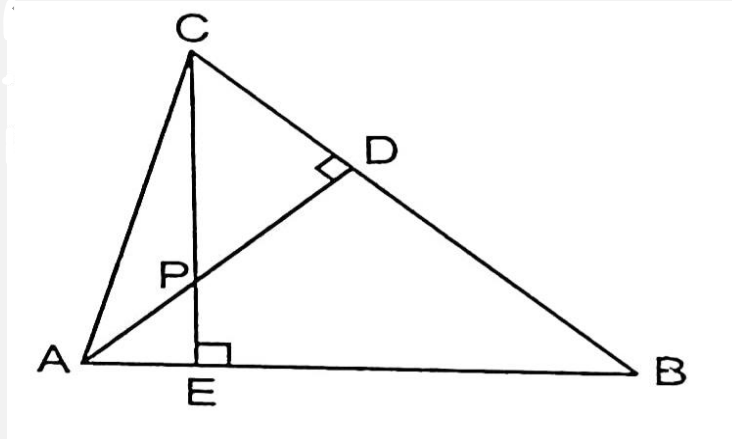
In $\triangle ADE$ and $\triangle ABC$,

$$\frac{AD}{AE} = \frac{AB}{AC} \quad \text{[Proved above]}$$

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

$$\therefore \triangle ADE \sim \triangle ABC \quad \text{[SAS]}$$

4. In Fig. altitudes AD and CE of $\triangle ABC$ intersect each other at the point P. Show that: (i) $\triangle AEP \sim \triangle CDP$ (ii) $\triangle ABD \sim \triangle CBE$ (iii) $\triangle AEP \sim \triangle ADB$ (iv) $\triangle PDC \sim \triangle BEC$



4. In Fig. altitudes AD and CE of $\triangle ABC$ intersect each other at the point P. Show that: (i) $\triangle AEP \sim \triangle CDP$ (ii) $\triangle ABD \sim \triangle CBE$ (iii) $\triangle AEP \sim \triangle ADB$ (iv) $\triangle PDC \sim \triangle BEC$

Sol. Given: AD and CE are altitudes of the $\triangle ABC$

(i) **To Prove:** $\triangle AEP \sim \triangle CDP$

Proof: In $\triangle AEP$ and $\triangle CDP$,

$$\angle AEP = \angle CDP \quad [\text{Each } 90^\circ]$$

$$\angle APE = \angle CPD \quad [\text{Vertically opposite angles}]$$

$$\triangle AEP \sim \triangle CDP \quad [\text{AA}]$$

(ii) In $\triangle ABD$ and $\triangle CBE$,

$$\angle ADB = \angle CEB \quad [\text{Each } 90^\circ]$$

$$\angle ABD = \angle CBE \quad [\text{Common}]$$

$$\triangle ABD \sim \triangle CBE \quad [\text{AA}]$$

(iii) In $\triangle AEP$ and $\triangle ADB$,

$$\angle AEP = \angle ADB \quad [\text{Each } 90^\circ]$$

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

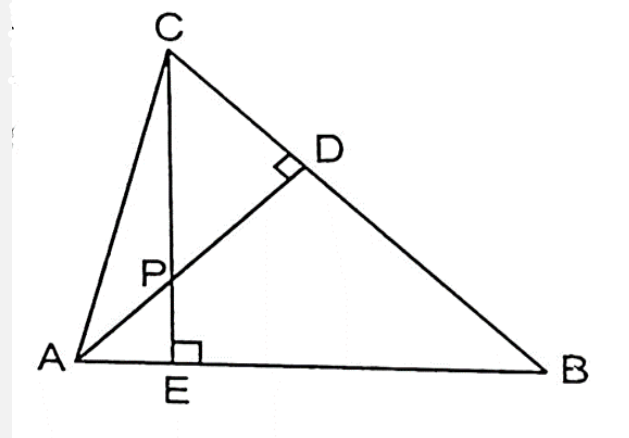
$$\therefore \triangle AEP \sim \triangle ADB \quad [\text{AA}]$$

(iv) In $\triangle PDC$ and $\triangle BEC$,

$$\angle PDC = \angle BEC \quad [\text{Each } 90^\circ]$$

$$\angle PCD = \angle BCE \quad [\text{Common}]$$

$$\triangle PDC \sim \triangle BEC \quad [\text{AA}]$$

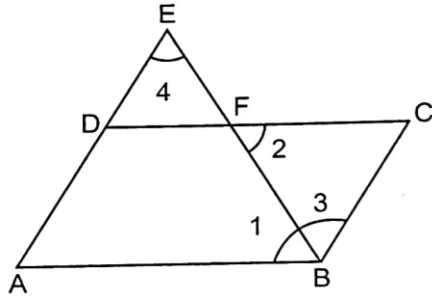


5. E is a point on the side AD produced of a parallelogram ABCD and BE intersects CD at F. Show that $\triangle ABE \sim \triangle CFB$.



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Sol. In $\triangle ABE$ and $\triangle CFB$,



$$\angle 1 = \angle 2$$

$$\angle 4 = \angle 3$$

[Alternate angles]

\Rightarrow

$$\triangle ABE \sim \triangle CFB$$

[AA]

HOME ASSIGNMENT Ex 6.3 Q 3 to Q 8

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.
2. If PS is the bisector of \angle QPR of Δ PQR. Prove that $QS/PQ = SR/PR$.

THANKING YOU
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