UDAAN

2026

Circles

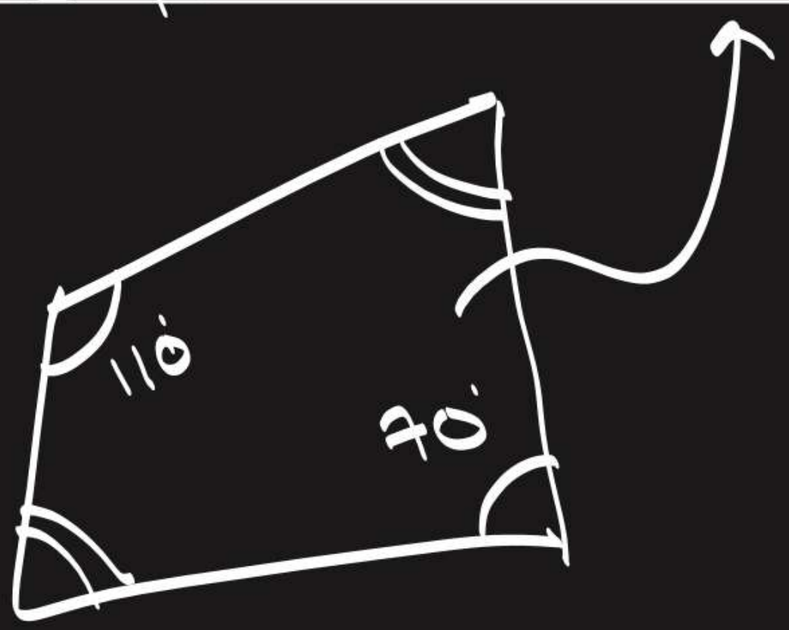
MATHS LECTURE-3

BY-RITIK SIR

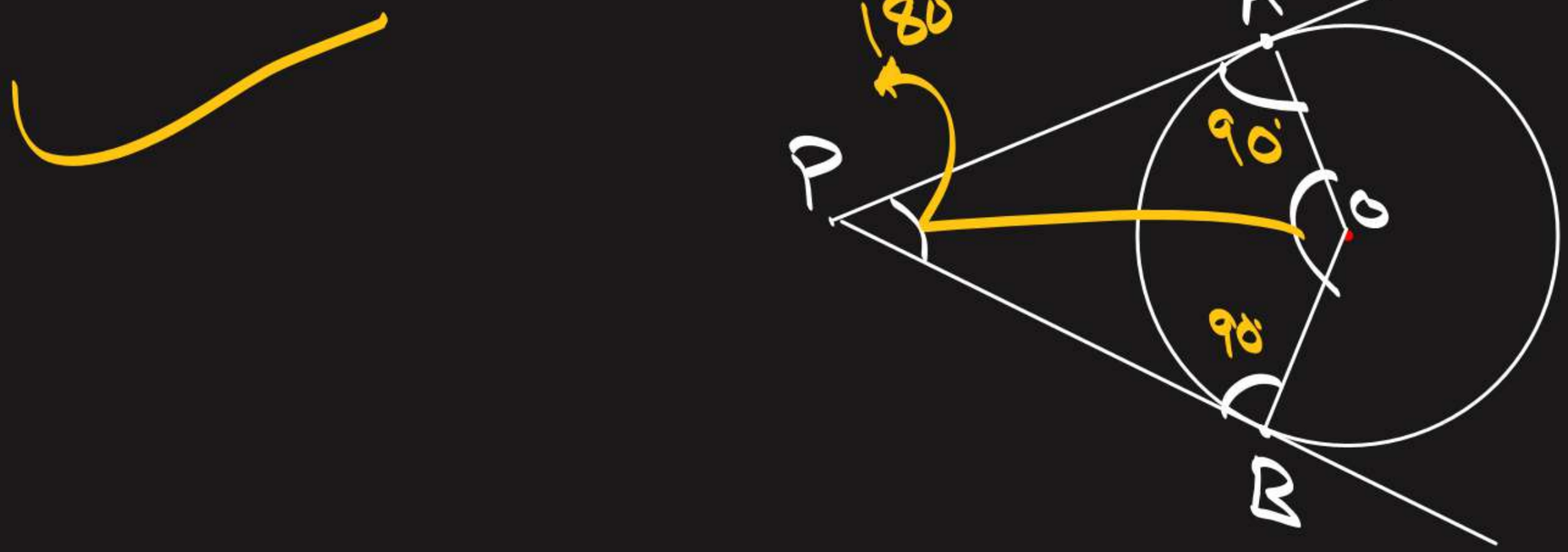
Topics *to be covered*

A Important questions (Part-2)

Cyclic Quadrilateral



#Q. In Figure, O is the centre of the circle. PA and PB are tangent segments. Show that the quadrilateral AOBP is cyclic.



#Q. A circle is inscribed in a ΔABC having sides 8 cm, 10 cm and 12 cm as shown in figure below. Find AD, BE and CF

CBSE 2001, 13, 15, 16

G:

To F:

Sol:

$AD = AF = x$

$BD = BE = y$

$CF = CE = z$

$x + z = 8$

$x + y = 10$

$z + y = 12$

$x = 8 - z$

$y = 12 - z$

$8 - z + 12 - z = 10$

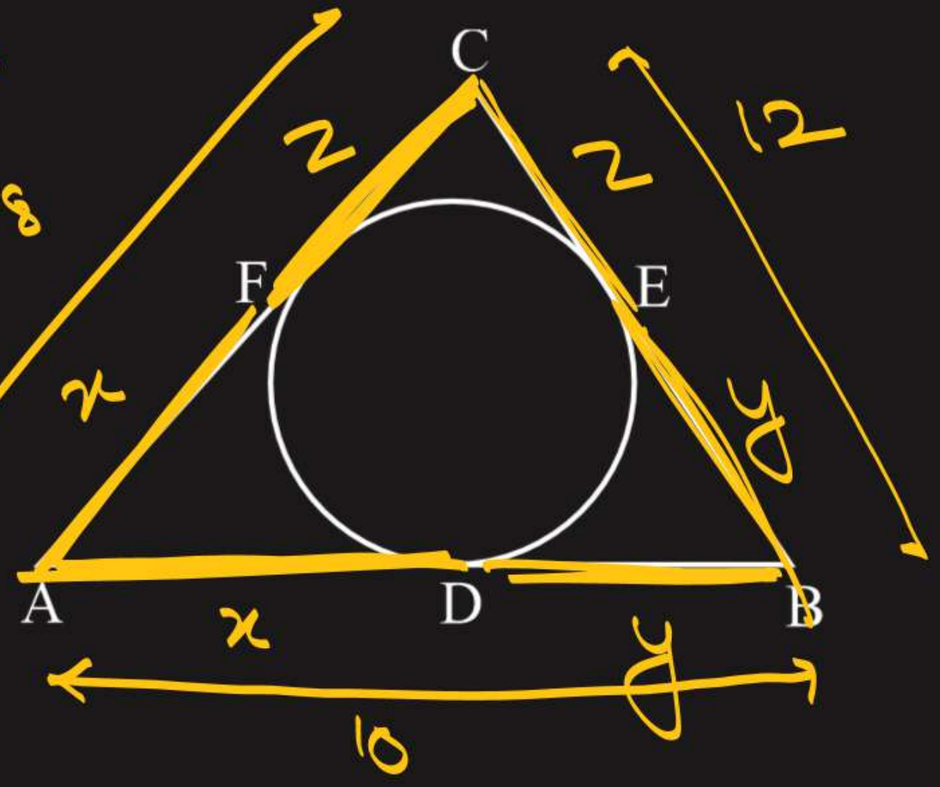
$20 - 2z = 10$

$10 = 2z$

$5 = z$

$x = 3$

$y = 7$



#Q. A circle is inscribed in a ΔABC having sides 8 cm, 10 cm and 12 cm as shown in figure below. Find AD, BE and CF

CBSE 2001, 13, 15, 16

G:

To F!

Sol:

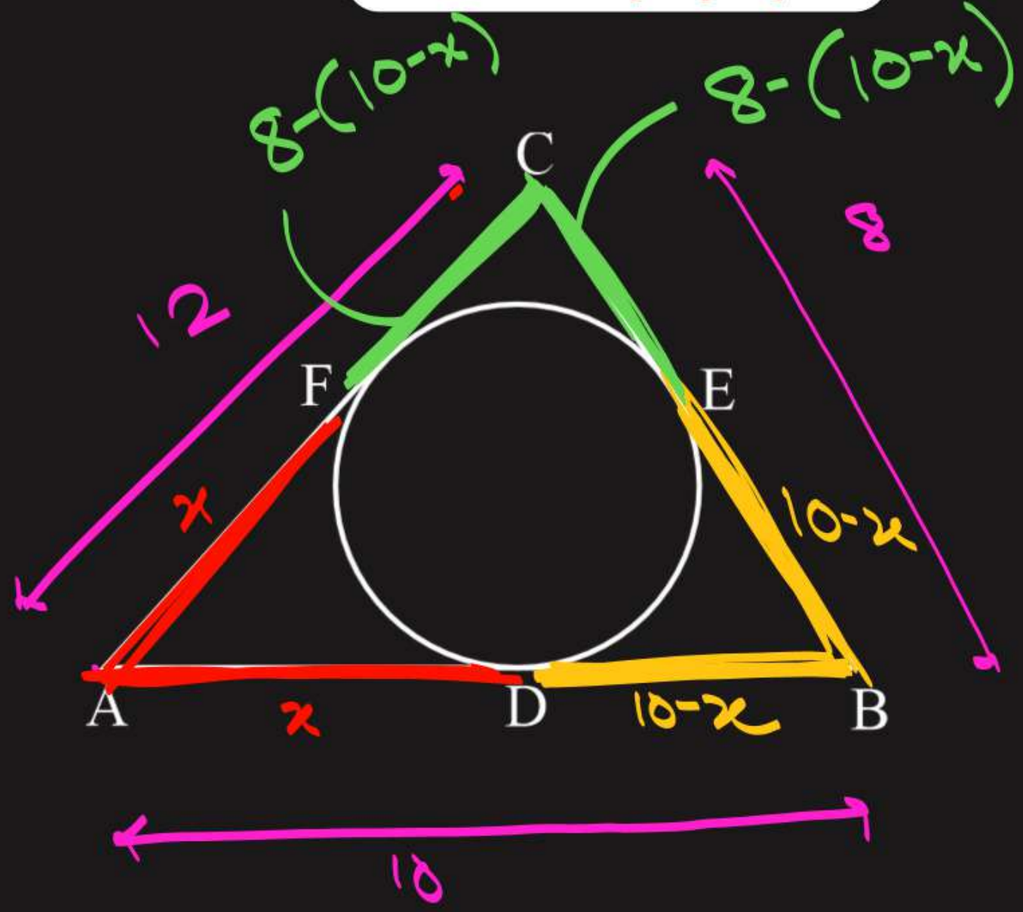
$$12 = x + 8 - (10 - x)$$

$$12 = x + 8 - 10 + x$$

$$12 = 2x - 2$$

$$14 = 2x$$

$$7 = x$$ //



#Q. If from an external point B of a circle with centre O, two tangents BC and BD are drawn such that $\angle DBC = 120°$, prove that BO = 2BC.

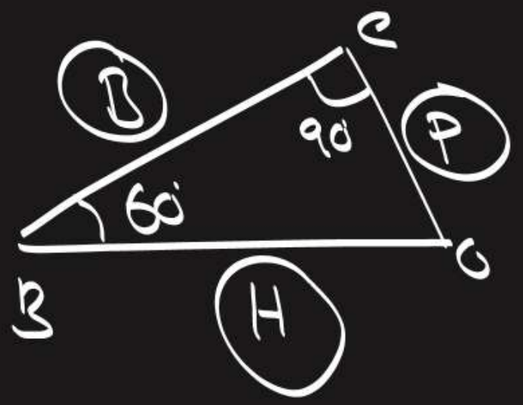
$BO = BC + BD$

G:

To p: $BO = 2BC$

Proof: $\angle BCO = 90°$ [Rt.]

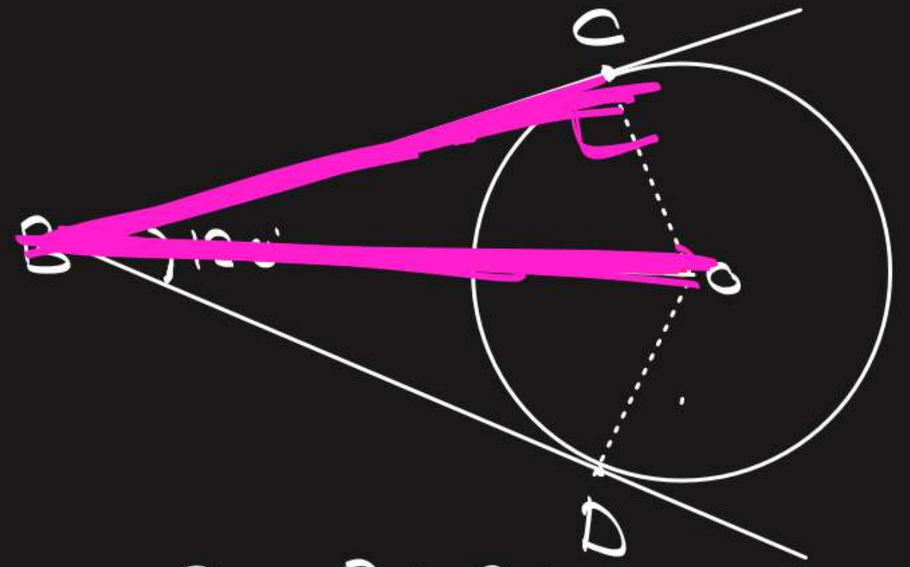
$\angle CBO = \angle DBO = 60°$ [Rt.]



$\cos 60° = \frac{B}{H}$

$\frac{1}{2} = \frac{BC}{BO}$

$BO = 2BC$



$BO = BC + BC$

$BO = BC + BD$ ||

#Q. Two tangents TP and TQ are drawn to a circle with centre O from an external point T. Prove that $\angle PTQ = 2\angle OPQ$.

CBSE 2009, 14, 17, 20, 23

G:

To p: $\angle PTO = 2\angle OPQ$

Proof: $\because TP = TQ$

$\Rightarrow \angle TPO = \angle TQP = x$ [Angles opp. to equal sides]

In $\triangle TPQ$, By A.S.P,

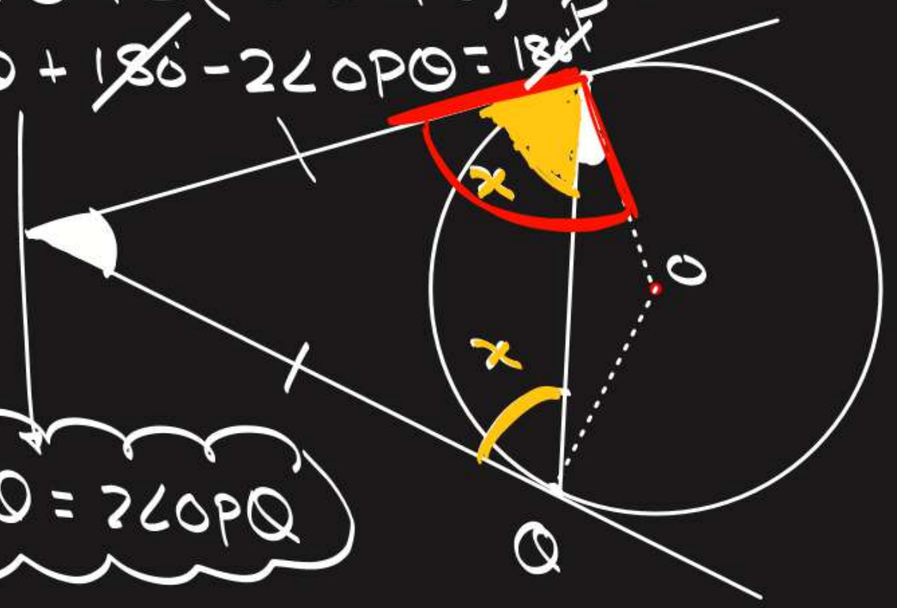
$\angle PTQ + x + x = 180^\circ$

$\angle PTQ + 2x = 180^\circ$

$\angle PTQ + 2(90^\circ - \angle OPQ) = 180^\circ$

$\angle PTQ + 180^\circ - 2\angle OPQ = 180^\circ$

$\angle PTQ = 2\angle OPQ$



now, $x + \angle OPQ = 90^\circ$ [Reason]

$x = 90^\circ - \angle OPQ$

$y + x + x = 180$

$y + 2x = 180$

$y + 2(90 - \theta) = 180$

$y + 180 - 2\theta = 180$

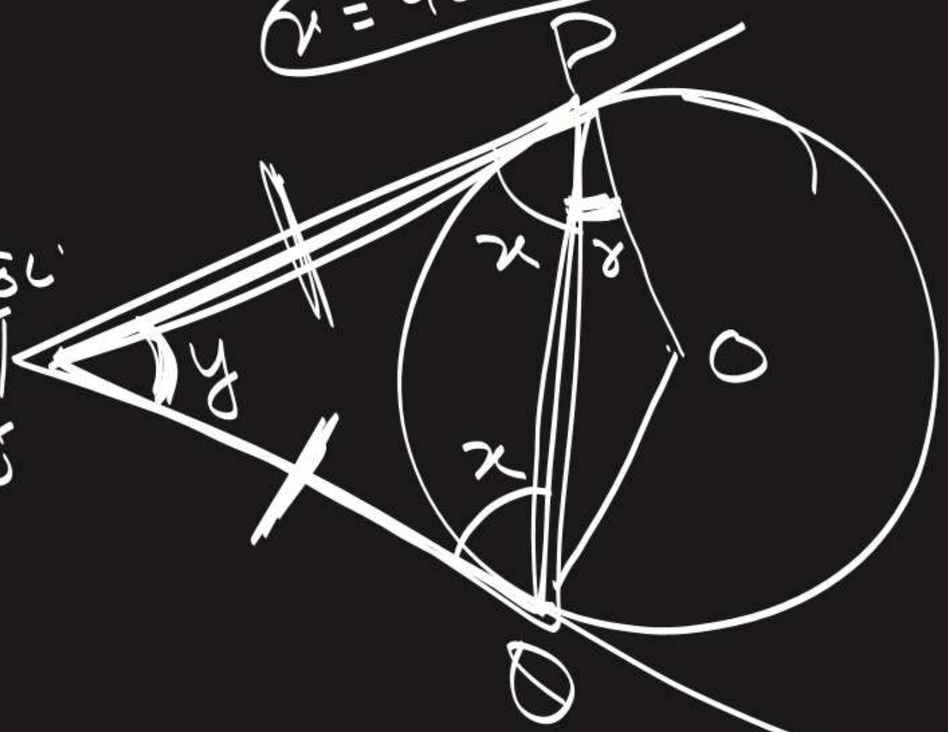
$y - 2\theta = 0$

$y = 2\theta$

$\angle PTO = 2\angle OPQ$

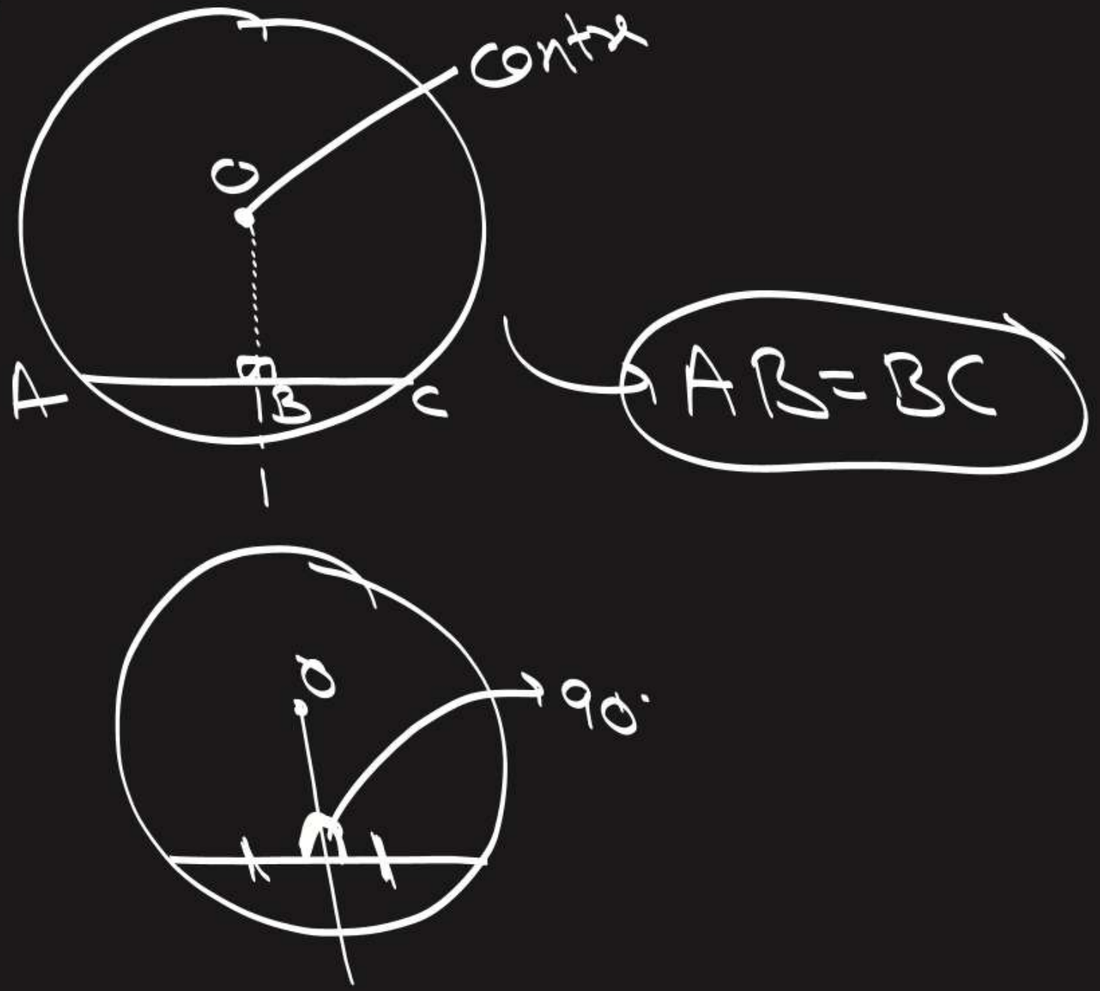
$x + \gamma = 90$

$x = 90 - \gamma$



Class 9th

(1)



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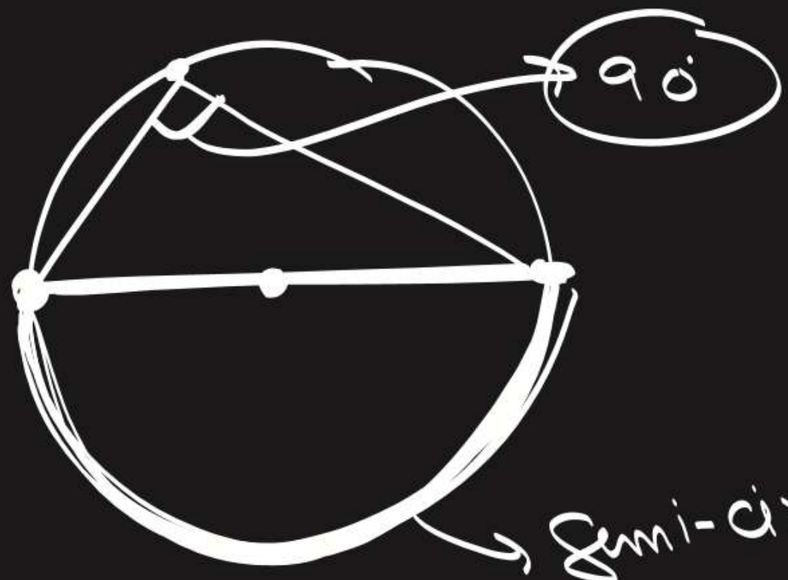


Angle ina Semi-circle is 90°

#Q. In two concentric circles, prove that a chord of larger circle which is tangent to smaller circle is bisected at the point of contact.

CBSE 2012

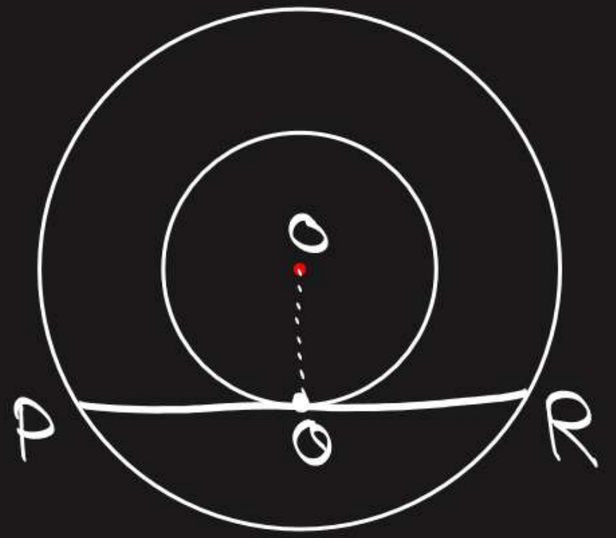
G:

To p: PQ = QR

Proof: $\because$ $OQ \perp PR$ [R]

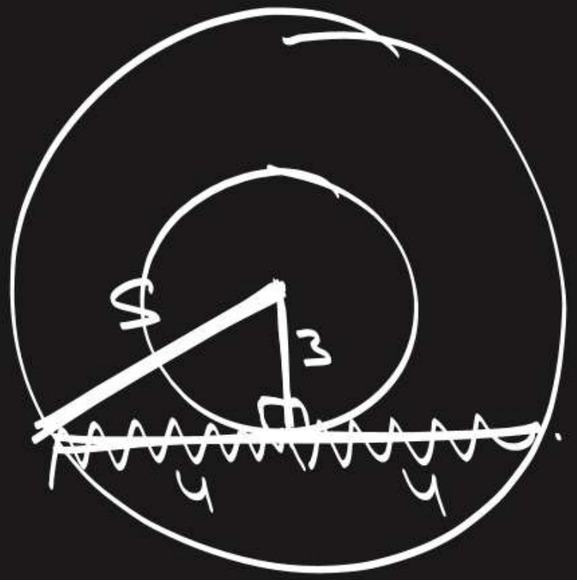
$\therefore$ PQ = QR

[Perpendicular from the centre to a chord bisects the chord]



#Q. Two concentric circles are of radii 5 cm and 3 cm. Find the length of the chord of the larger circle which touches the smaller circle.

CBSE 2023



8cm

#Q. The radii of two concentric circles are 13 cm and 8 cm. AB is a diameter of the bigger circle. BD is a tangent to the smaller circle touching it at D. Find the length AD.

G:

To Find: AD

Sol: $OB^2 = BD^2 + OD^2$

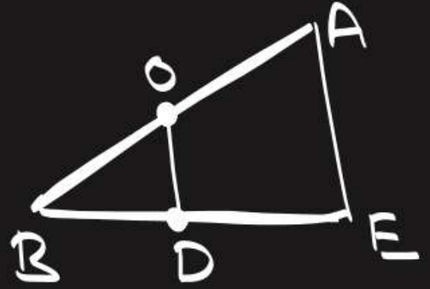
$13^2 = BD^2 + 8^2$

$169 - 64 = BD^2$

$\sqrt{105} = BD$

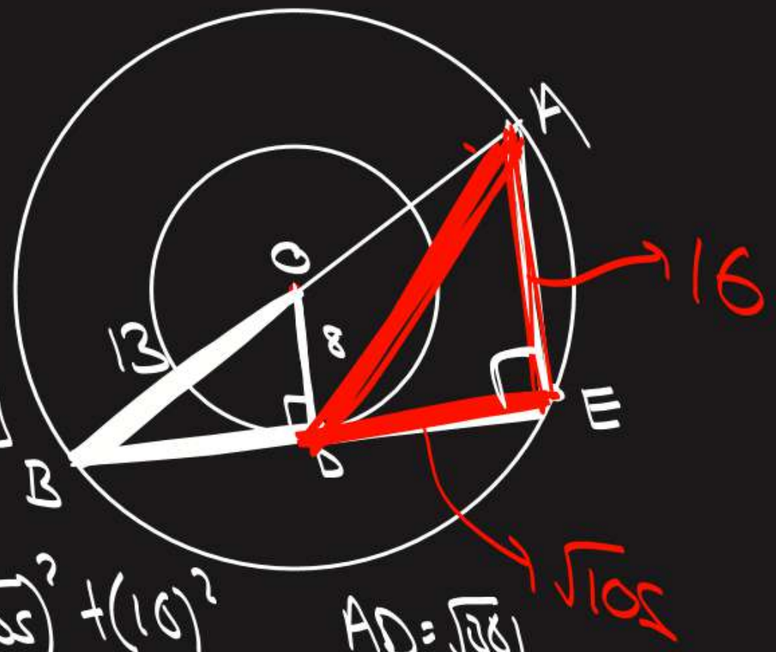
$\Rightarrow DE = \sqrt{105}$

$\angle AED = 90°$ [Angle in a Semi-circle]



$AE = 2OD$ [Mid-point theorem]

$AE = 16$ cm



$\triangle ADE$ (P.T)

$AD^2 = DE^2 + AE^2$

$AD^2 = (\sqrt{105})^2 + (16)^2$

$= 105 + 256$

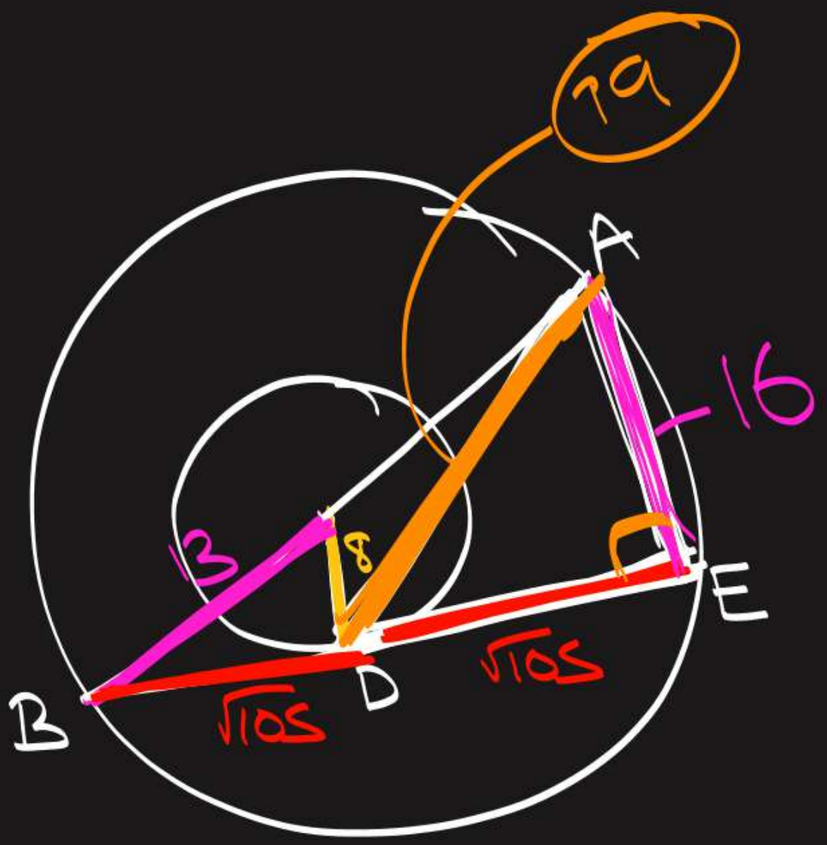
$= 361$

$AD = \sqrt{361}$

$AD = 19$ cm

90 days

45 days



#Q. PQ is a chord of length 8 cm of a circle of radius 5 cm. The tangents at P and Q intersect at a point T. Find the length TP.

CBSE 2014, 16, 19

G:

ToF:

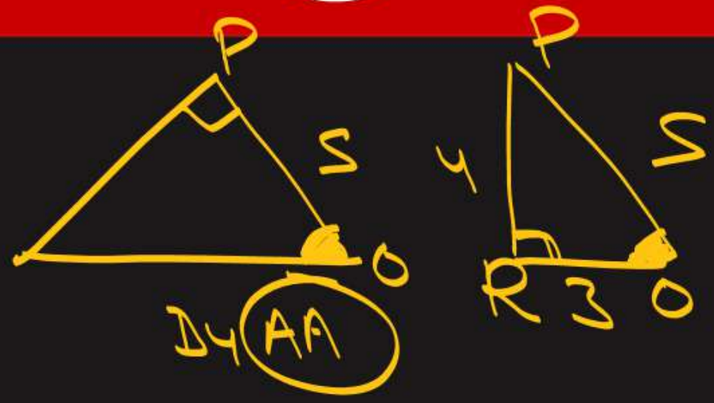
Sol:

$\triangle TPR \cong \triangle TOR$

↳ By CPCT,

$PR = RO = 4$

$\angle 1 = \angle 2 = 90^\circ$



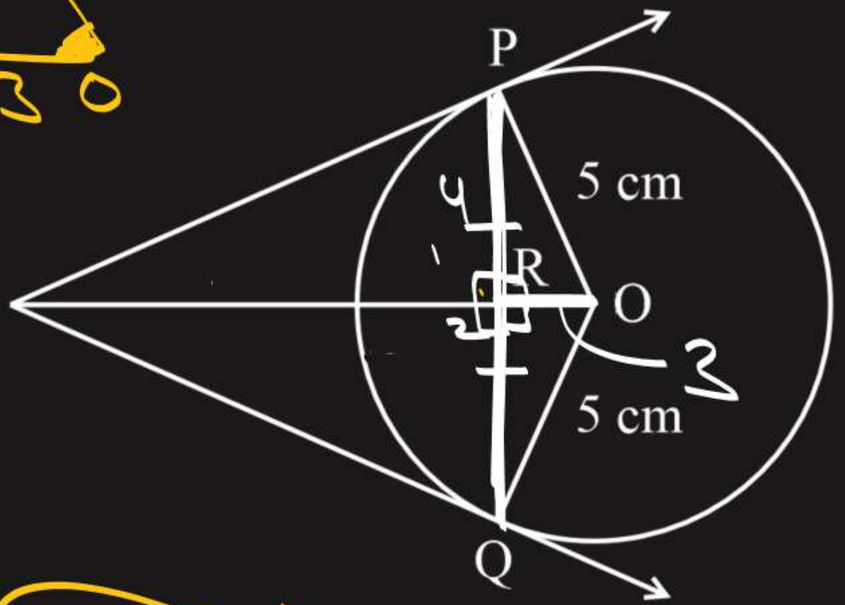
$\triangle TPO \sim \triangle PRO$

↳ By CPST,

$\frac{TP}{PR} = \frac{PO}{RO} = \frac{TO}{PO}$

$\frac{TP}{4} = \frac{5}{3}$

$TP = \frac{20}{3}$ cm



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CBSE 2014, 16, 19

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$PR = RO = 4$

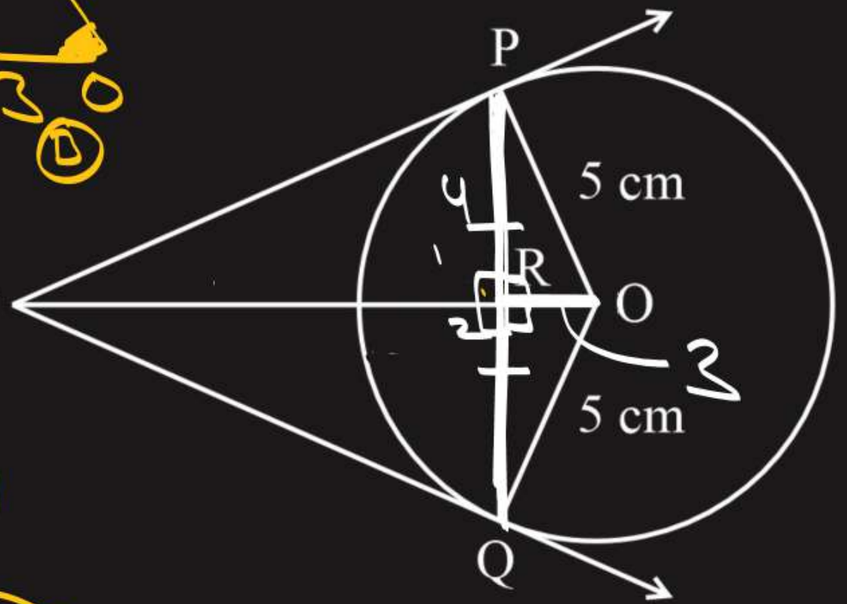
$\angle 1 = \angle 2 = 90^\circ$

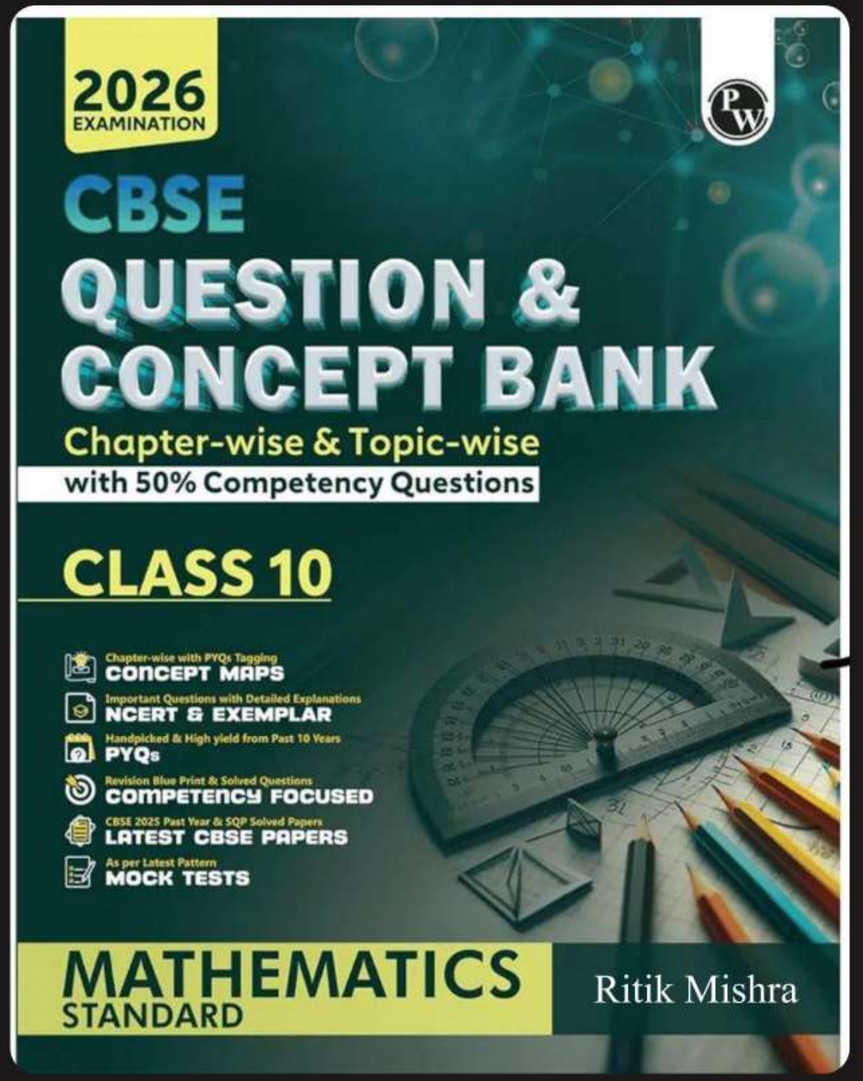
$\tan\theta = \frac{TP}{PO} = \frac{TP}{5}$

$\tan\theta = \frac{PR}{RO} = \frac{3}{4}$

$\frac{TP}{5} = \frac{3}{4}$

$TP = \frac{15}{4}$ cm



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RITIK SIR
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Thank You