UDAAN

2026

Triangles

MATHS LECTURE-4

BY-RITIK SIR

Topics *to be covered*

- **A** Concept and Criteria of Similarity
- **B** Important Questions

Similar → shape → equal.
→ size can be different.

Q Agar size alg, kya similar hai?

Ans: Can't say.

Chota → Bada

⇒ Similar

Congruent → similar

Similar → zaruri nahi hain ki congruent bhi hon.

Criteria

1. AAA (AA)
2. SAS → included
3. SSS

If, $\Delta ABC \sim \Delta PQR$

matbal ⇒ Sath kuch equal.

1. Pattern.
2. CPST

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

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

$\angle A = \angle D \rightarrow 30°$

$\angle B = \angle F \rightarrow 100°$

$\angle C = \angle E \rightarrow 50°$

A. DE = 12 cm, $\angle F = 50°$

B. DE = 12 cm, $\angle F = 100°$

C. EF = 12 cm, $\angle D = 100°$

D. EF = 12 cm, $\angle D = 30°$

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

$$\frac{5}{7.5} = \frac{8}{DE}$$

$$DE = \frac{8 \times \cancel{75}^{15}}{\cancel{5}_{1} \times 10} = 12$$

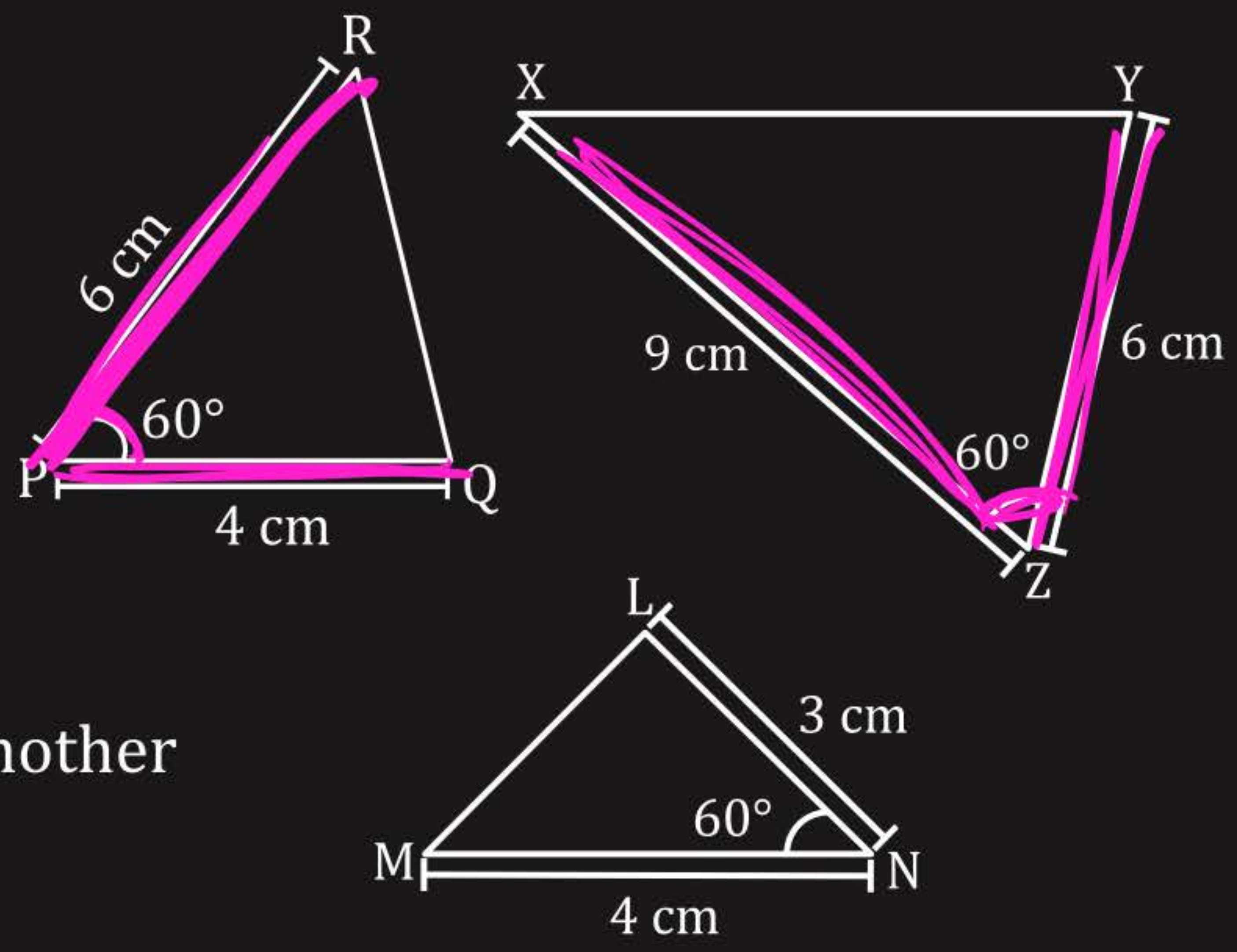
#Q. Show below are three triangles. The measure of two adjacent sides and included angle are given for each triangle. Which of these triangles are similar?

A. ΔRPQ and ΔXZY

B. ΔRPQ and ΔMNL

C. ΔXZY and ΔMNL

D. ΔRPQ, ΔXZY and ΔMNL are similar to one another



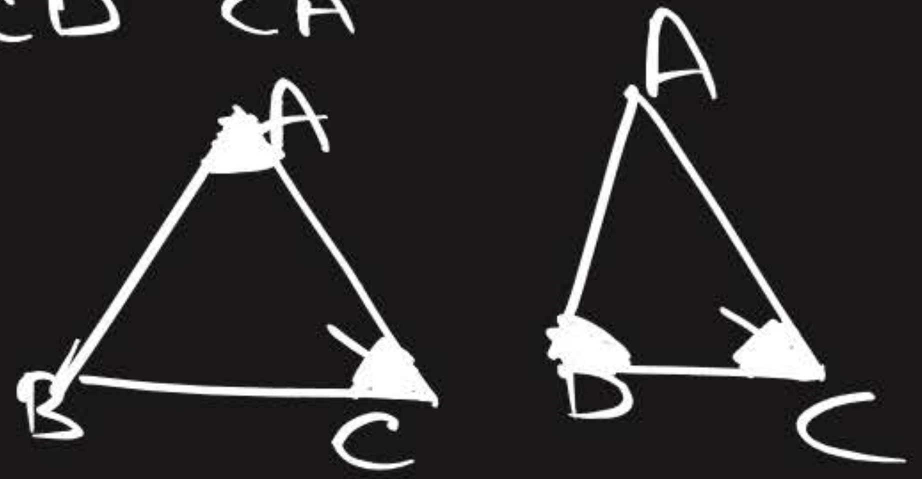
#Q. D is a point on the side BC of ΔABC such that $\angle ADC = \angle BAC$.

Prove that $\frac{CA}{CD} = \frac{CB}{CA}$ or, $CA^2 = CB \times CD$.

G: $\angle ADC = \angle BAC$

TOP: $\frac{CA}{CD} = \frac{CB}{CA}$

Proof:



In ΔABC and ΔADC

$\angle BAC = \angle ADC$ (given)

$\angle BCA = \angle DCA$ (common)

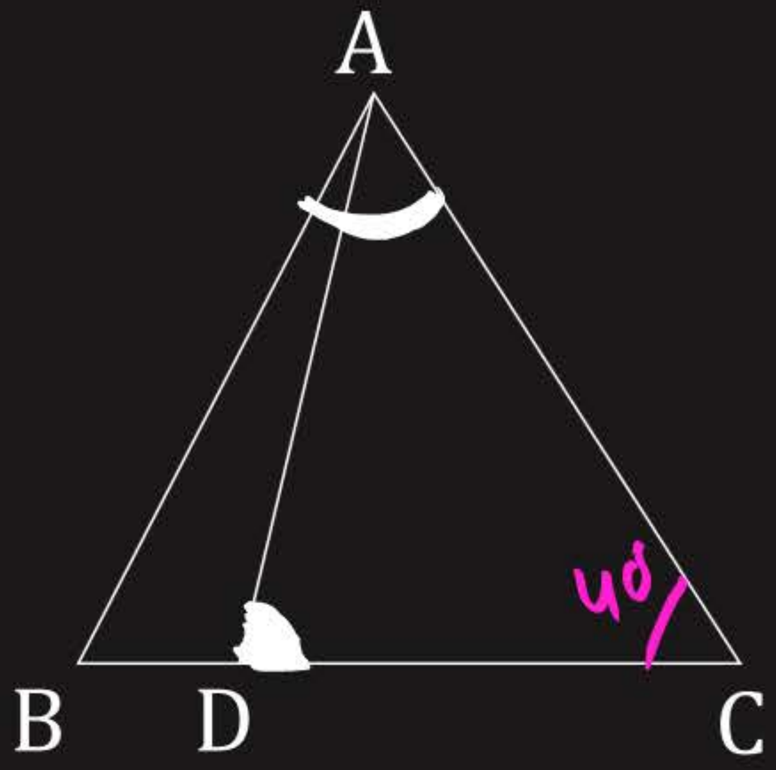
By AA,

$$\boxed{\Delta ACB \sim \Delta DCA}$$

By CPST,

$$\frac{AC}{DC} = \frac{CB}{CA} = \frac{AB}{DA}$$

H.P



angles equal.

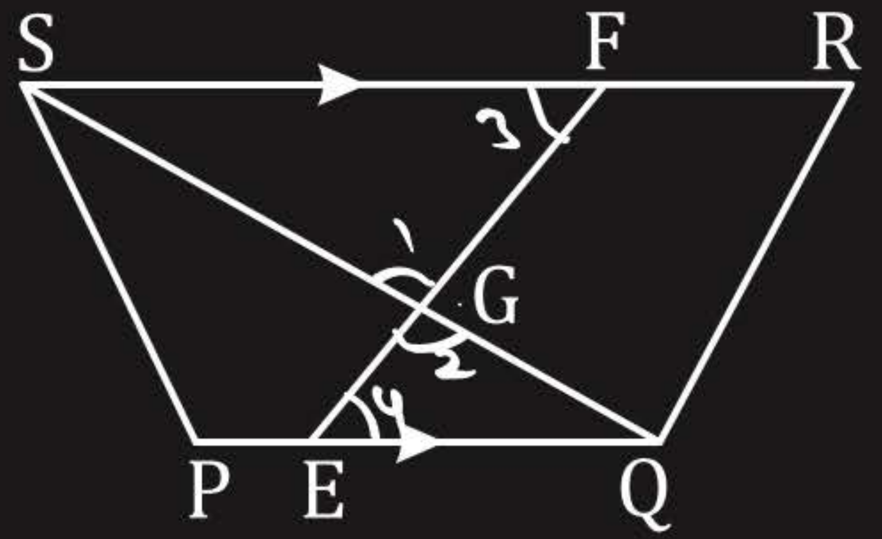
#Q. In the figure, PQRS is a trapezium in which PQ ∥ RS. On PQ and RS, there are points E and F respectively such that EF intersects SQ at G. Prove that EQ × GS = GQ × FS.

$\boxed{FS \times GQ = GS \times EQ}$

G: PQ∥RS

H.P

To p: EQ × GS = GQ × FS



Proof: In △GSF and △GEQ

∠1 = ∠2 (V.O.A)

∠3 = ∠4 (A.I.A)

By AA,

$\boxed{\triangle GFS \sim \triangle GEQ}$

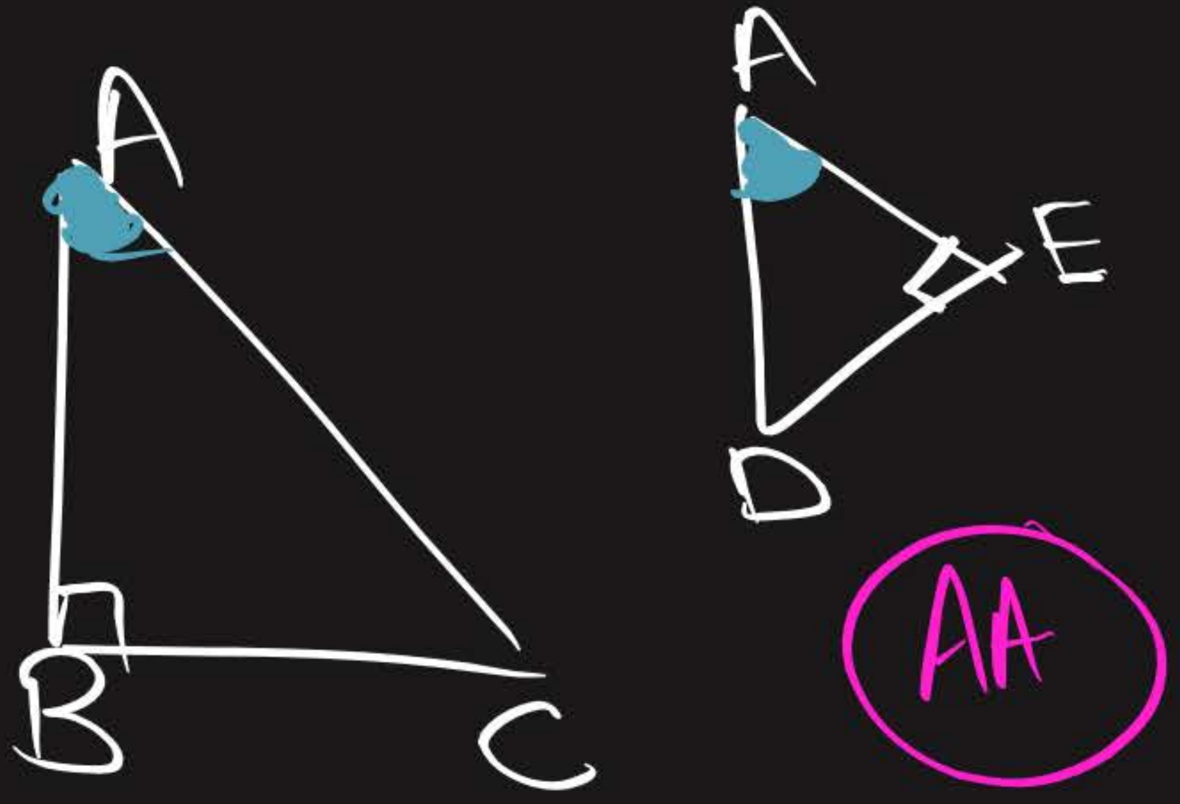
By CPST, $\frac{GF}{GE} = \frac{FS}{EQ} = \frac{GS}{GQ}$

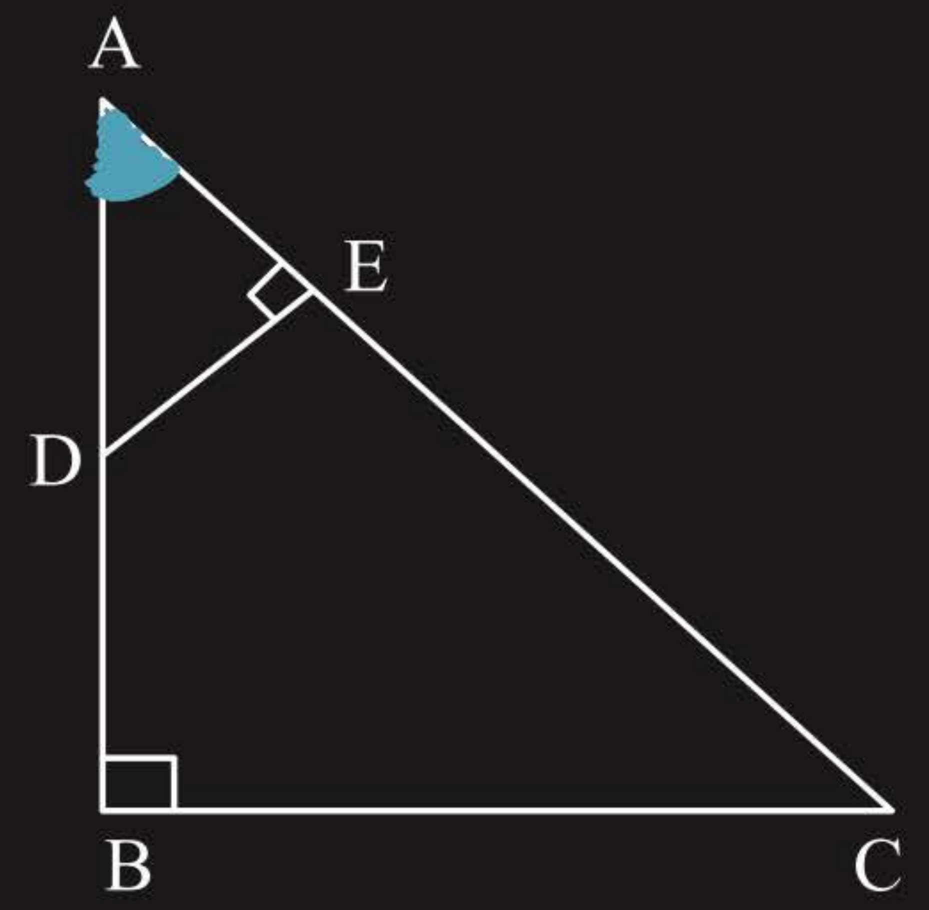
#Q. If AB ⊥ BC and DE ⊥ AC. Prove that ΔABC ~ ΔAED.

G:

To p:

Proof:





#Q. E is a point on side AD produced of a parallelogram ABCD and BE intersects CD at F. Prove that ΔABE ~ ΔCFB.

G: ABCD ||gm.

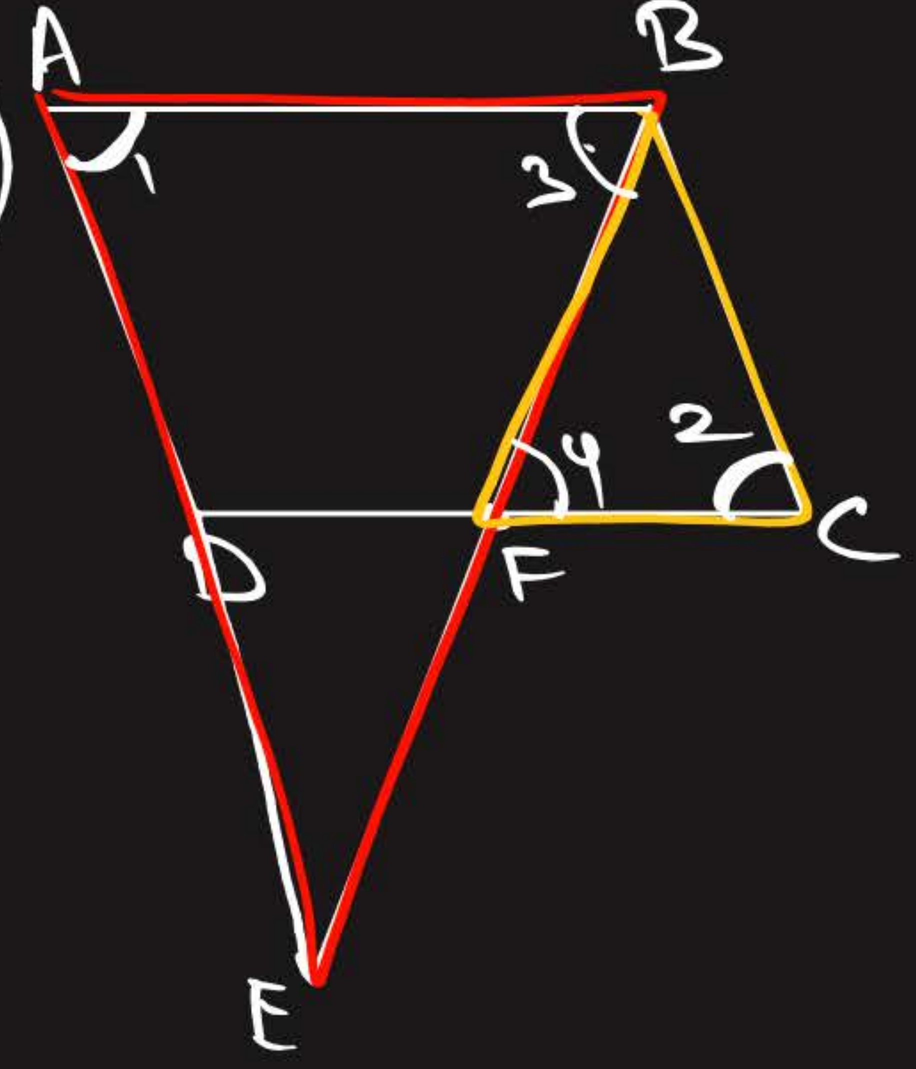
To p:

Proof: $\angle 1 = \angle 2$ (opp. angles of ||gm)

$\angle 3 = \angle 4$ (A.I.A)

AA

$\boxed{\Delta ABE \sim \Delta CFB}$



#Q. In the given figure, express x in terms of a, b and c.

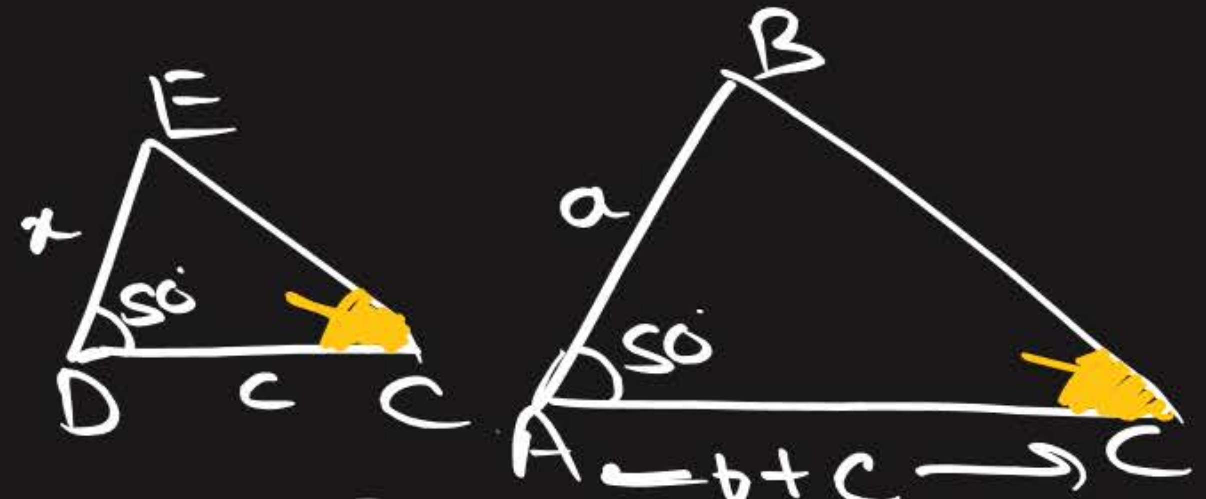
$x = a, b, c$

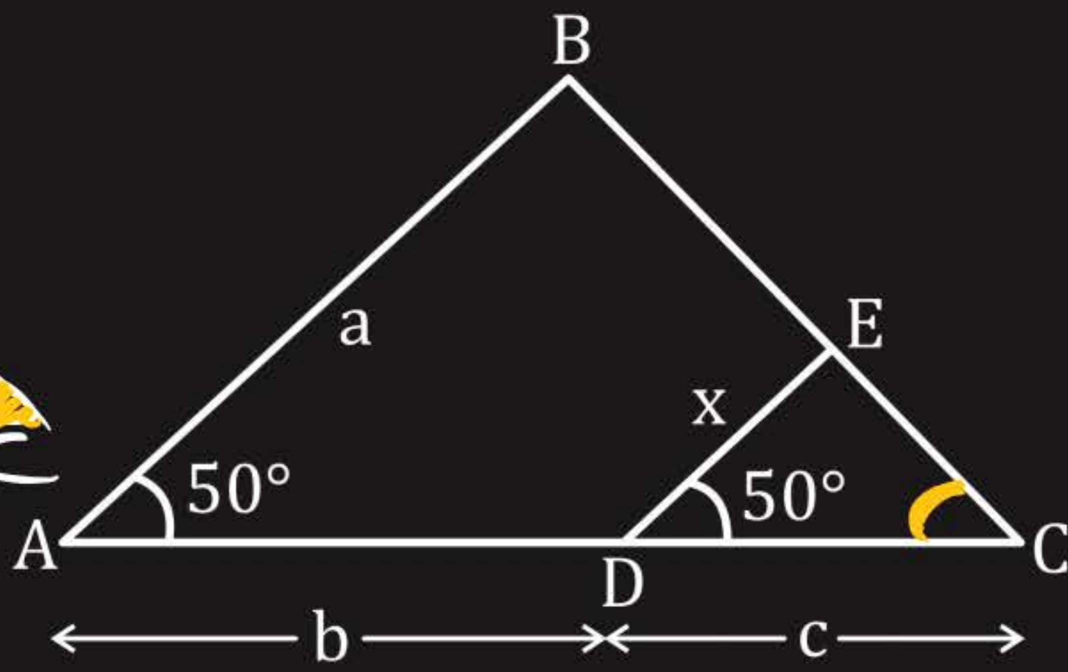
A. $\dfrac{ab}{a+b}$

B. $\dfrac{ac}{b+c}$

C. $\dfrac{a^2}{b+c}$

D. $\dfrac{ac}{a+c}$





AA

$\boxed{\Delta DCE \sim \Delta ACB}$

By CPST

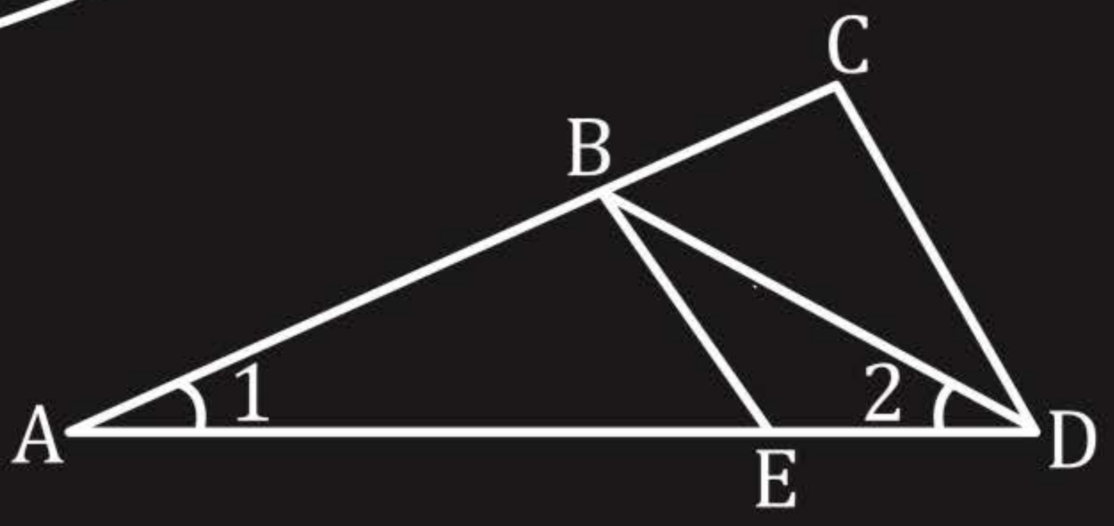
$\dfrac{DC}{AC} = \dfrac{CE}{CB} = \dfrac{DE}{AB}$

$\dfrac{DC}{AC} = \dfrac{DE}{AB}$

$\dfrac{c}{b+c} = \dfrac{x}{a}$

$\dfrac{ac}{b+c} = x$

#Q. In the given figure below, $\frac{AD}{AE} = \frac{AC}{BD}$ and $\angle 1 = \angle 2$. Show that $\Delta BAE \sim \Delta CAD$.



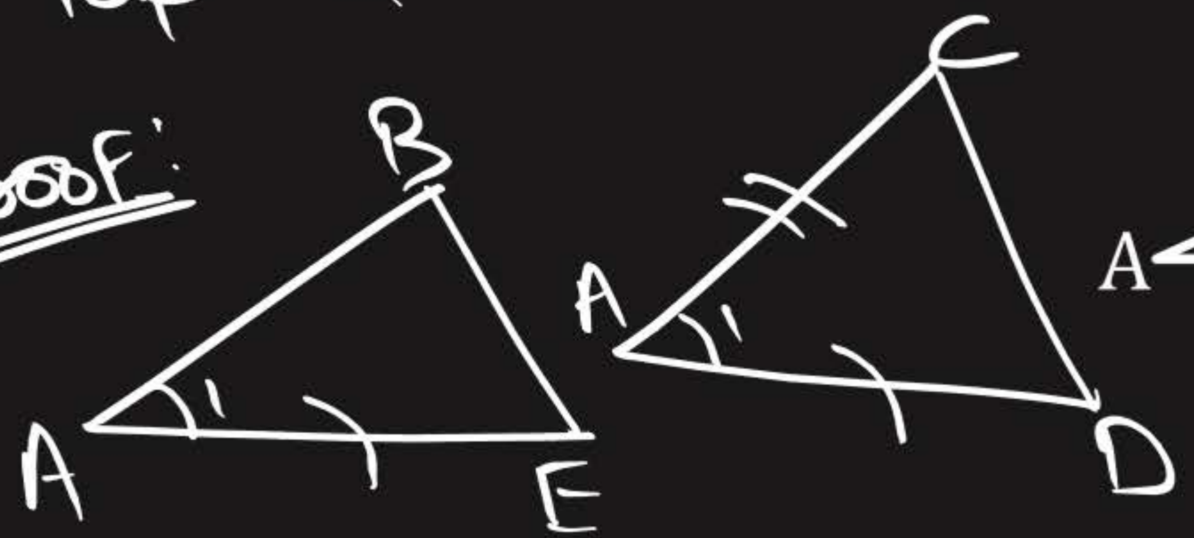
#Hint

If, $\angle Q = \angle R$
then, $PR = PQ$

G:

TOP:

Proof:



$\angle 1 = \angle 2$

$BD = AB$

(sides opp. to equal angle)

In ...... Δ's.

$\angle 1 = \angle 1$ (common)

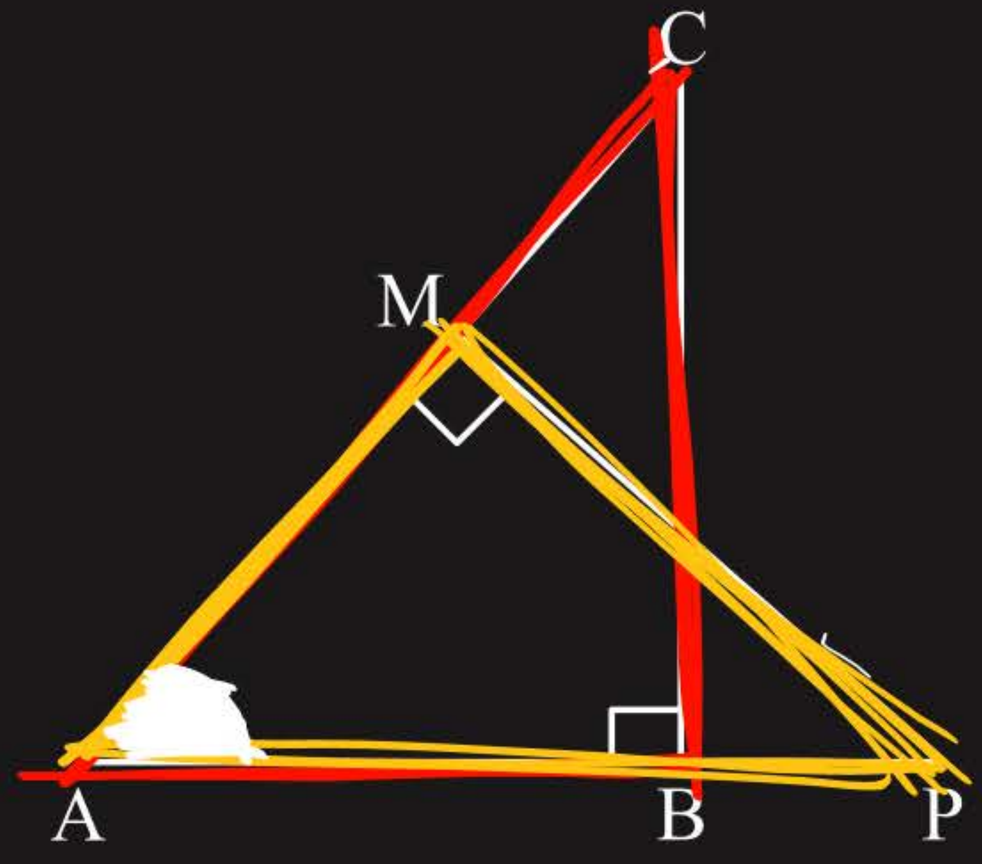
$\frac{AD}{AE} = \frac{AC}{BD} \rightarrow AB$

SAS

$\Delta BAE \sim \Delta CAD$

#Q. In the given figure, ABC and AMP are two right triangles, right angled at B and M respectively, prove that $\Delta ABC \sim \Delta AMP$.

AA



#Q. In the given figure, if $\angle A = 90°$, $\angle B = 90°$, OB = 4.5 cm, OA = 6 cm and AP = 4 cm, then find QB.

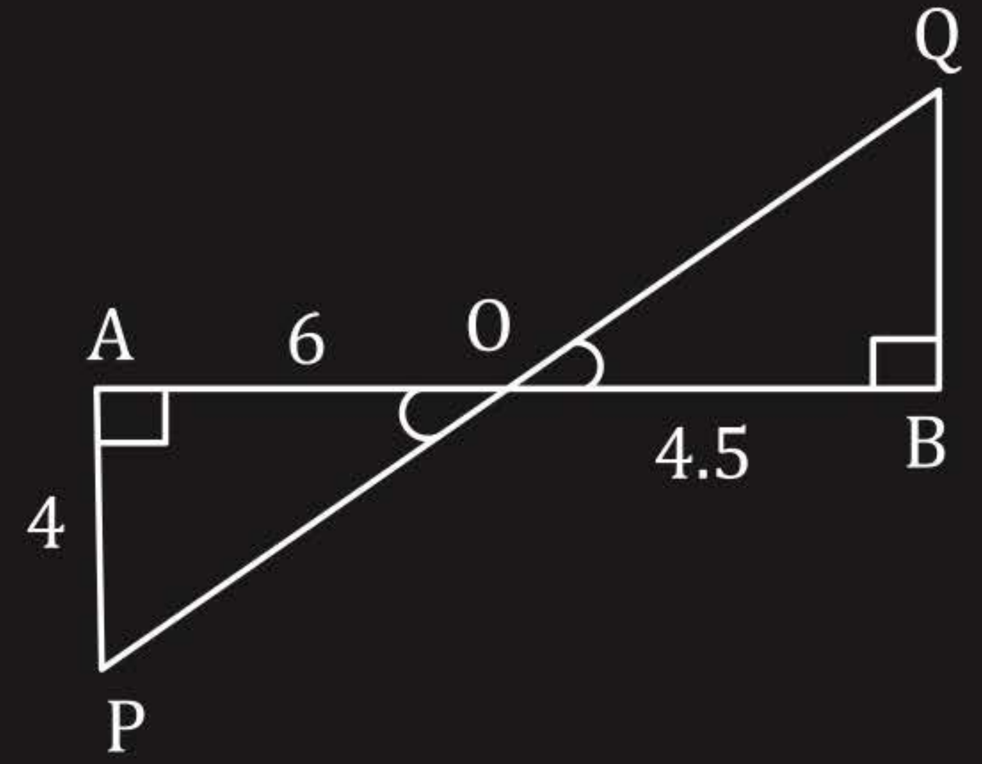
$$\boxed{\Delta AOP \sim \Delta BOQ}$$

$$\frac{AO}{BO} = \frac{OP}{OQ} = \frac{AP}{BQ}$$

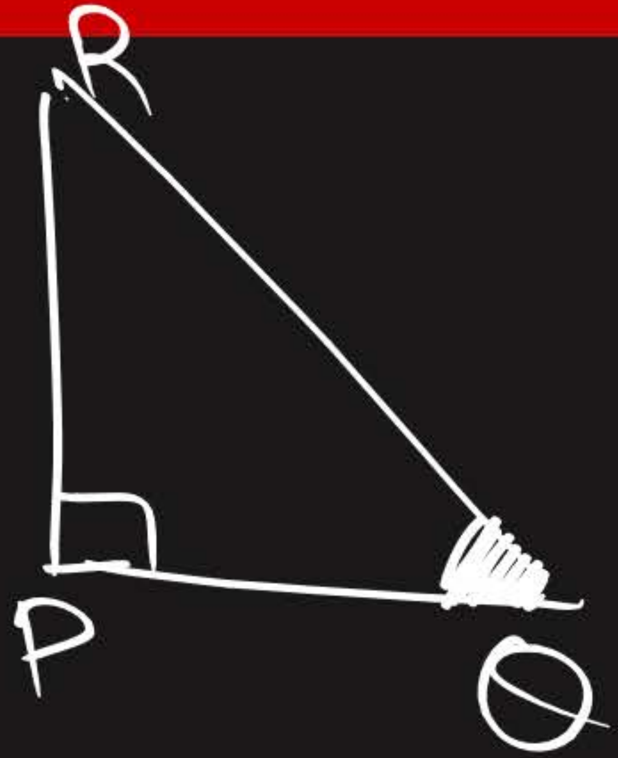
$$\frac{6}{4.5} = \frac{4}{BQ}$$

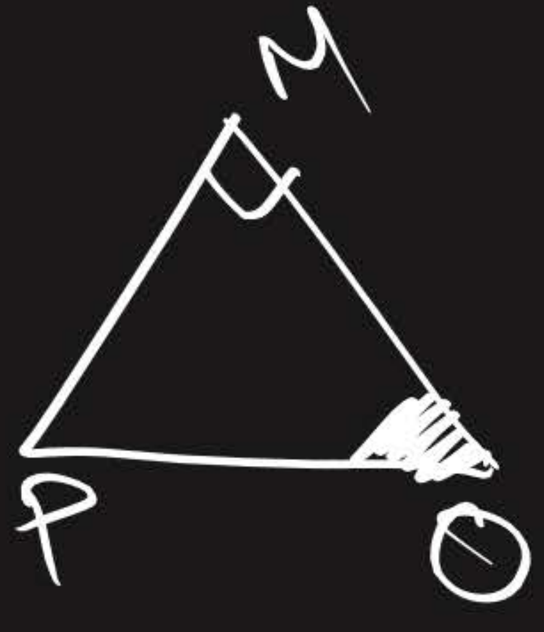
$$BQ = \frac{\cancel{4}^{2} \times 4.5}{\cancel{6}_{3}}$$

$$BQ = \frac{2 \times \cancel{45}^{15}}{10 \times \cancel{3}_{1}} = 3 \text{ cm}$$



#Q. In the figure, ΔPQR is right-angled at P. M is point on QR such that PM is perpendicular to QR. Show that $PQ^2 = QM \times QR$.





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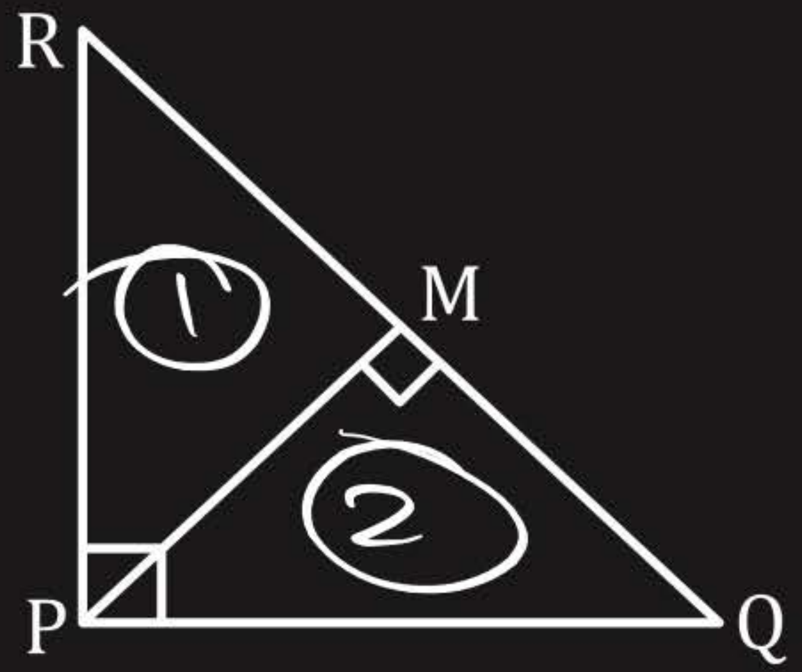


AA

$\boxed{\Delta RQP \sim \Delta PQM}$

CPST

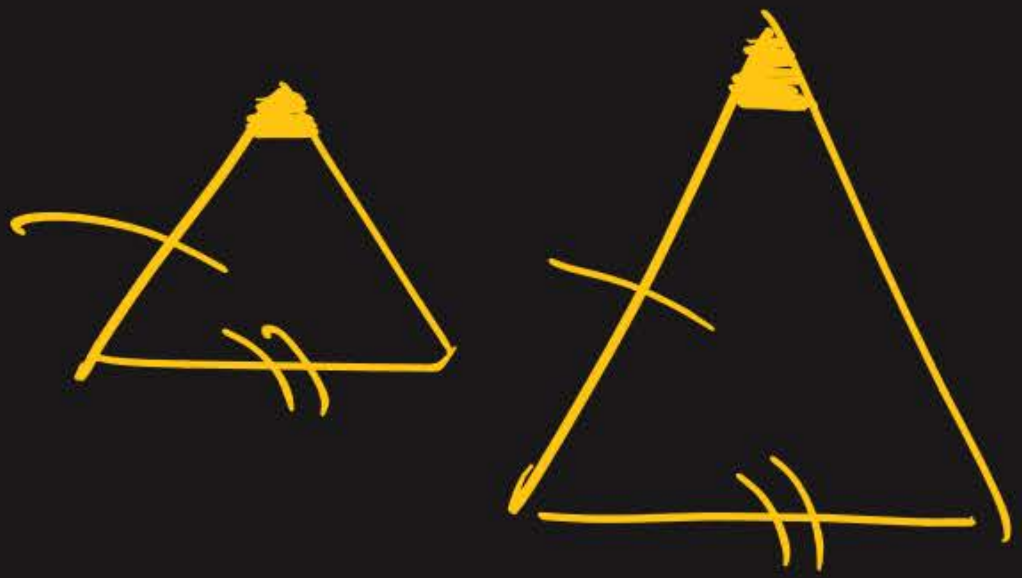
$$\frac{RQ}{PQ} = \frac{QP}{QM} = \frac{RP}{PM}$$

$$QM \cdot QP = PQ^2$$

#Q. Is the following statement true? Why? "Two quadrilaterals are similar, if their corresponding angles are equal."

False

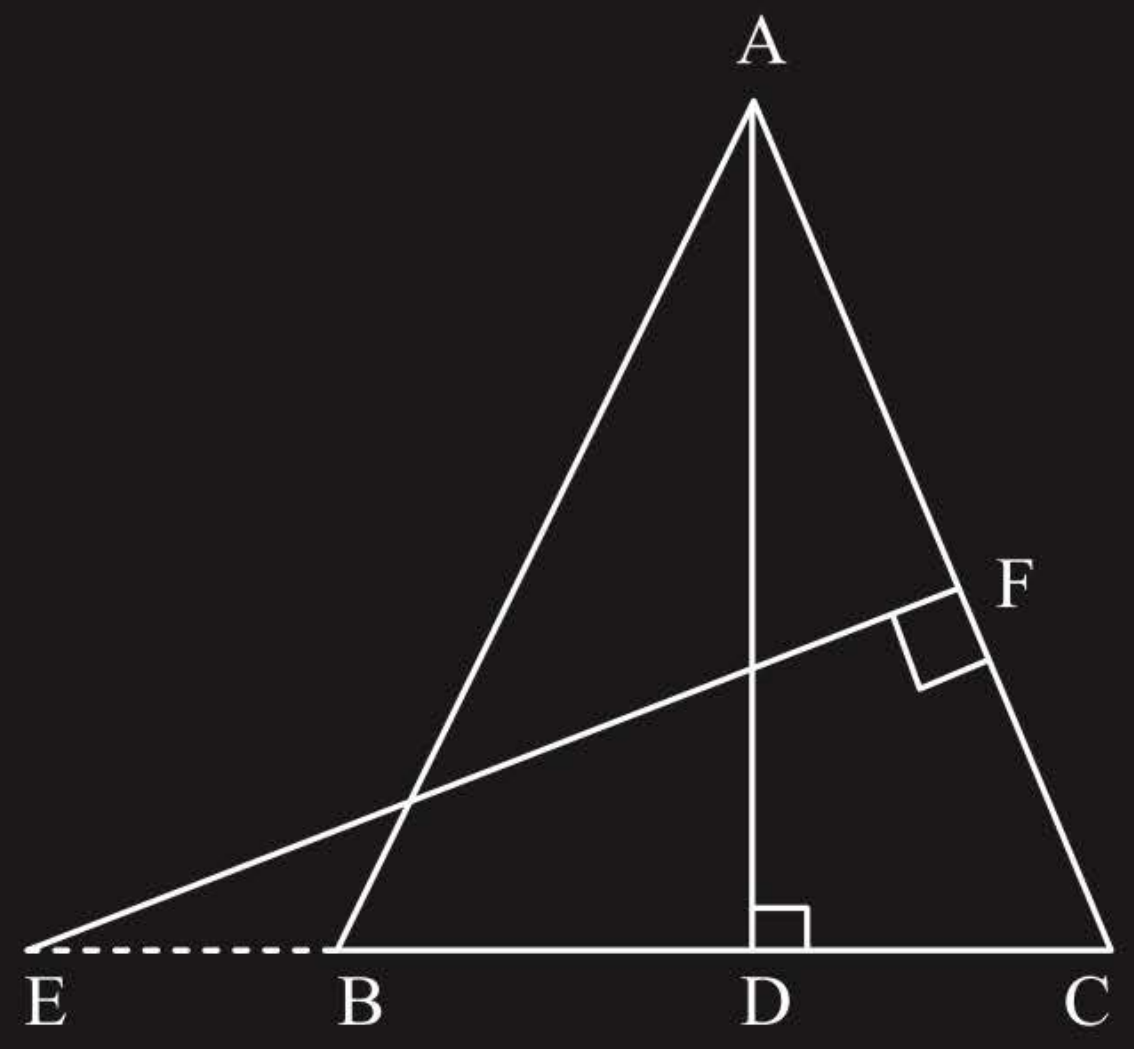
#Q. Is it true to say that, if in two triangles, an angle of one triangle is equal to an angle of another triangle and two sides of one triangle are proportional to the two sides of the other triangle, then the triangles are similar? Give reason for your answer?



False

#Q. In fig. E is a point on side CB produced of an isosceles triangle ABC with AB = AC. If AD ⊥ BC and EF ⊥ AC, prove that ΔABD ~ ΔECF.

#GPL



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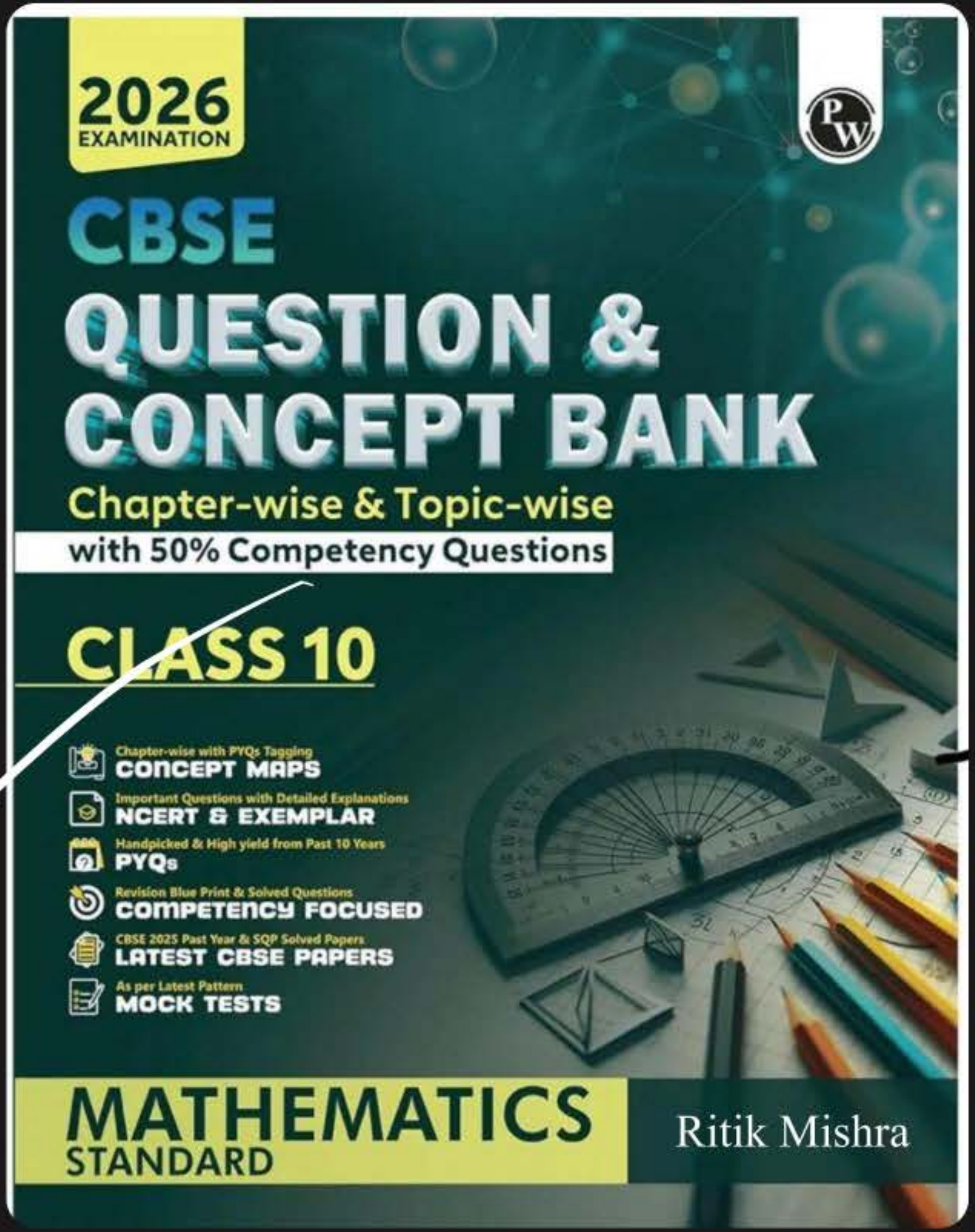


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