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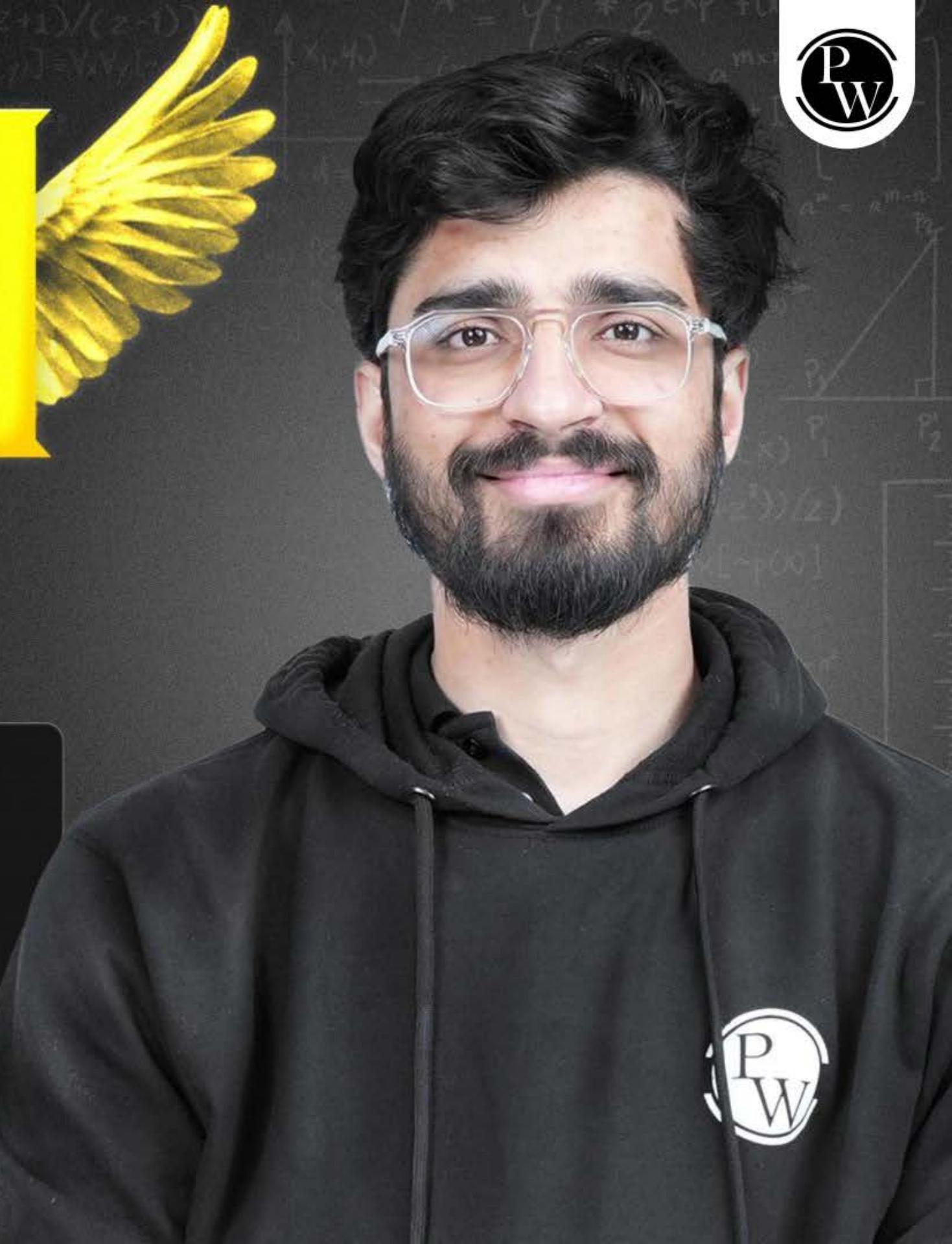
2026

Triangles

MATHS

LECTURE-3

BY-RITIK SIR



Topics

to be covered

Recalling Congruency of triangles

Concept of Similarity and Questions //



easy //

#Q. ABCD is a parallelogram, P is a point on side BC and DP when produced meets

AB produced at L. Prove that $\frac{DP}{PL} = \frac{DC}{BL}$.

Given: ABCD is a ||gm.

$$\text{To Prove: } \frac{DP}{PL} = \frac{DC}{BL}$$

Proof: $\because AD \parallel BC$
 $\Rightarrow AD \parallel BP$

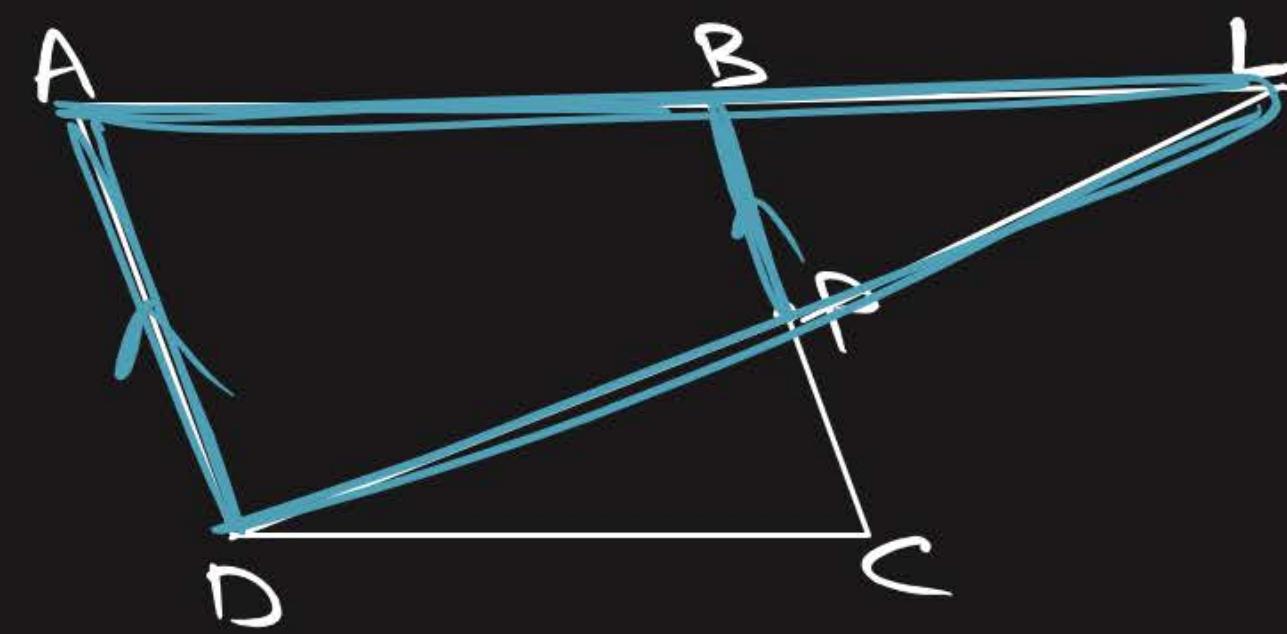
By B.P.T,

$$\frac{DP}{PL} = \frac{AB}{BL}$$

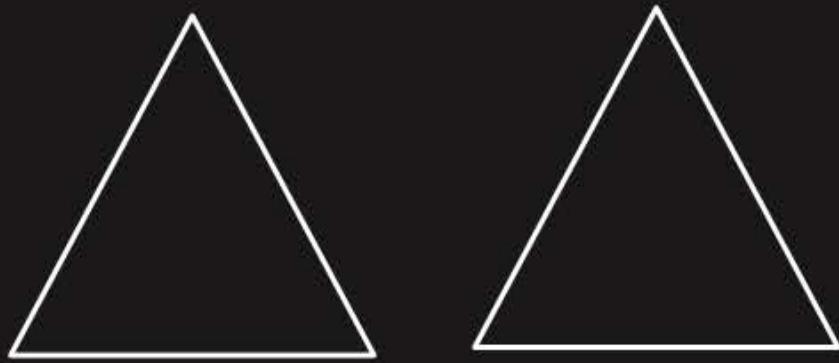
$\therefore AB = DC$
 (Opp. sides
 of ||gm)

$$\frac{DP}{PL} = \frac{DC}{BL}$$

A.P



Congruent \rightarrow shape \rightarrow equal.
 \rightarrow size \rightarrow equal. (superimpose)



$$\triangle ABC \cong \triangle PQR$$

$$AB = PQ$$

$$BC = QR$$

$$AC = PR$$

$$\angle A = \angle P$$

$$\angle B = \angle Q$$

$$\angle C = \angle R$$

1

SAS

2

SSS

3

ASA

4

AAS

5

RHS.

6

Criteria's



Concept of Similarity

In earlier classes, we have learnt about congruent figures. Two geometric figures having the same shape and size are known as congruent figures. Note that congruent figures are alike in every respect. In this chapter, we shall study about similarity of geometric figures. Geometric figures having the same shape but different sizes are known as similar figures. Two congruent figures are always similar but similar figures need not be congruent as discussed in the following illustrations.

Similar \rightarrow Shape \rightarrow equal.
Similar \rightarrow Size \rightarrow alg-ho sahita hai.



Illustration – 1

Any two line segments are always similar but they need not be congruent. They are congruent, if their lengths are equal.

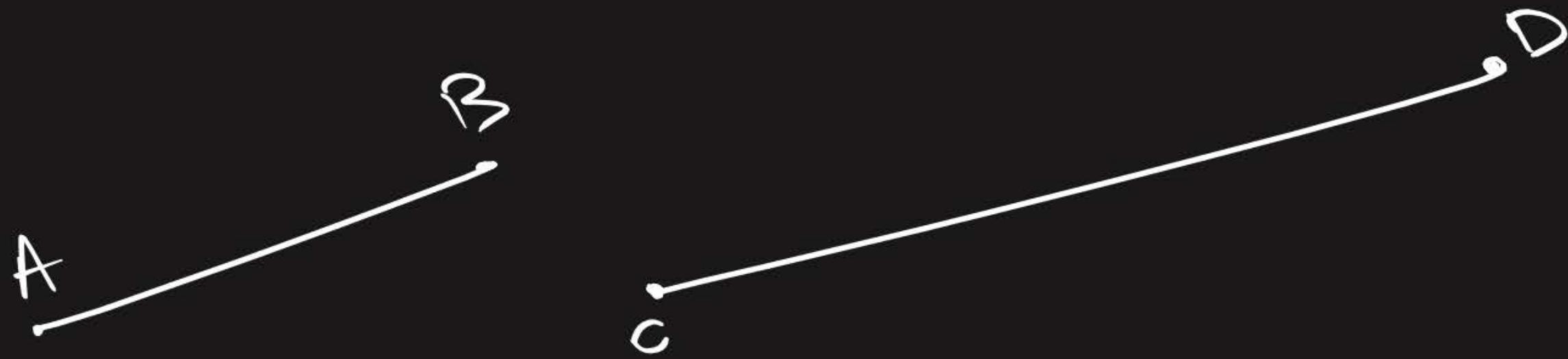
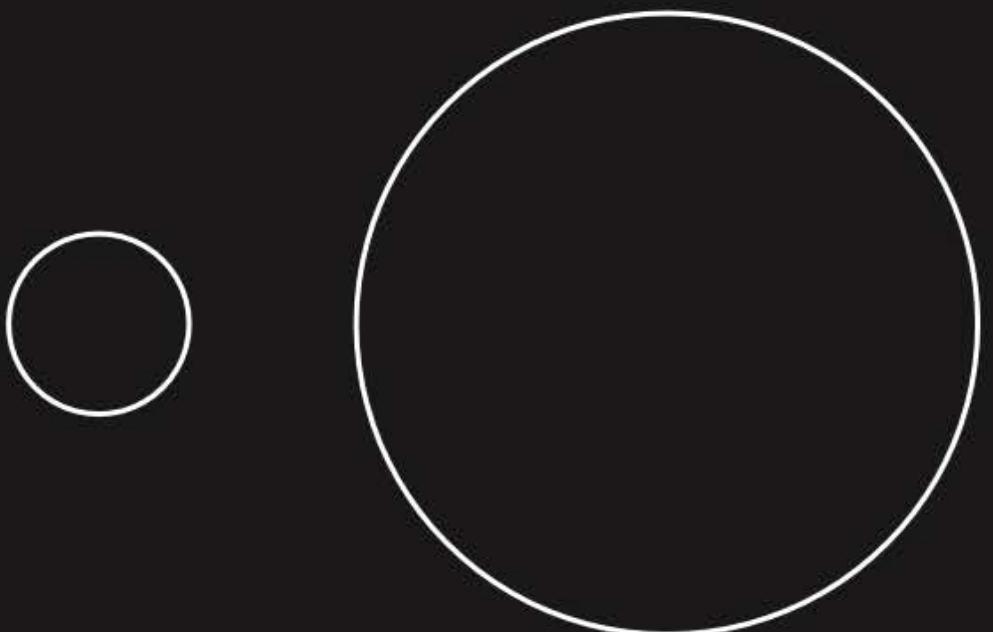




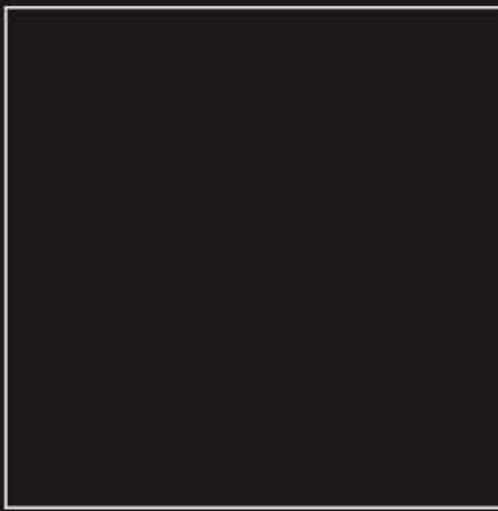
Illustration – 2

Any two circles are similar but not necessarily congruent. They are congruent if their radii are equal.





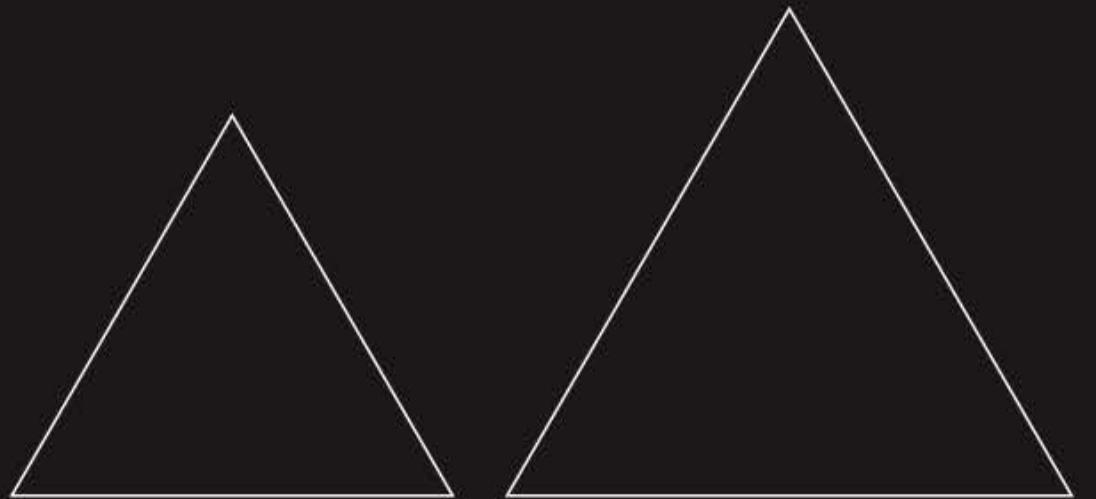
Any two squares are similar





Any two equilateral triangles are similar

If two figures are similar one can be obtained from the other either by shrinking or by stretching, without changing its shape. There is one-to-one correspondence between the parts of two similar figures.



#Q. All circles and squares are

NCERT Intex

A Congruent

B Similar

C Both (A) and (B)

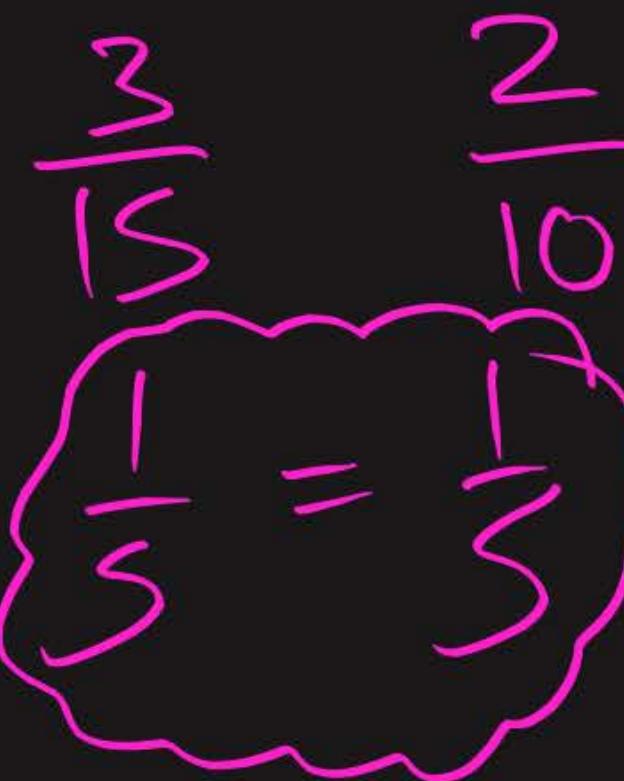
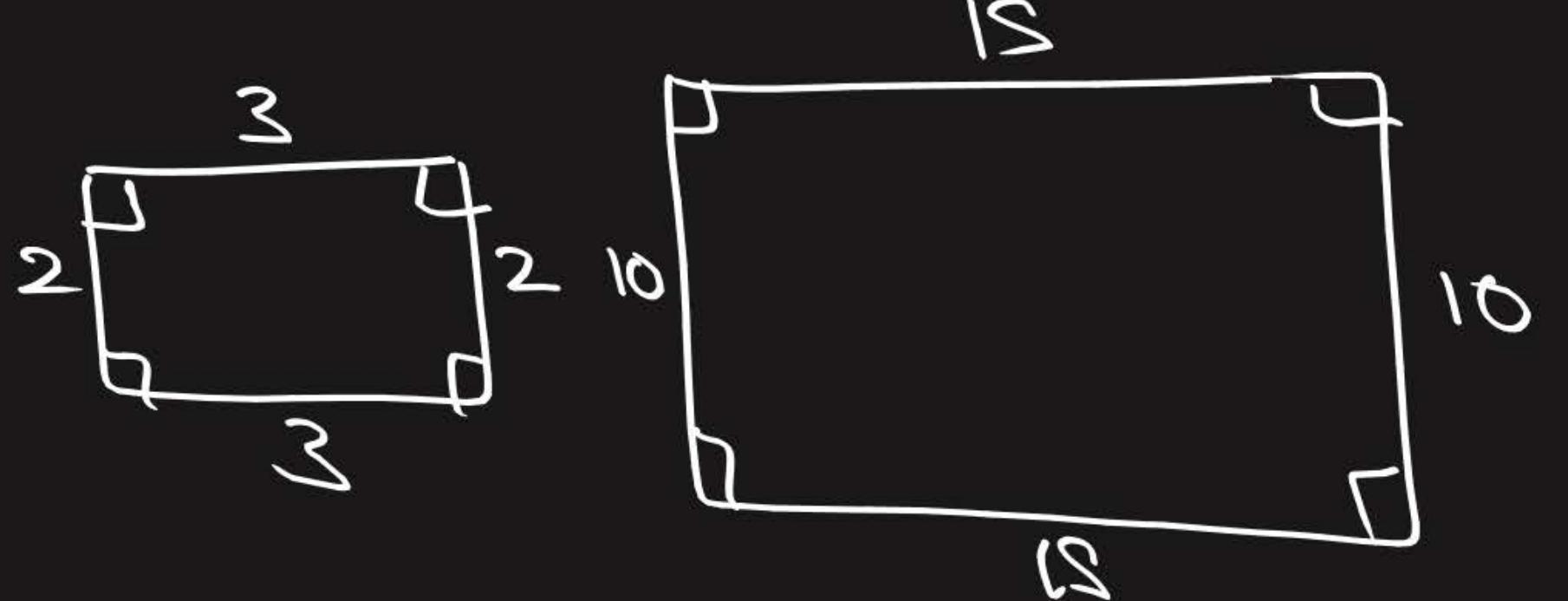
D None of these



Similar Polygons

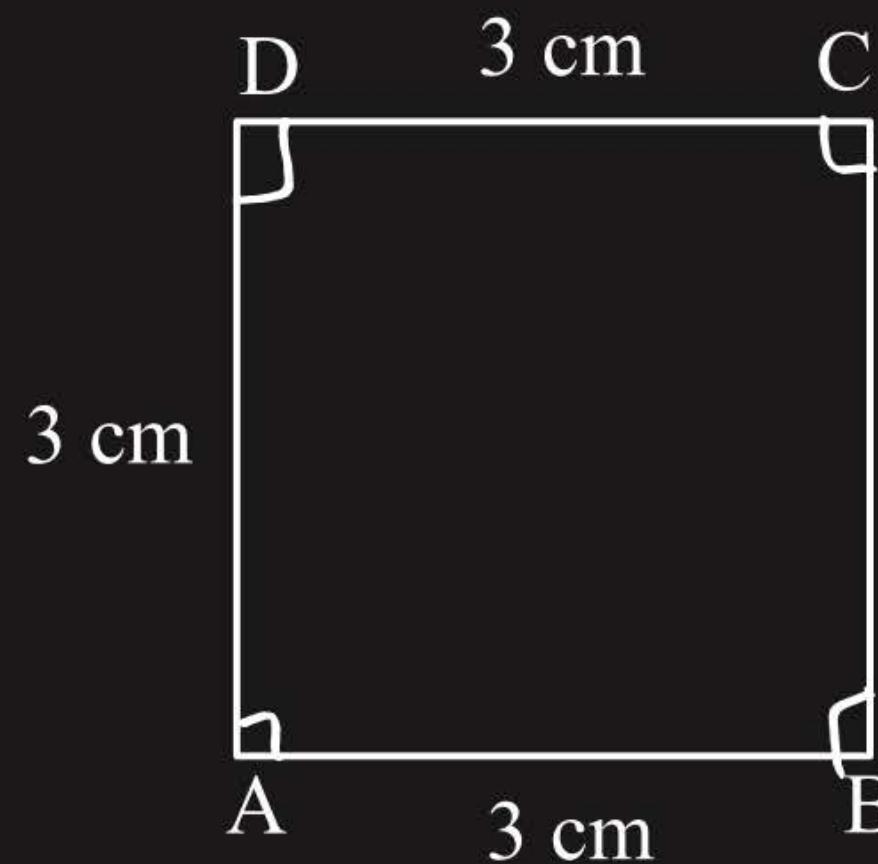
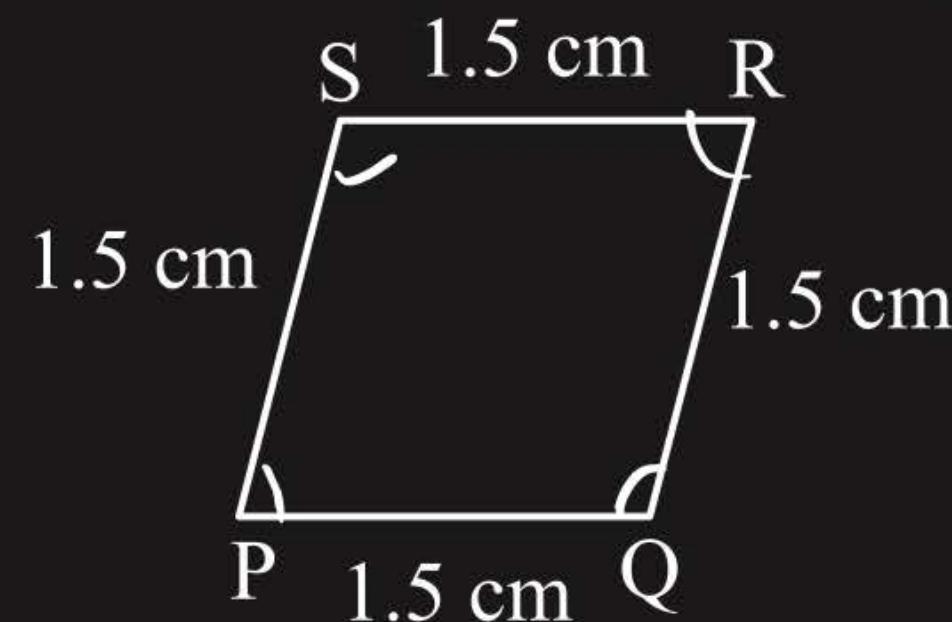
Definition : Two polygons are said to be similar to each other, if

- (i) Their corresponding angles are equal, and
- (ii) The lengths of their corresponding sides are proportional.



#Q. State whether the following quadrilaterals are similar or not:

$$\angle 1 = \angle 2 = \angle 3 = \angle 4$$



NCERT Intex

Not Similar

Similarity of Triangles



If two Δ's are similar,
then - - -

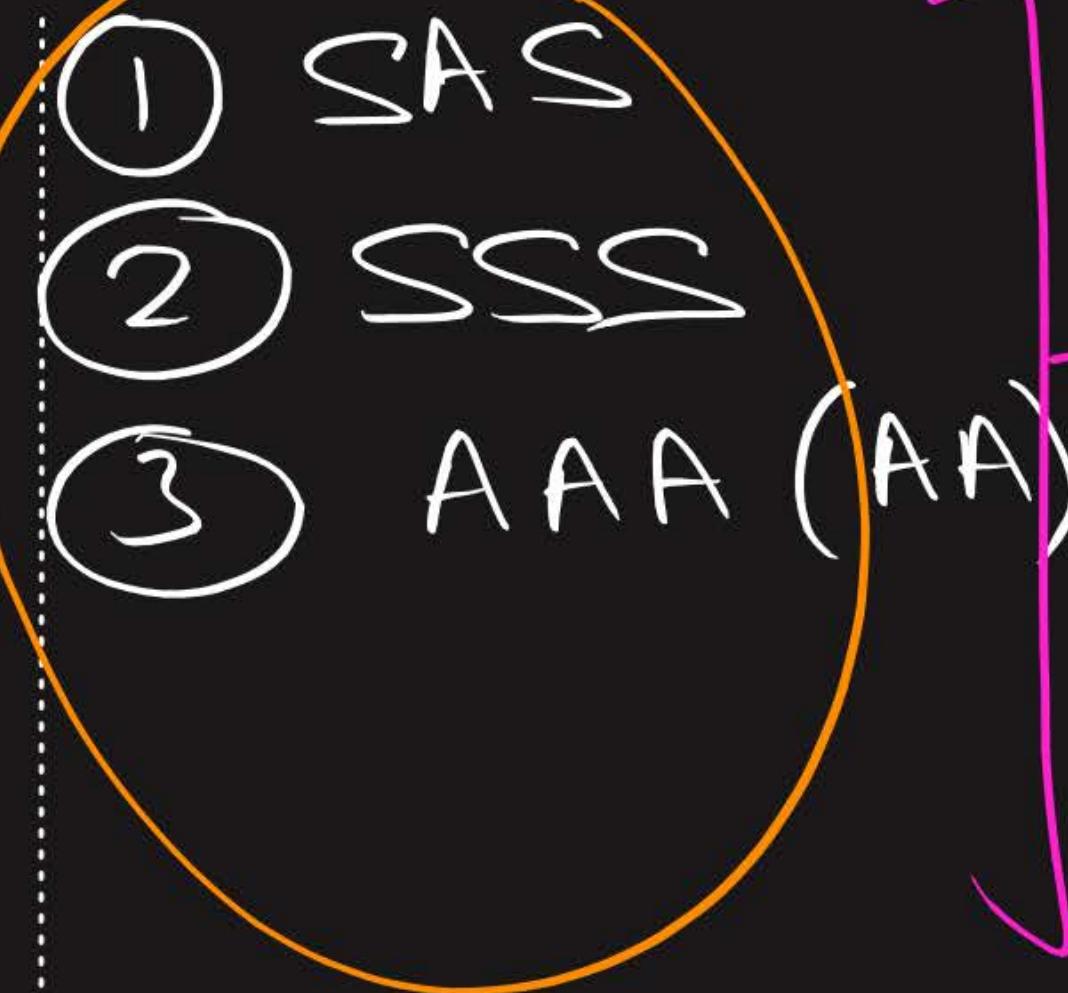
$$\Delta ABC \sim \Delta PQR$$

$$\angle A = \angle P$$

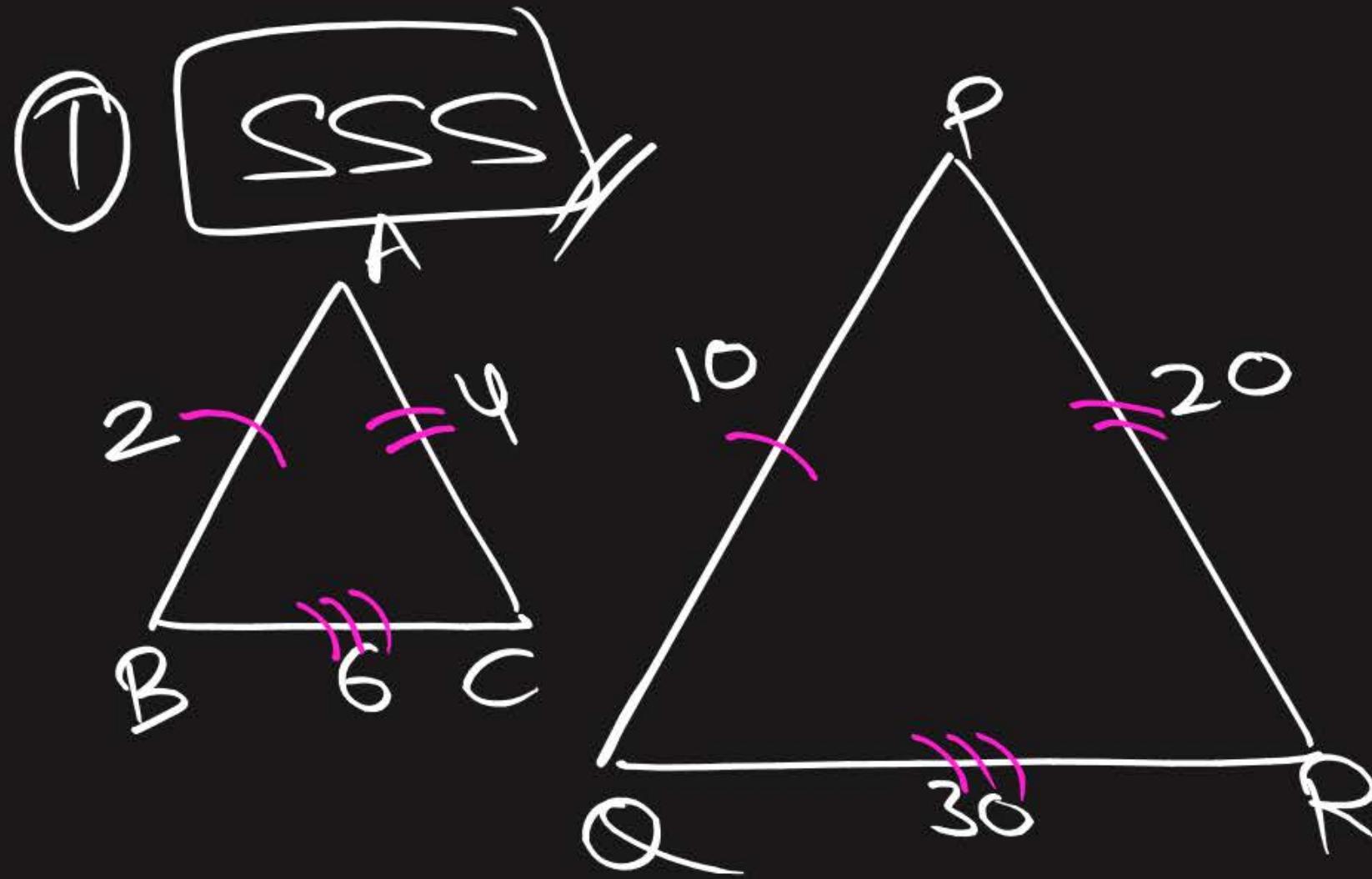
$$\angle B = \angle Q$$

$$\angle C = \angle R$$

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



→ Proofs' Recorded
↓
uploaded



$$\frac{2}{10} = \frac{4}{20} = \frac{6}{30}$$

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

$$\triangle ACB \sim \triangle PRO$$

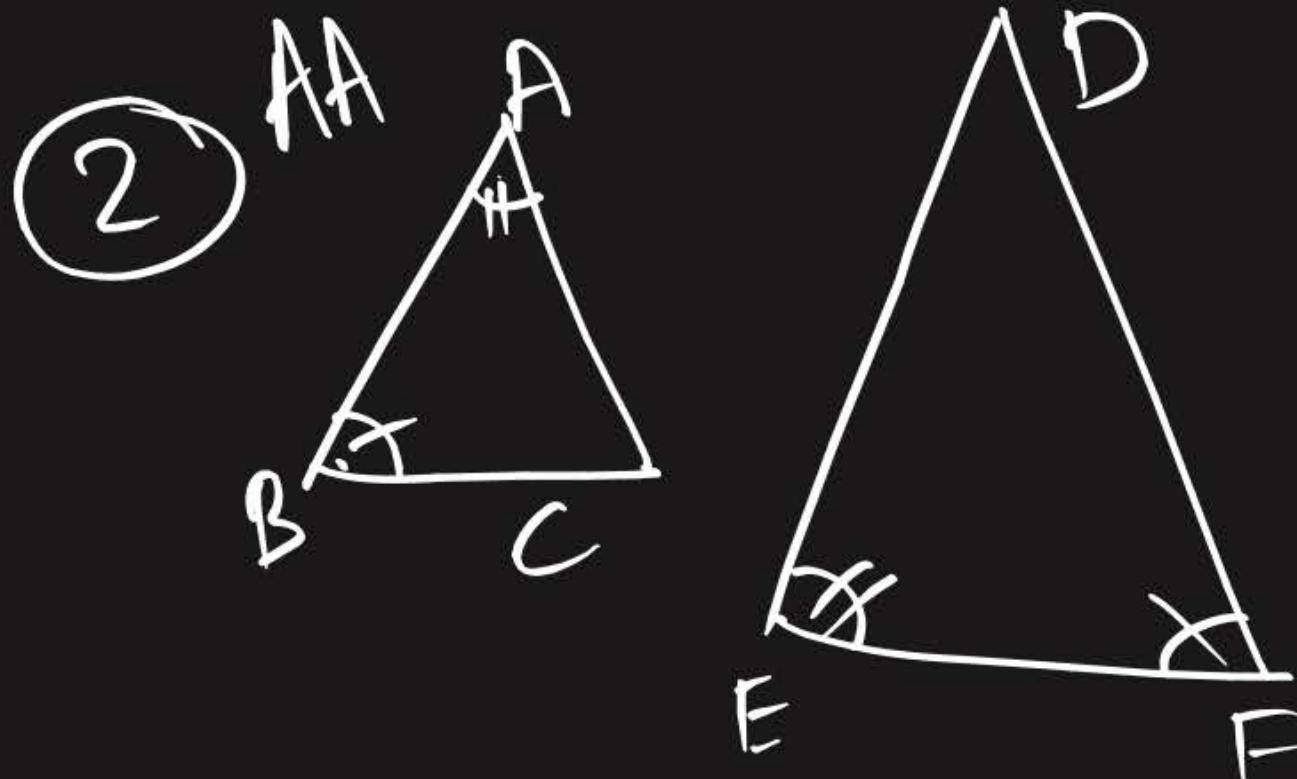
Pattern

By CPST,

$$\angle A = \angle P$$

$$\angle C = \angle R$$

$$\angle B = \angle Q$$



By AA,

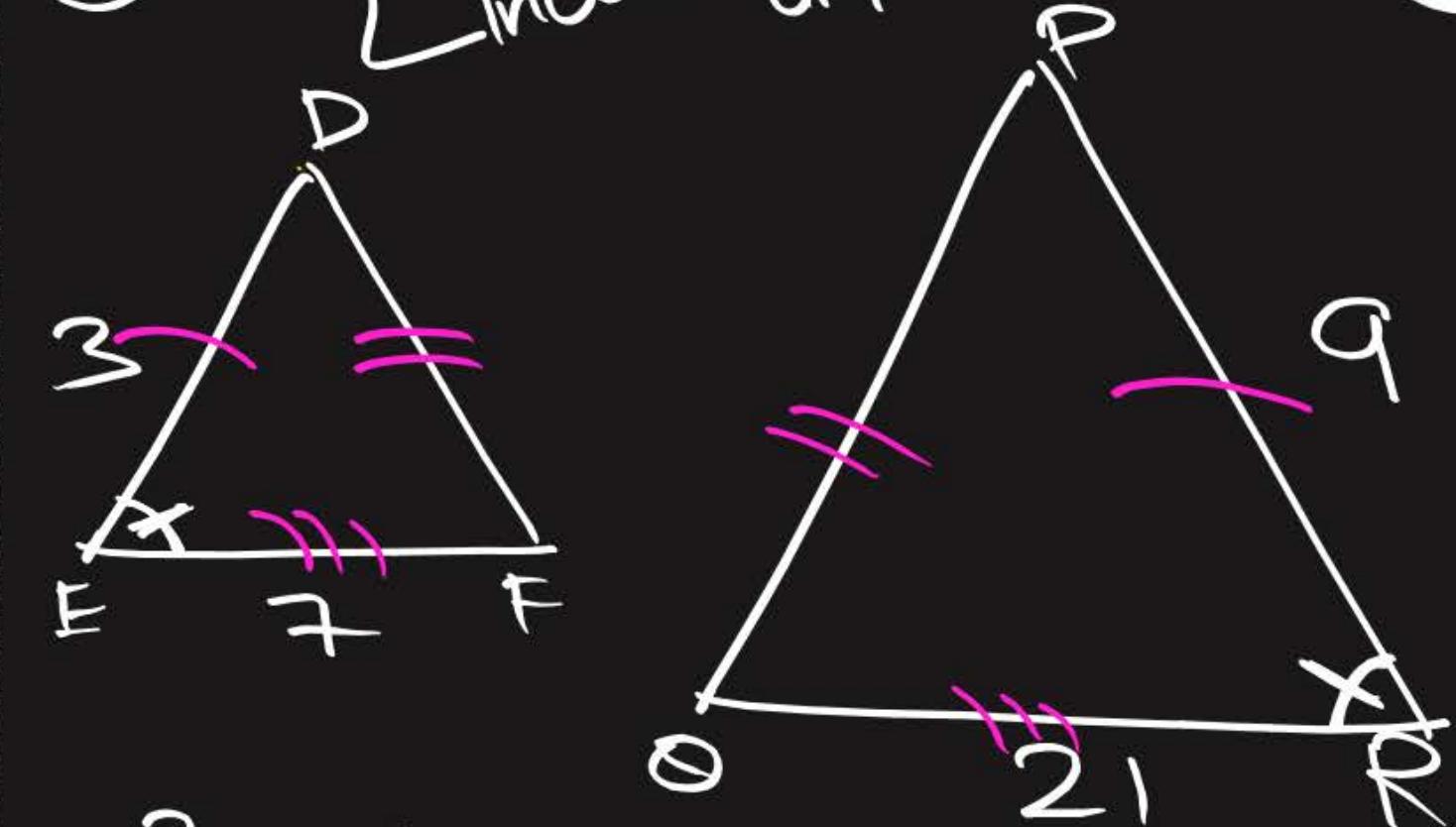
$$\triangle CAB \sim \triangle DEF$$

By CPST,

$$\angle C = \angle D$$

$$\frac{CA}{DE} = \frac{AB}{EF} = \frac{CB}{DF}$$

③ SAS
∠ included angle.



$$\frac{DF}{PR} = \frac{EF}{OR}$$

$$\angle F = \angle R$$

$$\angle E = \angle Q$$

$$\triangle DFE \sim \triangle POR$$

By CPST,

$$\angle D = \angle P, \angle F = \angle O$$

$$\frac{DF}{PO} = \frac{FE}{OR} = \frac{DE}{PR}$$



Criteria of Similarity of Similar Triangles

Let $\triangle ABC$ and $\triangle DEF$ be two given triangles

$\triangle ABC$ will be similar to $\triangle DEF$ (i.e. $\triangle ABC \sim \triangle DEF$). If

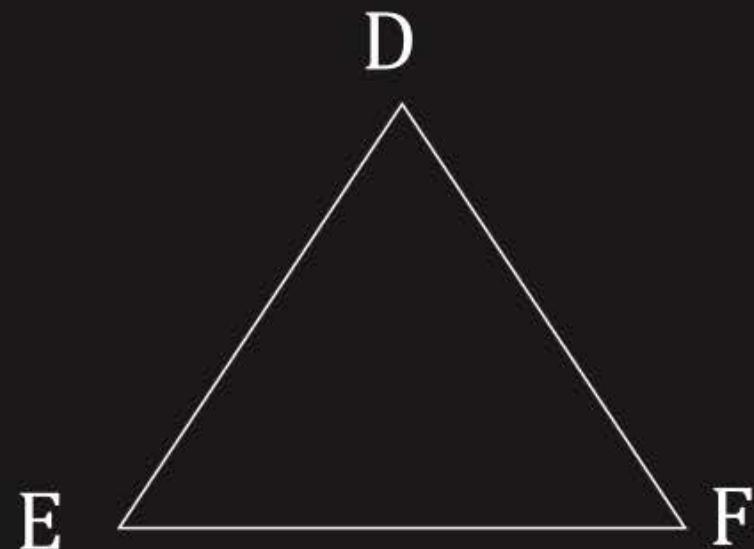
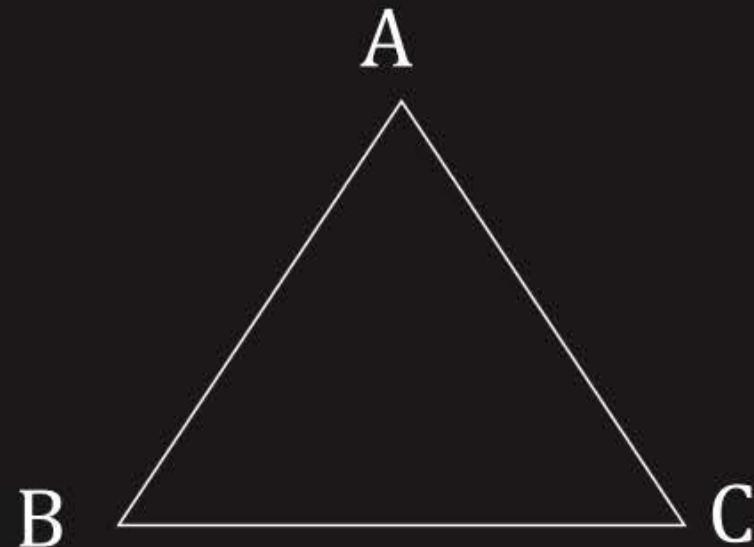
any one of the following conditions holds good.

(a) When the corresponding angles are equal

i.e. $\angle A = \angle D$; $\angle B = \angle E$; $\angle C = \angle F$,

then the triangles are said to be similar by

AAA similarity.





Criteria of Similarity of Similar Triangles

(b) **When two angles are equal**

i.e. $\angle A = \angle D$; $\angle B = \angle E$,

then the triangles are said to be similar by AA similarly.

(c) **When the corresponding sides are proportional**

i.e., $\frac{AB}{DE} = \frac{AC}{DF} = \frac{BC}{EF}$,

then the triangles are said to be similar by SSS similarity.



Criteria of Similarity of Similar Triangles

(d) When any two corresponding sides are proportional and the included angles are equal

i.e. $\frac{AB}{DE} = \frac{AC}{DF}$ and $\angle A = \angle D$,

then the triangles are said to be similar by SAS similarity.

#Q. If $\Delta ABC \sim \Delta EDF$, then which of the following is not true?

A $BC \cdot EF = AC \cdot FD$

B $AB \cdot EF = AC \cdot DE$.

C $BC \cdot DE = AB \cdot EF$

D $BC \cdot DE = AB \cdot FD$

$$\frac{AB}{ED} = \frac{BC}{DF} = \frac{AC}{EF}$$

#Q. If in ΔABC and ΔDEF , $\frac{AB}{DE} = \frac{BC}{FD}$, then they will be similar, when

A $\angle B = \angle E$

B $\angle A = \angle D$

C ~~$\angle B = \angle D$~~

D $\angle A = \angle F$



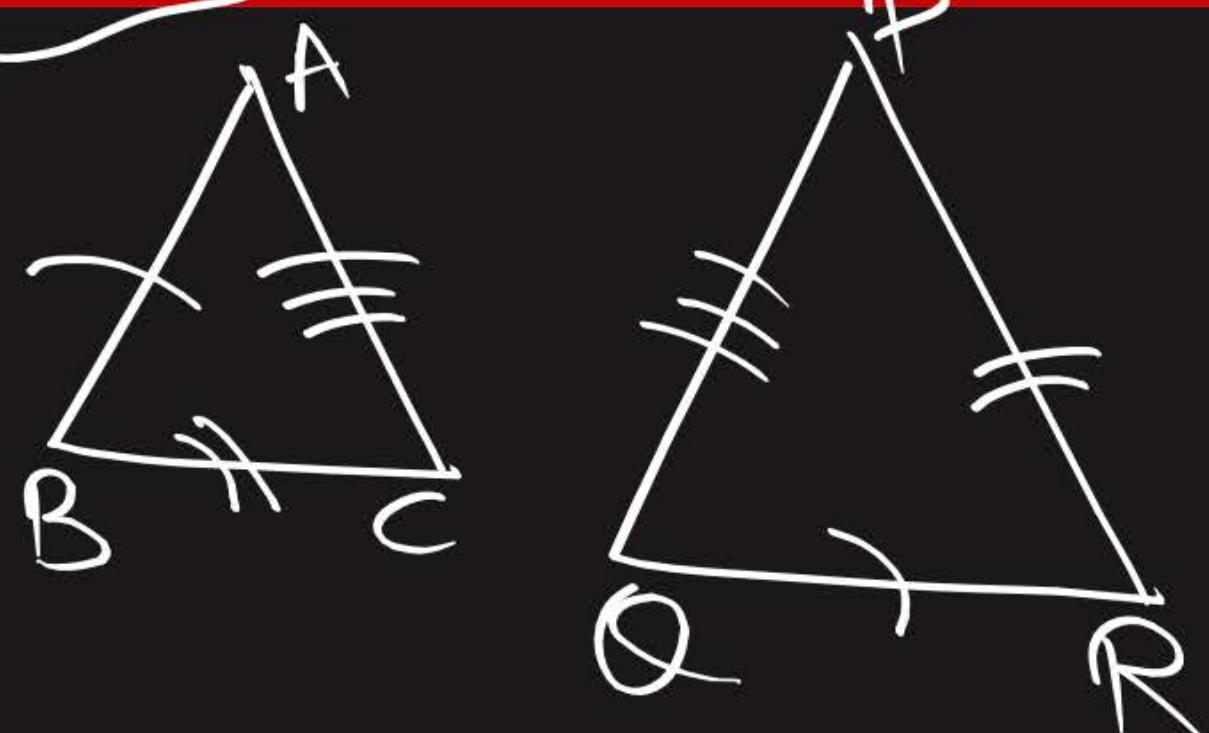
#Q. If in two triangles ABC and PQR, then $\frac{AB}{QR} = \frac{BC}{PR} = \frac{CA}{PQ}$.

A $\Delta PQR \sim \Delta CAB$

B $\Delta PQR \sim \Delta ABC \times$

C $\Delta CBA \sim \Delta PQR \times$

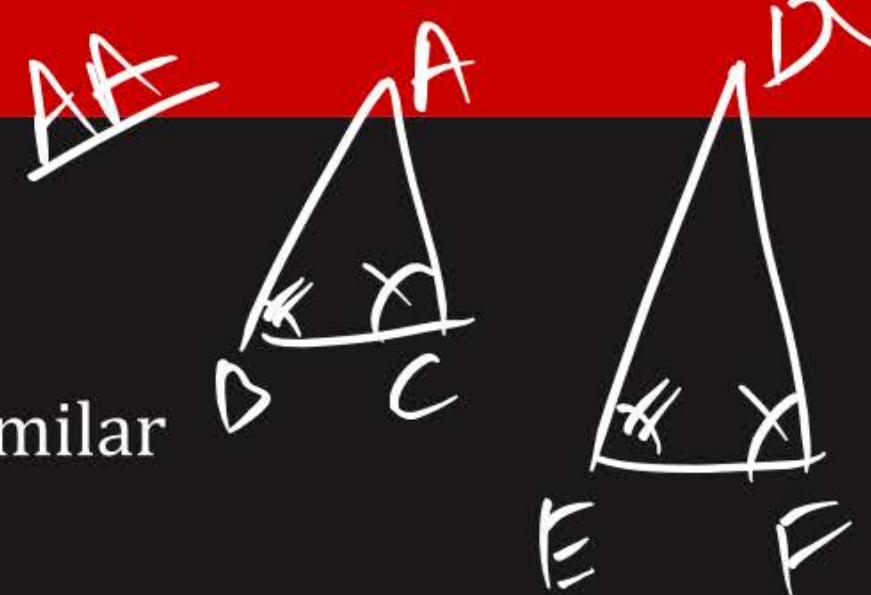
D $\Delta BCA \sim \Delta PQR \times$



NCERT Exemplar

SSS

#Q. In a $\triangle ABC$ and $\triangle DEF$, $\angle F = \angle C$, $\angle B = \angle E$ and $AB = \frac{1}{2} DE$. Then the two triangles are



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A

Congruent, but not similar

B

Similar, but not congruent

C

Neither congruent nor similar

D

Congruent as well as similar

#Q. If in two triangles DEF and PQR, $\angle D = \angle Q$ and $\angle R = \angle E$, then which of the following is not true?

NCERT Exemplar

A $\frac{EF}{PR} = \frac{DF}{PQ}$

C $\frac{DE}{QR} = \frac{DF}{PQ}$

B ~~$\frac{DE}{PQ} = \frac{FE}{RP}$~~

D ~~$\frac{EF}{RP} = \frac{DF}{QR}$~~

AA

$$\Delta DEF \sim \Delta QRP$$

CPST $\frac{DE}{QR} = \frac{EF}{RP} = \frac{DF}{QP}$

#Q. If is given that $\Delta ABC \sim \Delta DFE$, $\angle A = 30^\circ$ $\angle C = 50^\circ$, $AB = 5$ cm, $AC = 8$ cm and $DF = 7.5$ cm. Then, which of the following is true?

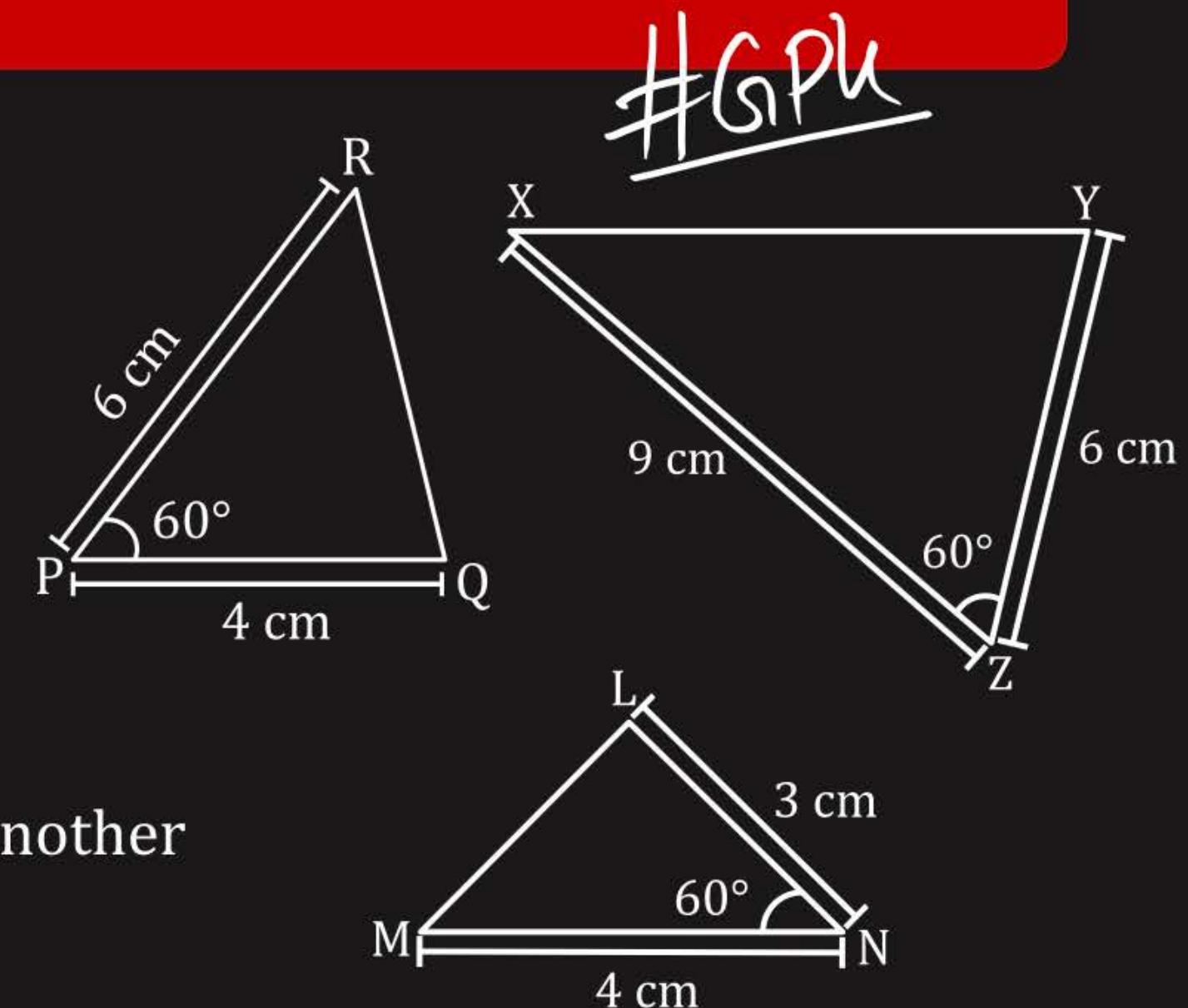
NCERT Exemplar

- A** $DE = 12$ cm, $\angle F = 50^\circ$
- B** $DE = 12$ cm, $\angle F = 100^\circ$
- C** $EF = 12$ cm, $\angle D = 100^\circ$
- D** $EF = 12$ cm, $\angle D = 30^\circ$

#GPK

#Q. Show below are three triangles. The measure of two adjacent sides and included angle are given for each triangle. Which of these triangles are similar?

- A** $\triangle RPQ$ and $\triangle XZY$
- B** $\triangle RPQ$ and $\triangle MNL$
- C** $\triangle XZY$ and $\triangle MNL$
- D** $\triangle RPQ$, $\triangle XZY$ and $\triangle MNL$ are similar to one another





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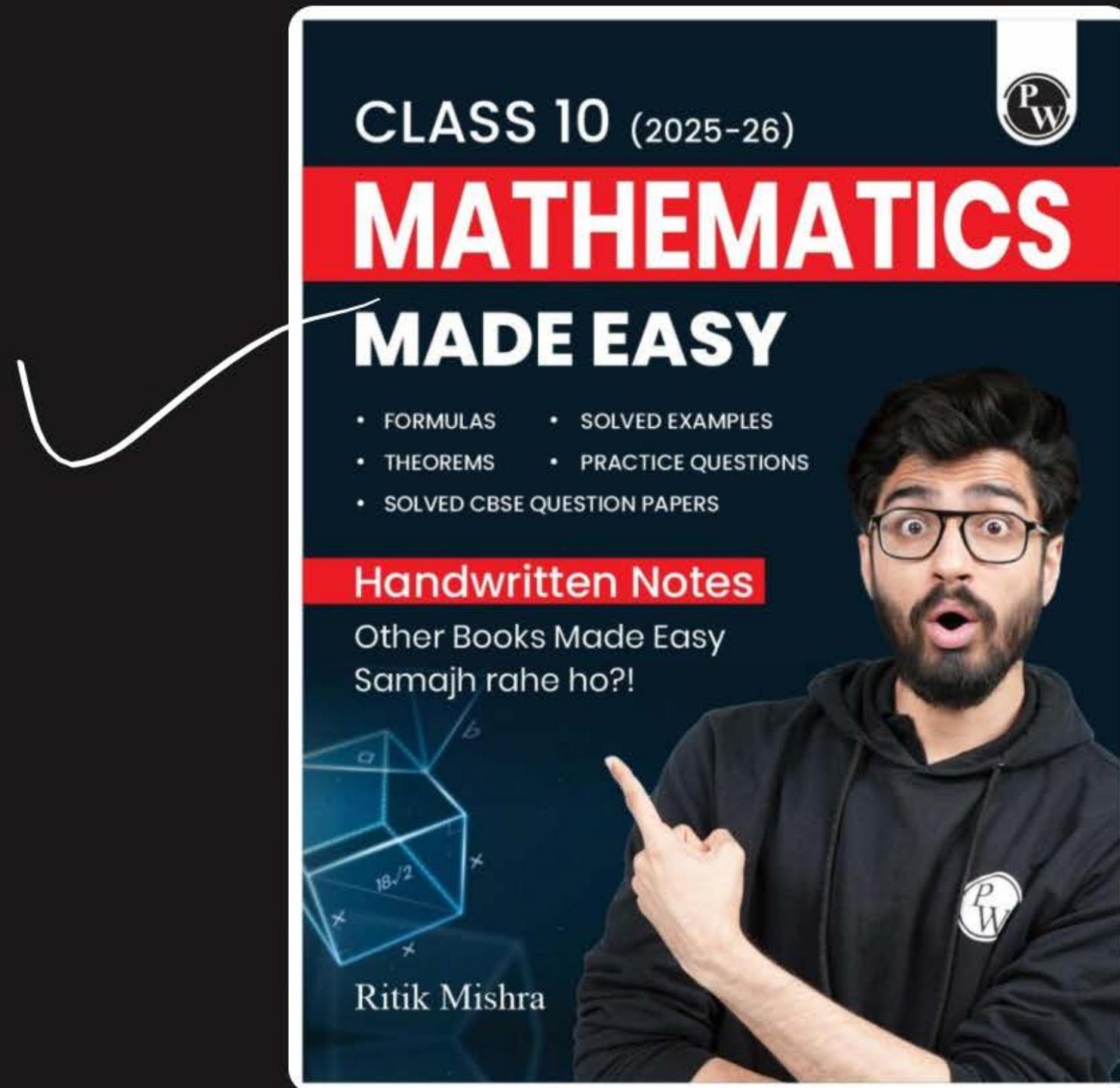
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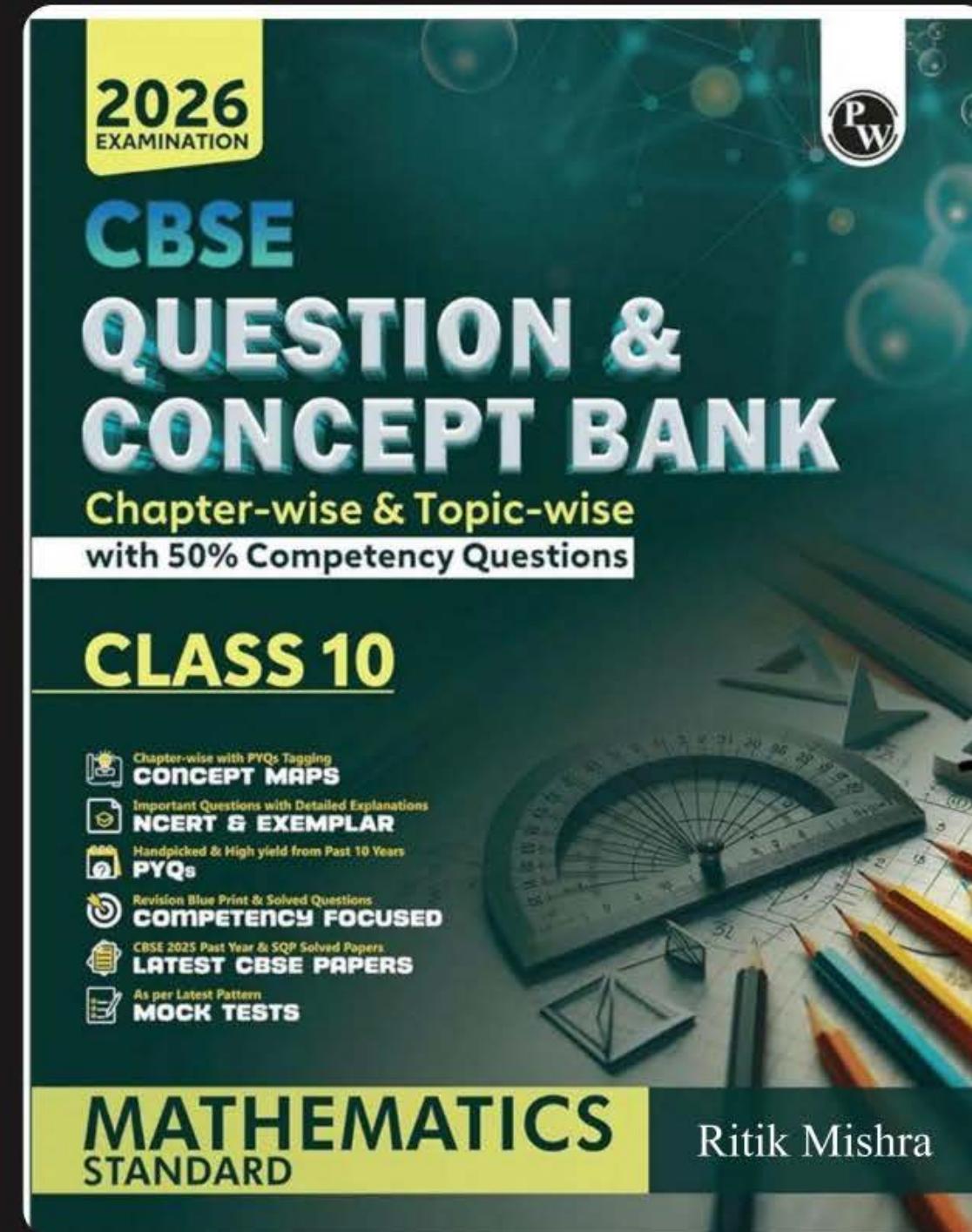
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