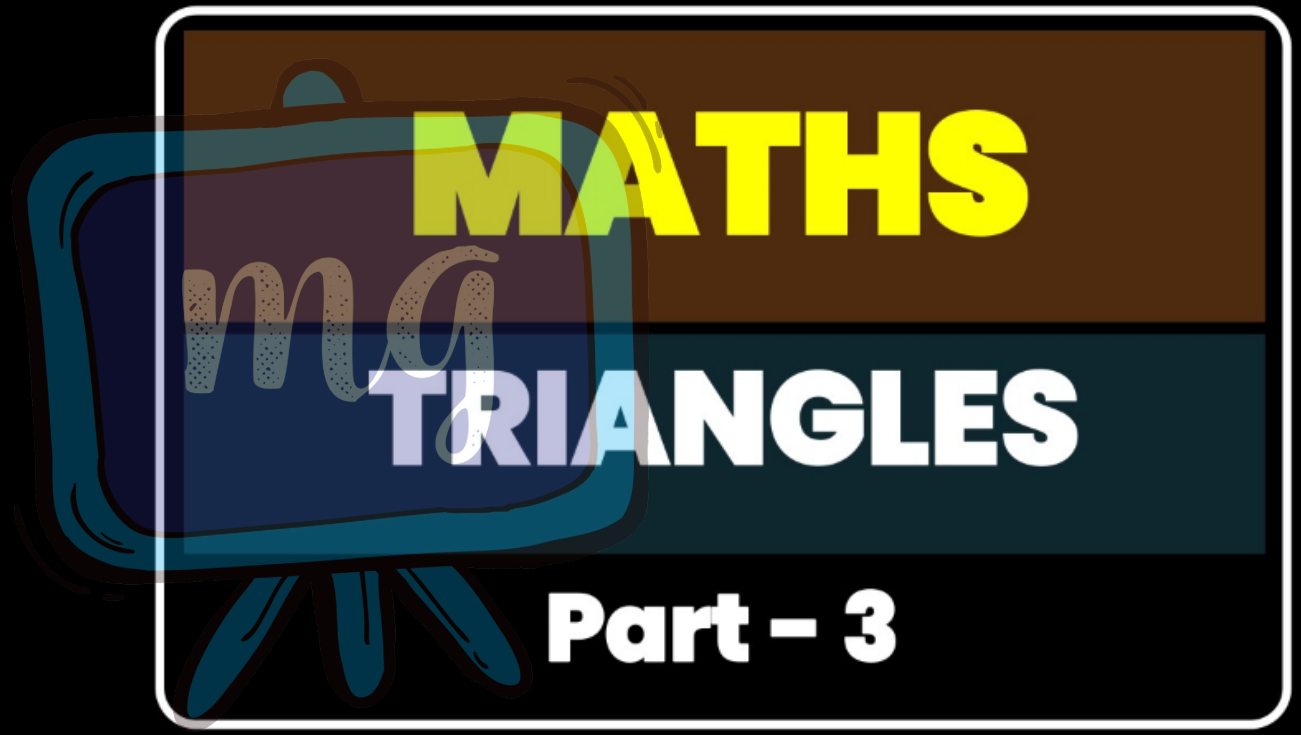
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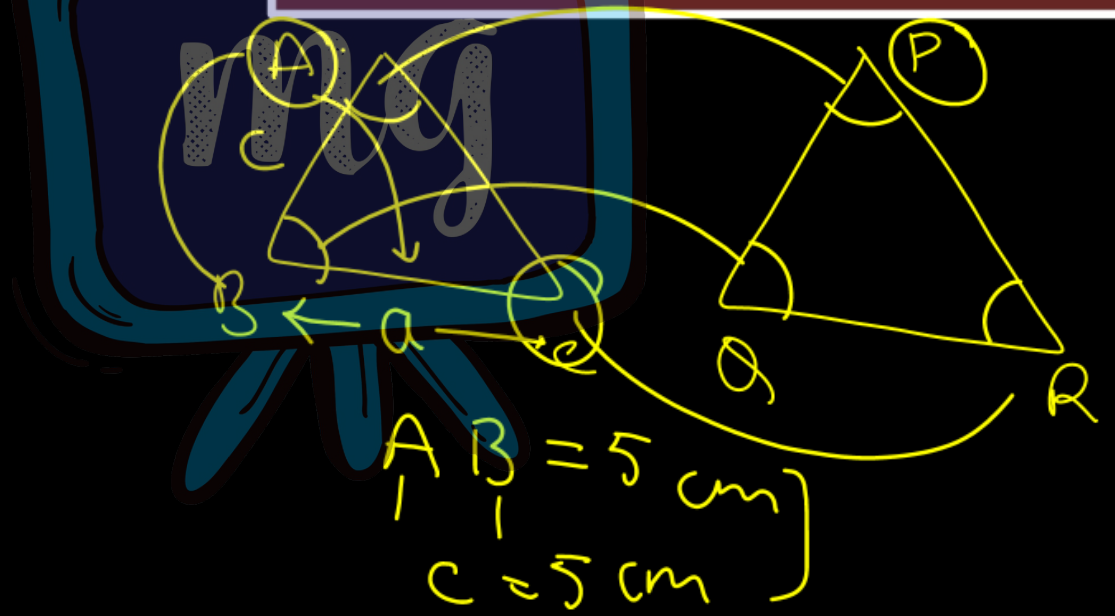


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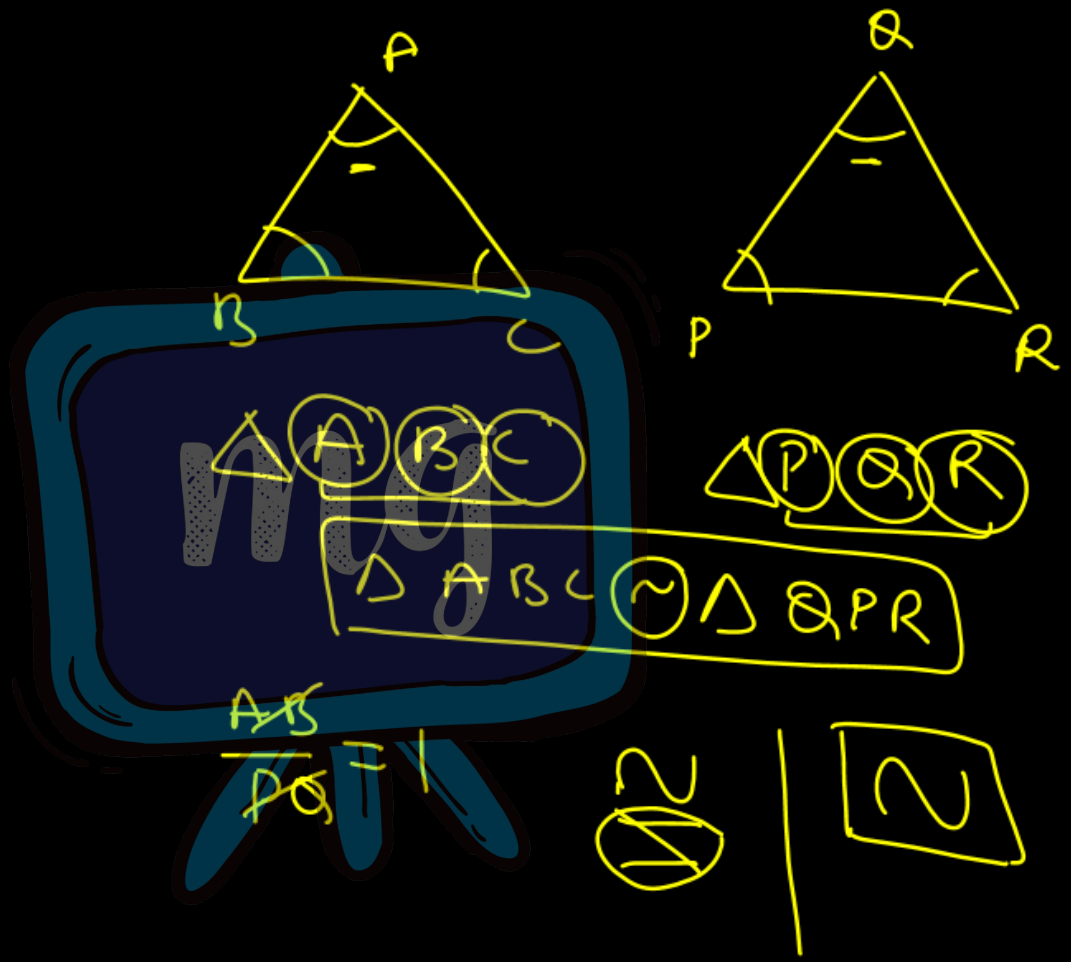
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CRITERIA FOR SIMILARITY OF TRIANGLES



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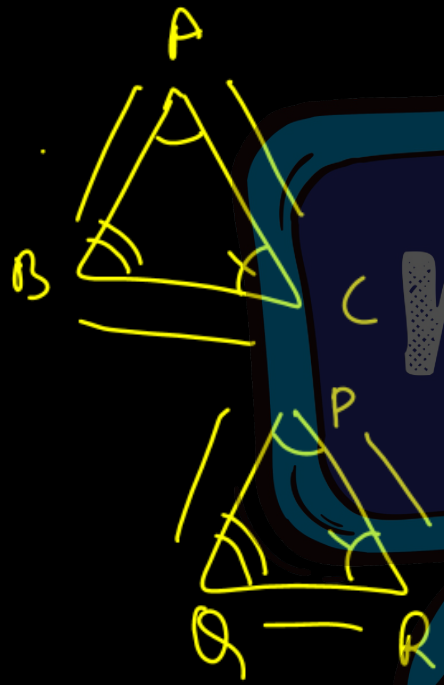
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THEOREM 6.3

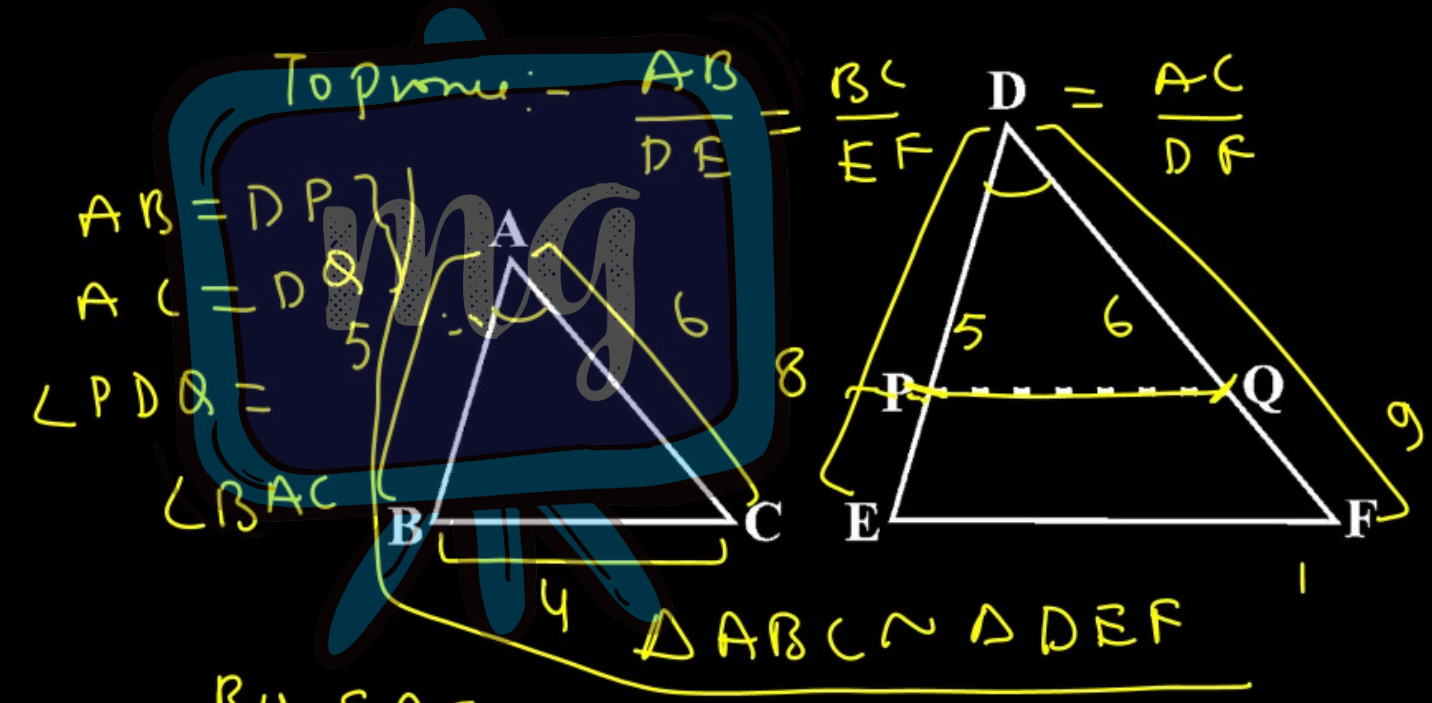
If in two triangles, corresponding angles are equal, then their corresponding sides are in the same ratio (or proportion) and hence the two triangles are similar

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

To prove :- $\frac{AB}{DE} = \frac{BC}{EF} = \frac{AC}{DF}$



$AB = DP$

$AC = DQ$

$\angle PDQ =$

$\angle BAC$

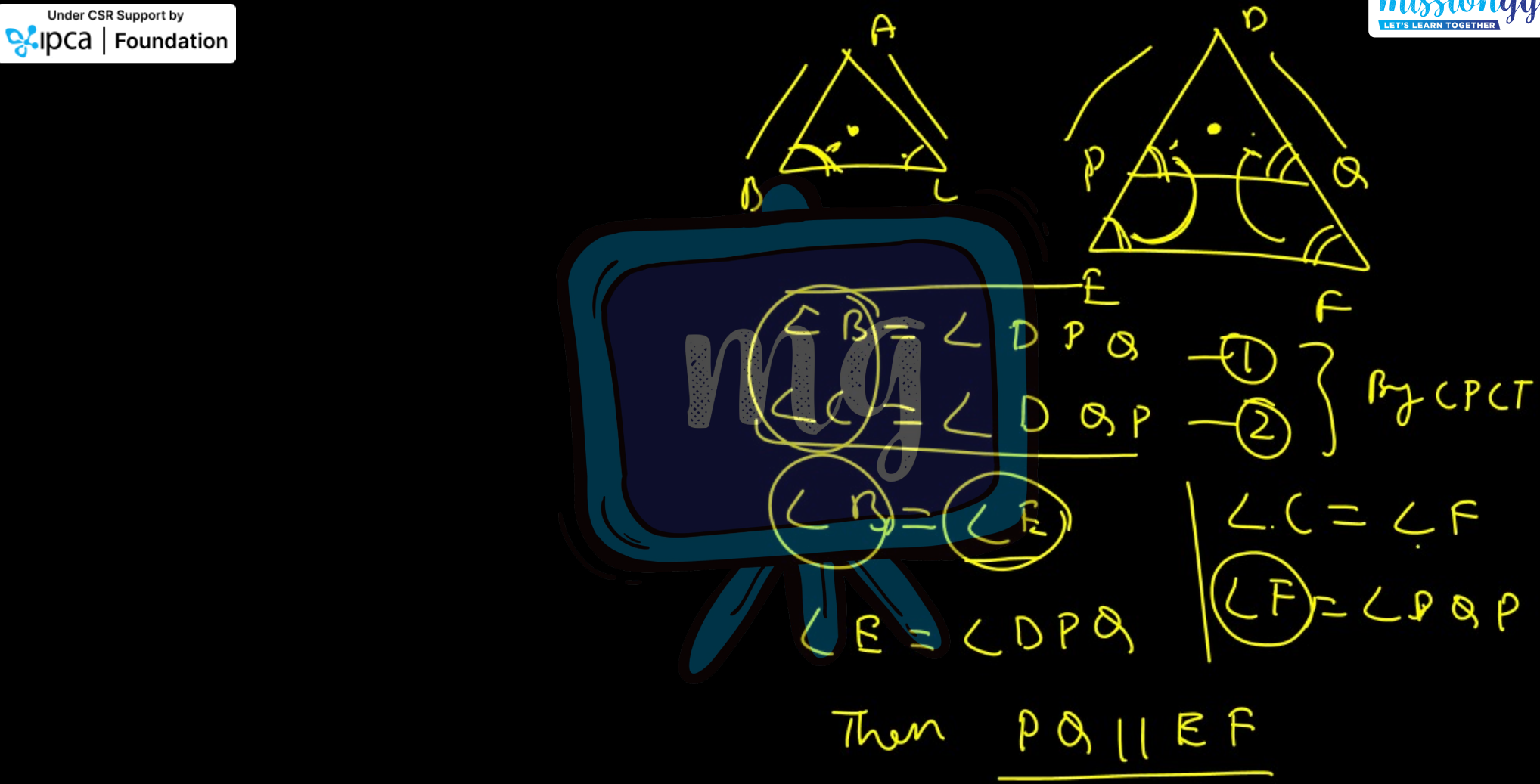
$\triangle ABC \sim \triangle DEF$

By SAS Congruency Rule

$\triangle ABC \cong \triangle DPQ$

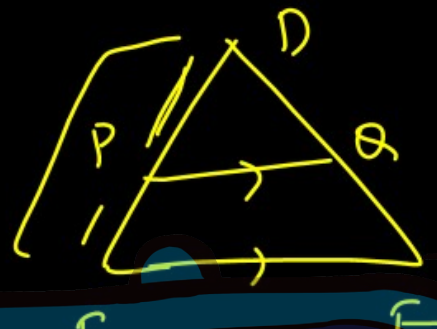
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$$\frac{DP}{PE} = \frac{DQ}{QF}$$

Converse of BPT

Let's prove the obtained Result.

$$\frac{PE}{DP} + 1 = \frac{QF}{DQ} + 1$$

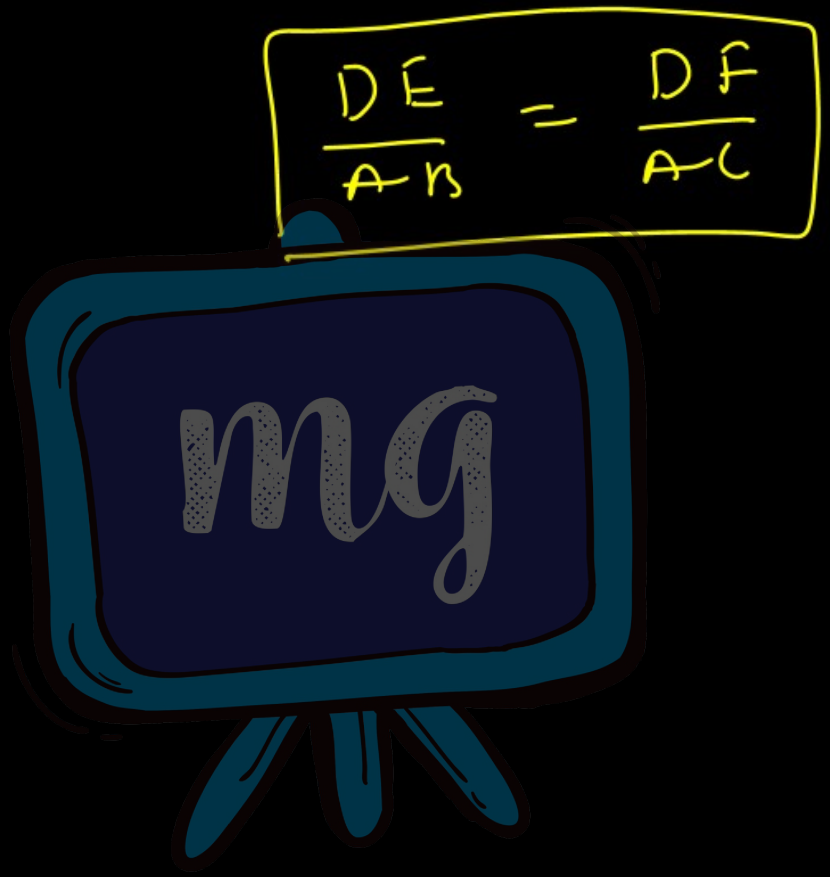
{ ∵ by adding 1 both sides }

$$\frac{DP + PE}{DP} = \frac{QF + DQ}{DQ}$$

$$\frac{DE}{DP} = \frac{DF}{DQ}$$

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- If two angles of one triangle are respectively equal to two angles of another triangle, then the two triangles are similar.



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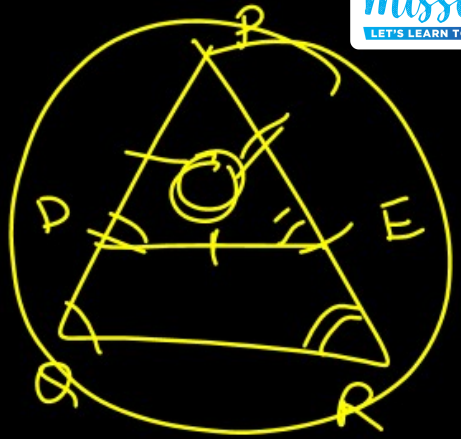
THEOREM 6.4

If in two triangles, sides of one triangle are proportional to (i.e., in the same ratio of) the sides of the other triangle, then their corresponding angles are equal and hence the two triangles are similar.

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Given = $\frac{AB}{PQ} = \frac{BC}{QR} = \frac{AC}{PR}$

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

Construction: Cut $PD = AB$ and $PE = AC$

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$$\frac{AB}{DP} = \frac{AC}{PE} = 1$$

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

$$\frac{PD}{PQ} = \frac{PE}{PR} = \frac{BC}{QR}$$

$$\frac{PD}{PQ} = \frac{PE}{PR} = \frac{DE}{QR}$$





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$\triangle PDE \sim \triangle PQR$

[AA – Similarity Rule]

Hence by ① and ②

$\frac{BC}{QR} = \frac{DE}{QR}$

$BC = DE$

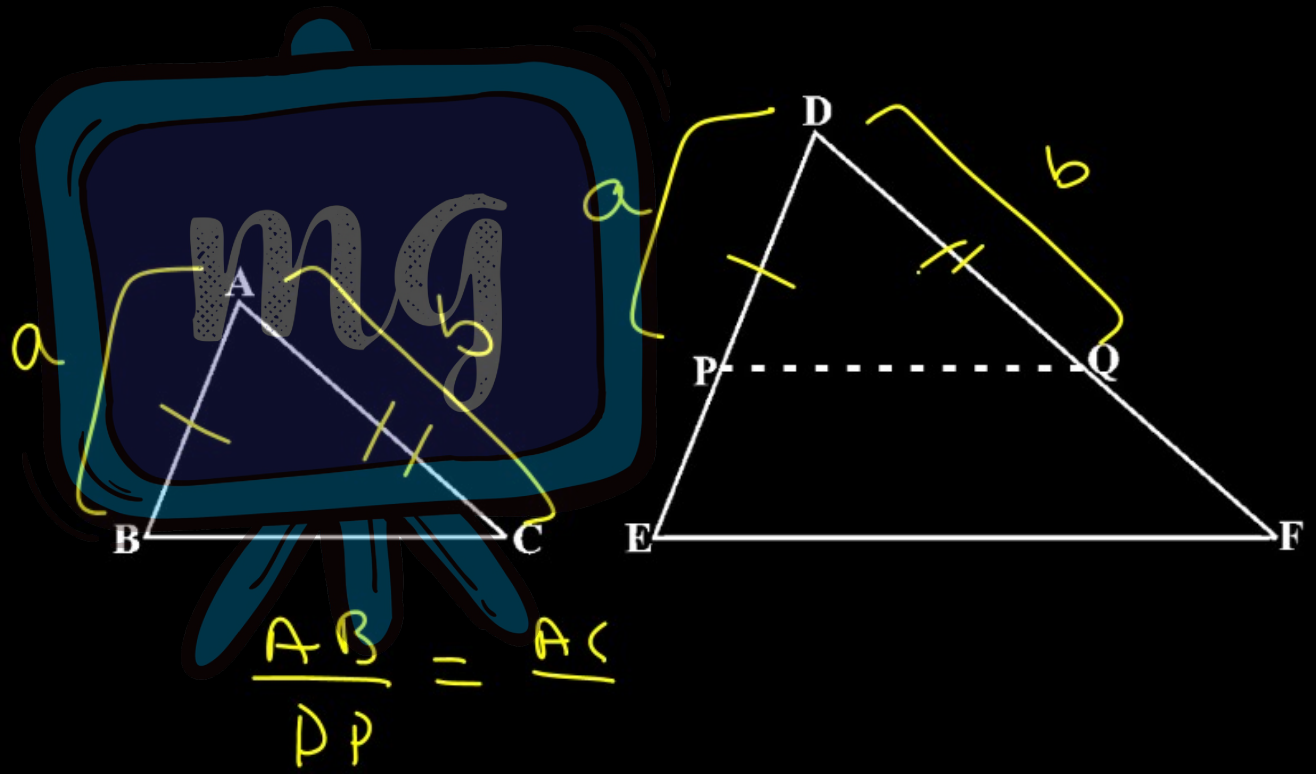
Hence $\triangle ABC \cong \triangle PDE$

$\triangle ABC \sim \triangle PQR$

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THEOREM 6.5

If one angle of a triangle is equal to one angle of the other triangle and the sides including these angles are proportional, then the two triangles are similar.

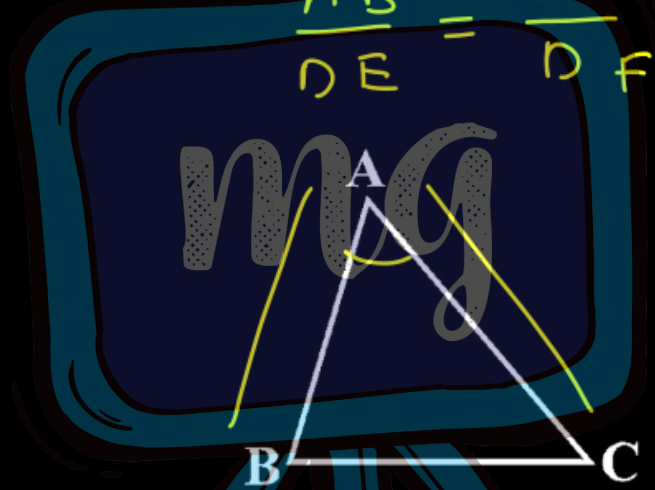
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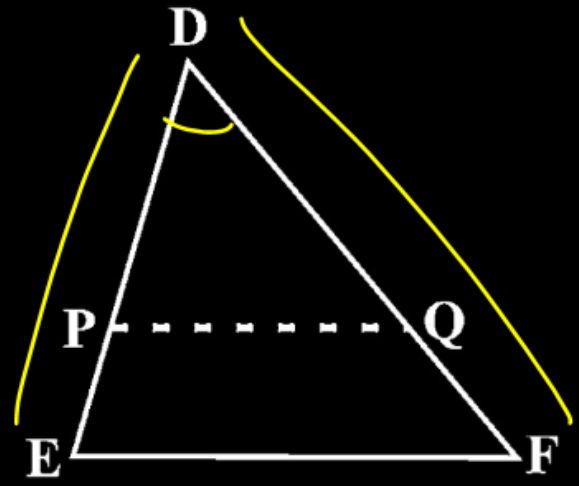
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Given:- $\angle A = \angle D$

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



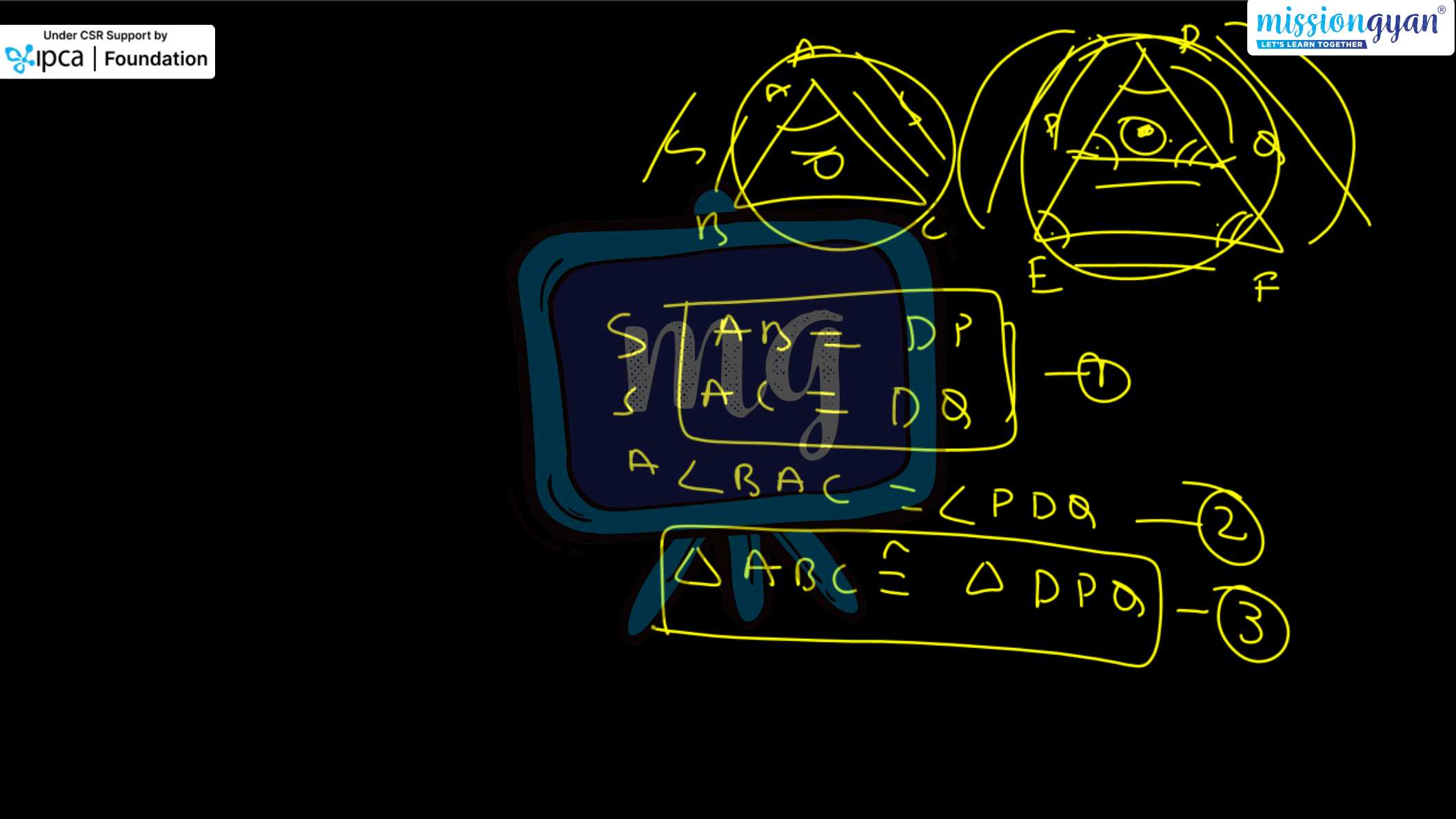


To Prove: $\triangle ABC \sim \triangle DEF$

Const.- Cut $DP = AB$, $DQ = AC$. Join PQ.

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$$\frac{AB}{DE} = \frac{AC}{DF}$$

$$\frac{DP}{DE} = \frac{DQ}{DF}$$

By converse of BPT

$EF \parallel PQ$

$\angle P = \angle E$

$\angle Q = \angle F$

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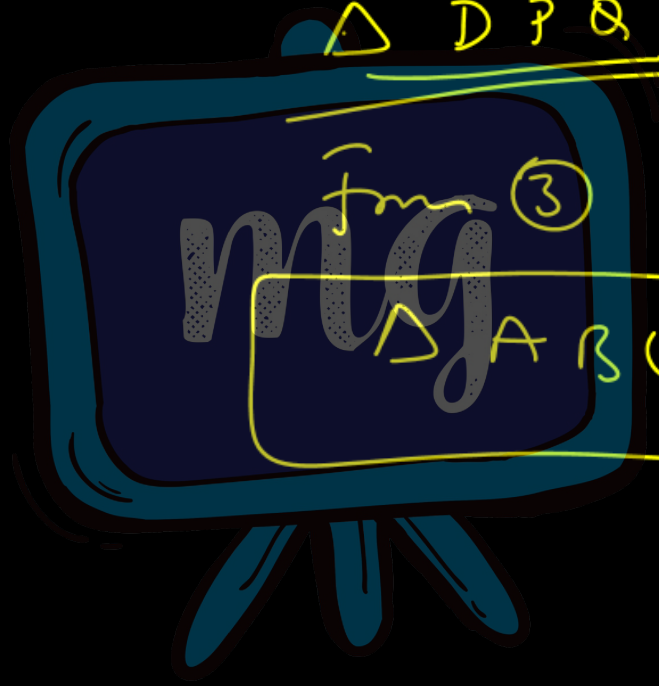
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By AA Similarity

$\triangle DPQ \sim \triangle DEF$ (4)

from (3) and (4)

$\triangle ABC \sim \triangle DEF$



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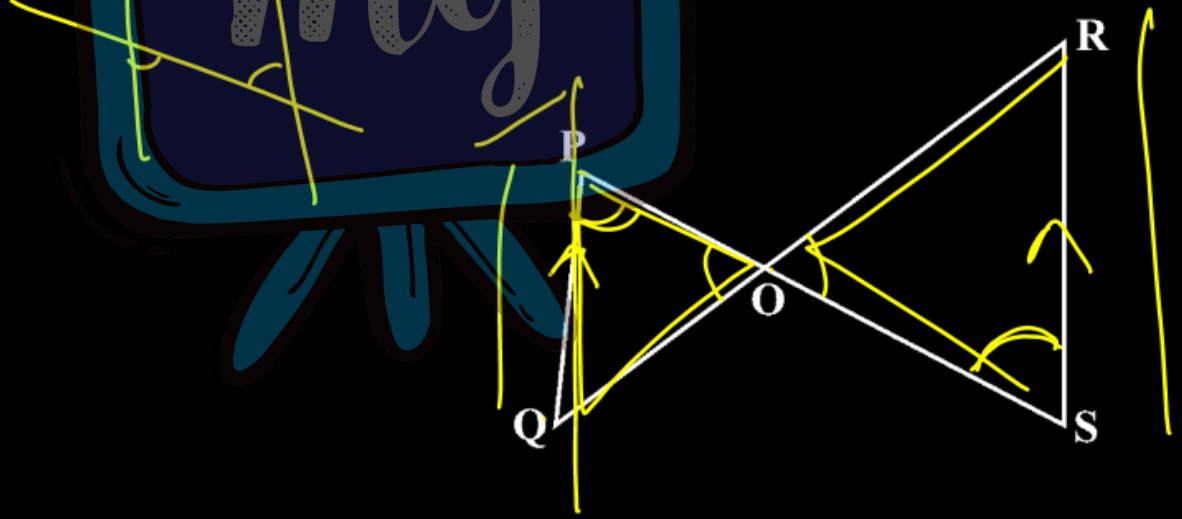
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Example : 4

In Fig., if PQ II RS, prove that

$\Delta POQ \sim \Delta SOR$



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In $\triangle OPQ$ and $\triangle ORS$

$\angle OPQ = \angle ORS$ {AIA}

$\angle POQ = \angle ROS$ {VOA}

By A-A Similarity Rule

$\triangle OPQ \sim \triangle ORS$

H.P.

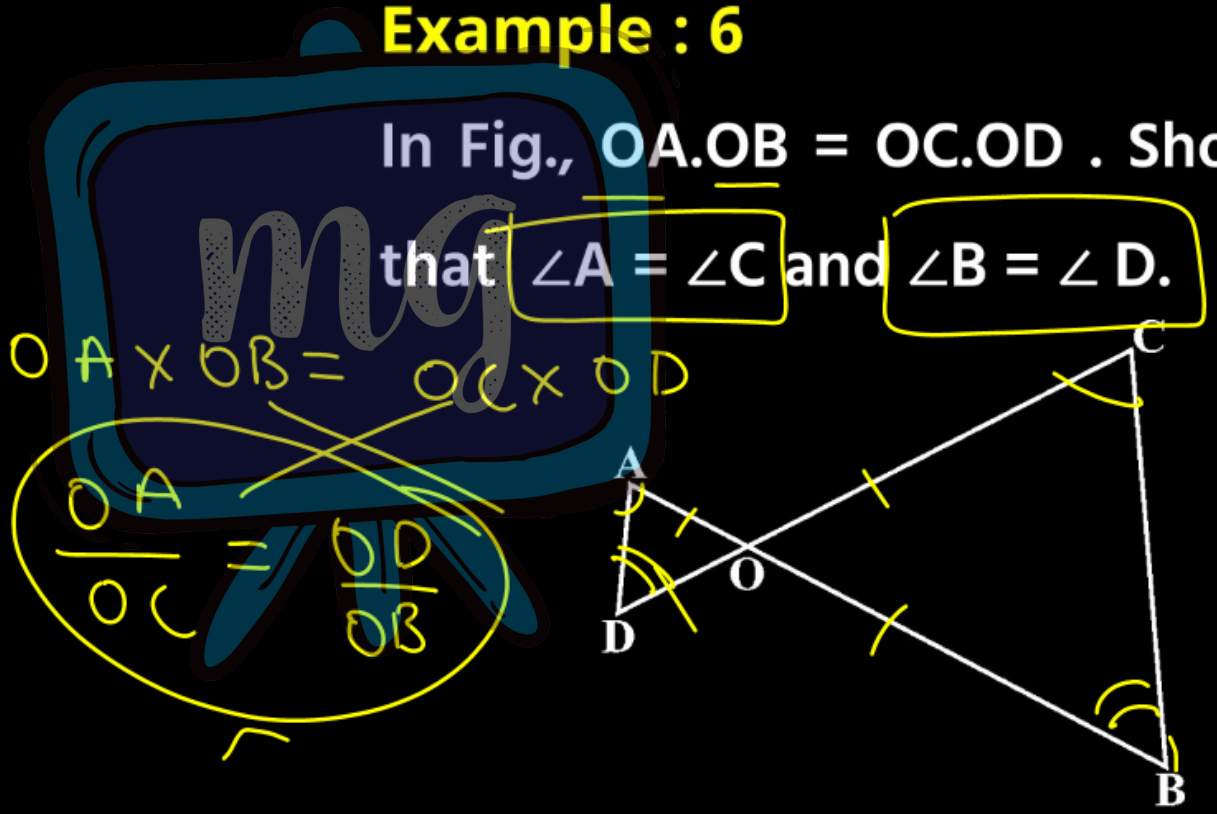
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Example : 6

In Fig., OA.OB = OC.OD . Show that $\angle A = \angle C$ and $\angle B = \angle D$.



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

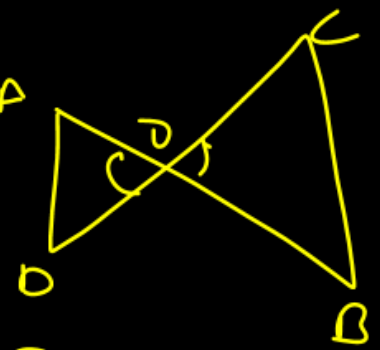
$\triangle DOCB \sim \triangle OAD$

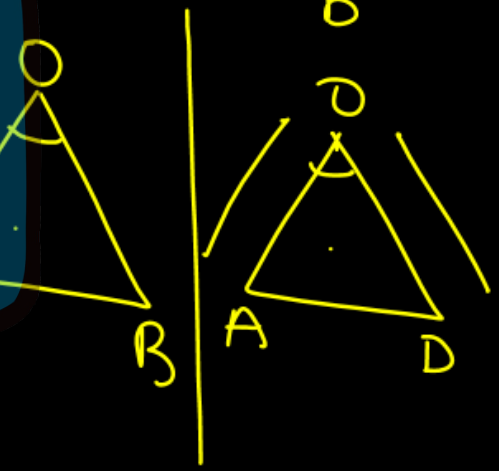
Hence by

CPST

$\angle A = \angle C$

$\angle B = \angle D$





$\angle COB = \angle AOD$

By SAS - Similarity Rule