UDAAN

2026

Circles

MATHS LECTURE-4

BY-RITIK SIR

Topics *to be covered*

A Important questions (Part-3)

Most favourite.

#Q. In figure below, l and m are two parallel tangents at A and B. The tangent at C makes an intercept DE between l and m. Prove that ∠DFE = 90°.

CBSE 2000, 13, 19, 22

G: $l \parallel m$

ToP: $\angle DFE = 90^\circ$

Proof: $\angle ADC + \angle DEC = 180^\circ$ [Co-interior angles]

$\angle BEF = \angle CEF = x$

$\angle ADF = \angle CDF = y$

[Tangents are equally inclined to the line Segment joining the Centre to that point]

$2y + 2x = 180^\circ$

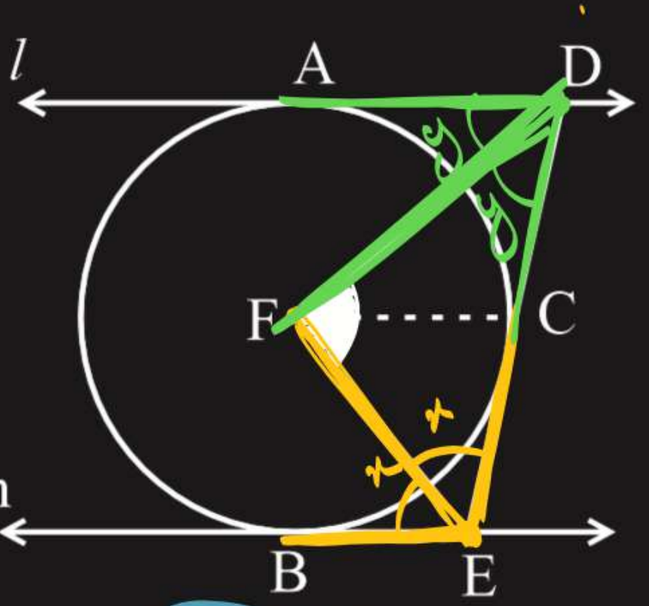
$2(y+x) = 180^\circ$

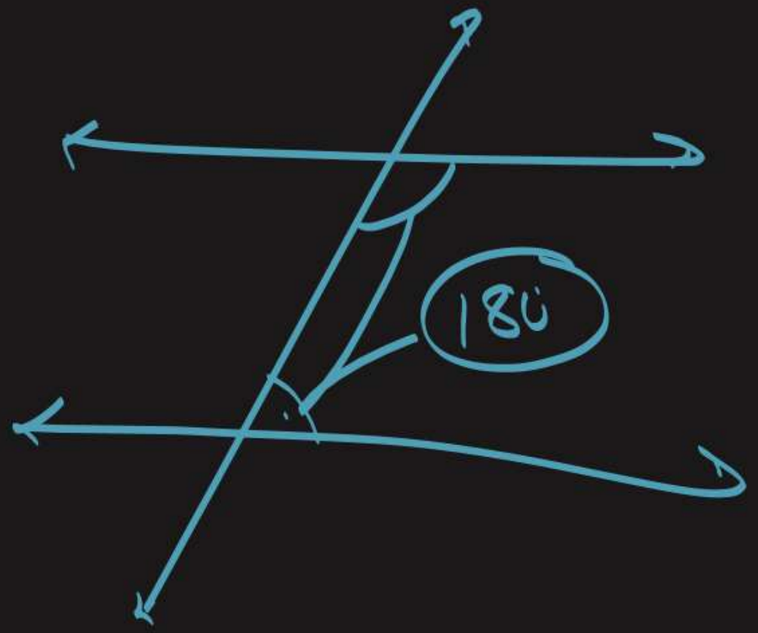
$\boxed{y+x = 90^\circ}$

Now, in ΔDEF

$\angle DFE + (y+x) = 180^\circ$

$\angle DFE = 90^\circ$ H.P




180

#Q. A circle touches the sides of a quadrilateral ABCD at P, Q, R, S respectively. Show that the angles subtended at the centre by a pair of opposite sides are supplementary.

CBSE 2012, 14, 17, 19

G:

Top: $\angle AOB + \angle COD = 180^\circ$

$\angle AOD + \angle COD = 180^\circ$

$2\angle 2 + 2\angle 3 + 2\angle 6 + 2\angle 7 = 360^\circ$

$2[\angle 2 + \angle 3 + \angle 6 + \angle 7] = 360^\circ$

$\angle 2 + \angle 3 + \angle 6 + \angle 7 = 180^\circ$

Proof: $\angle 1 = \angle 2$

$\angle 3 = \angle 4$

$\angle 5 = \angle 6$

$\angle 7 = \angle 8$

[Tangents Subtends equal angles at the Centre]

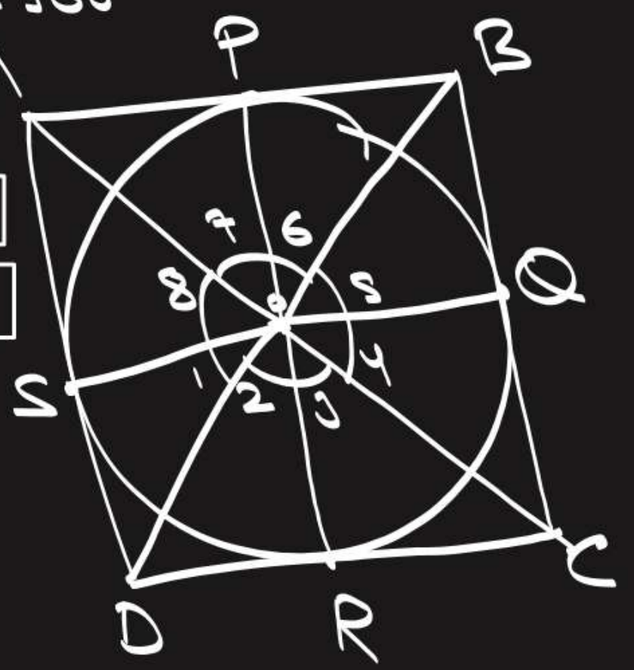
$\angle COD + \angle AOD = 180^\circ$

$\Rightarrow \angle AOD + \angle COD = 180^\circ$

H.P

$\angle 1 + \angle 2 + \angle 3 + \angle 4 + \angle 5 + \angle 6 + \angle 7 + \angle 8 = 360^\circ$

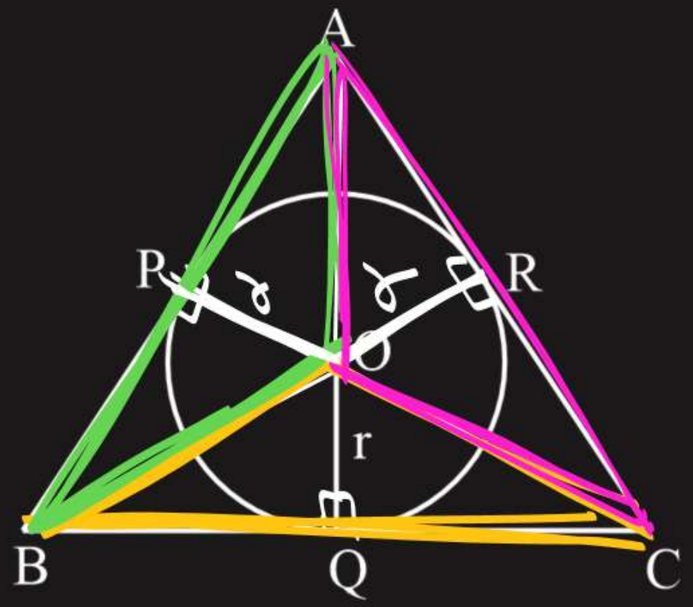
$\angle 2 + \angle 2 + \angle 3 + \angle 3 + \angle 6 + \angle 6 + \angle 7 + \angle 7 = 360^\circ$



#Q. In Figure below, the sides AB, BC and CA of triangle ABC touch a circle with center O and radius r at P, Q and R respectively.
Prove that:

CBSE 2013

Ans: $\text{Area}(\Delta ABC) = \frac{1}{2}(\text{Perimeter of } \Delta ABC) \times r$



Proof: L.H.S

$= \text{Area of } \Delta ABC$

$= A.\Delta BOC + A.\Delta AOB + A.\Delta AOC$

$= \frac{1}{2} \times BC \times r + \frac{1}{2} \times AB \times r + \frac{1}{2} \times AC \times r$

$= \frac{1}{2} r [BC + AB + AC]$

$= \boxed{\frac{1}{2} \cdot r \cdot P.\Delta ABC.}$

#Q. In figure below, a ΔABC is drawn to circumscribe a circle of radius 4 cm such that the segments BD and DC are of lengths 8 cm and 6 cm respectively. Find the lengths of sides AB and AC, when area of ΔABC is 84 cm^2.

CBSE 2015, 23

G:

To Find:

Sol:

$$A(\Delta ABC) = A(\Delta AOB) + A(\Delta AOC) + A(\Delta BOC)$$

$$84 = \frac{1}{2} \cdot AB \cdot 4 + \frac{1}{2} \cdot AC \cdot 4 + \frac{1}{2} \cdot BC \cdot 4$$

$$84 = 2[AB + AC + BC]$$

$$\frac{84}{2} = 8 + x + x + 6 + 8 + 6$$

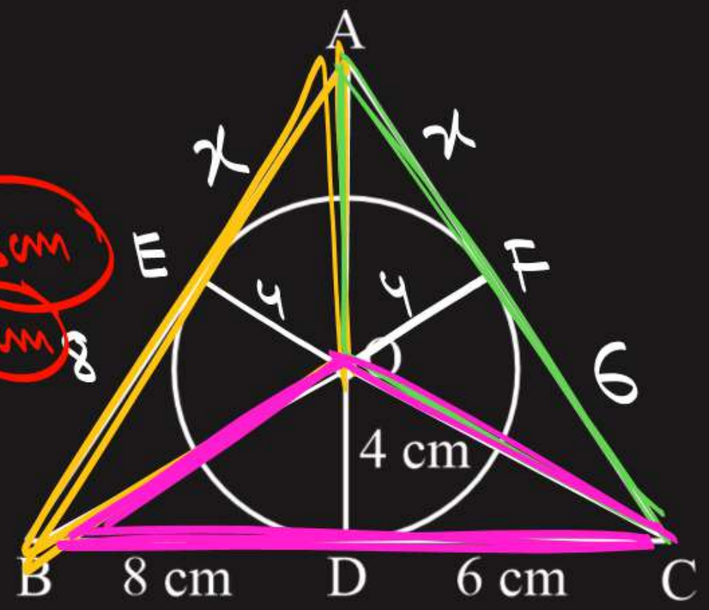
$$42 = 28 + 2x$$

$$14 = 2x$$

$$7 = x$$

$\Rightarrow AB = x + 8 = 15$ cm

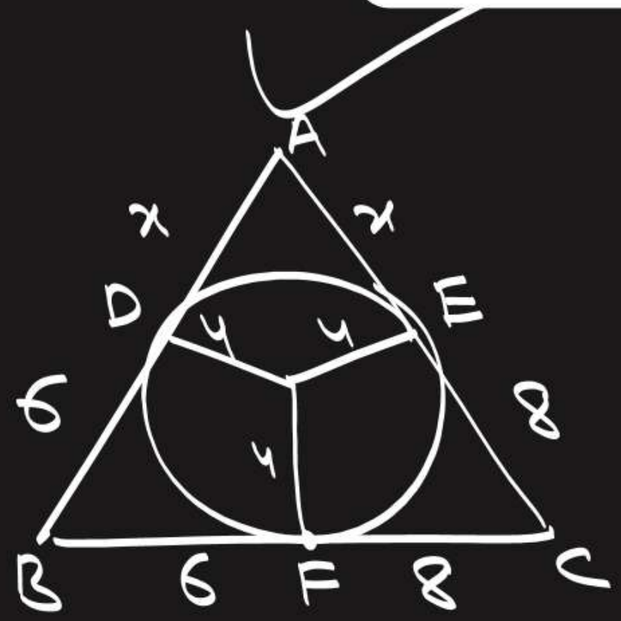
$\Rightarrow AC = x + 6 = 13$ cm



#GPM

#Q. The radius of the incircle of a triangle is 4 cm and the segments into which one side is divided by the point of contact are 6 cm and 8 cm. Determine the other two sides of the triangle.

CBSE 2014



$A(\Delta ABC) = \cdots\cdots\cdots$

$P = 28 + 2x$

$S = \frac{28+2x}{2} = 14 + x$

Semi perimeter

$$A = \sqrt{S(S-a)(S-b)(S-c)}$$

$$= \sqrt{14+x\,(14+x-14)\,(14+x-x-8)\,(14+x-6-x)}$$

#Q. In figure below, ABC is a right triangle right-angled at B such that BC = 6 cm and AB = 8 cm. Find the radius of its incircle.

CBSE 2002

G:

TOF:

Sol:

By P.T$_g$

$AC^2 = AB^2 + BC^2$

$AC^2 = 8^2 + 6^2$

$= 64 + 36$

$AC = \sqrt{100}$

$AC = 10$

$A.\Delta ABC = A.\Delta AOB + A.\Delta BOC + A.\Delta AOC$

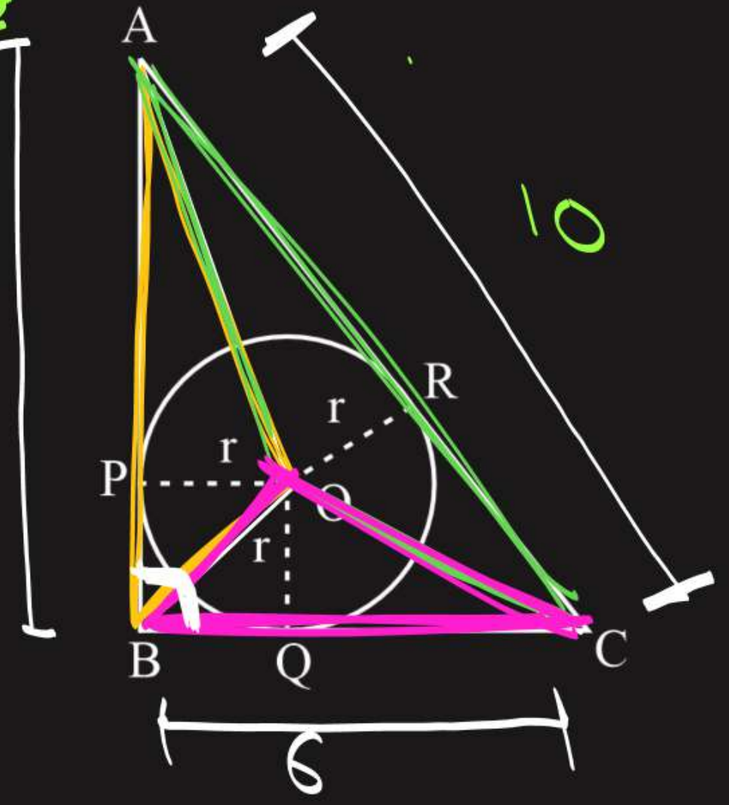
$\frac{1}{2} \cdot BC \cdot AB = \frac{1}{2} \cdot 8r + \frac{1}{2} \cdot 6x + \frac{1}{2} \cdot 10r$

$\frac{1}{2} \cdot 6 \cdot 8 = 4r + 3r + 5r$

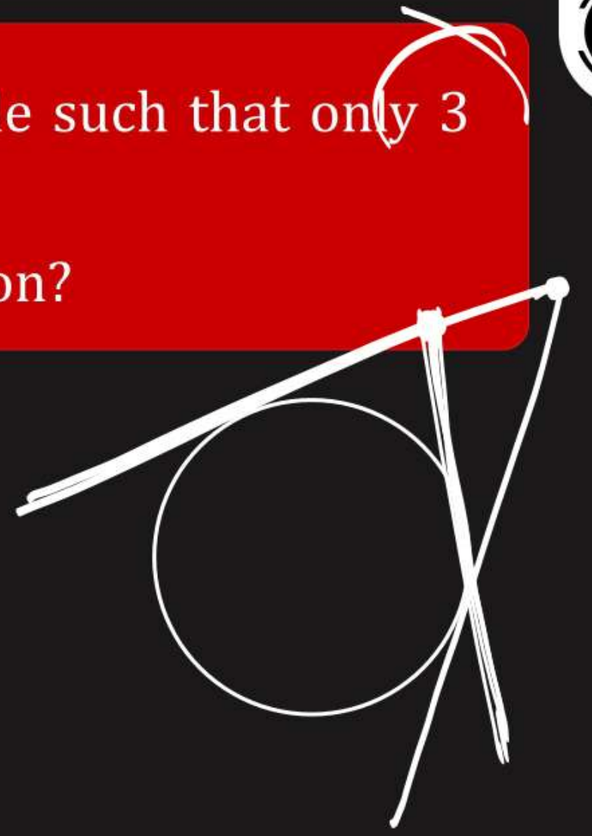
$24 = 12r$

$2 = r$

Ans: radius = 2 cm



#Q. A circle is drawn. Two points are marked outside the circle such that only 3 tangents can be drawn to the circle using these two points.
Which of the following is true based on the above information?



A All 3 tangents are equal in length.

B Both the points lie on one of the tangents.

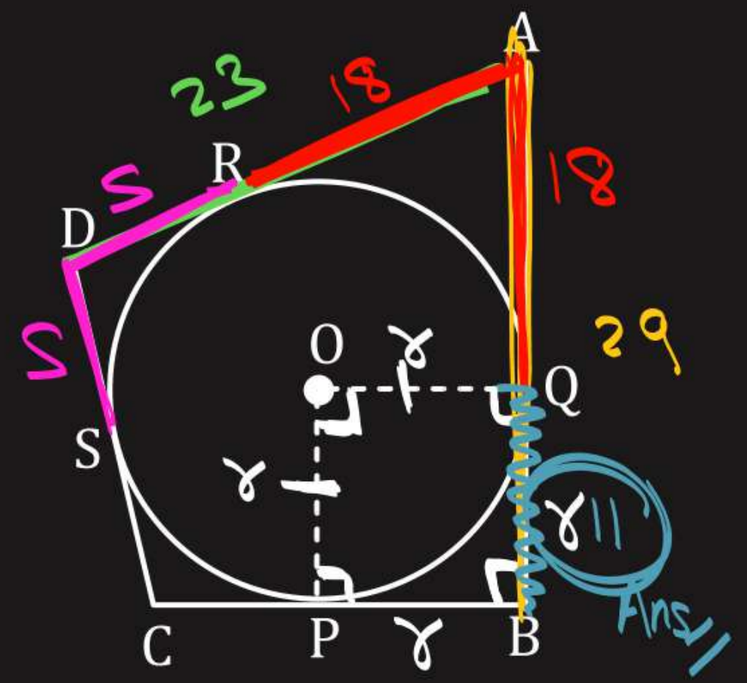
C The tangents and the circle have two common points in total.

D Such a situation is not possible as with 2 points, there will be 4 tangents to the circle

#Q. In figure, a circle is inscribed in a quadrilateral ABCD in which $\angle B = 90°$. If AD = 23 cm, AB = 29 cm and DS = 5 cm, find the radius r of the circle.

OQBP → Square

CBSE 2003



#Q. In figure, ABC is a right triangle right-angled at B such that BC = 6 cm and AB = 8 cm. Find the radius of its incircle.

$AB = AP + PB$

$8 = 10-(6-r)+r$

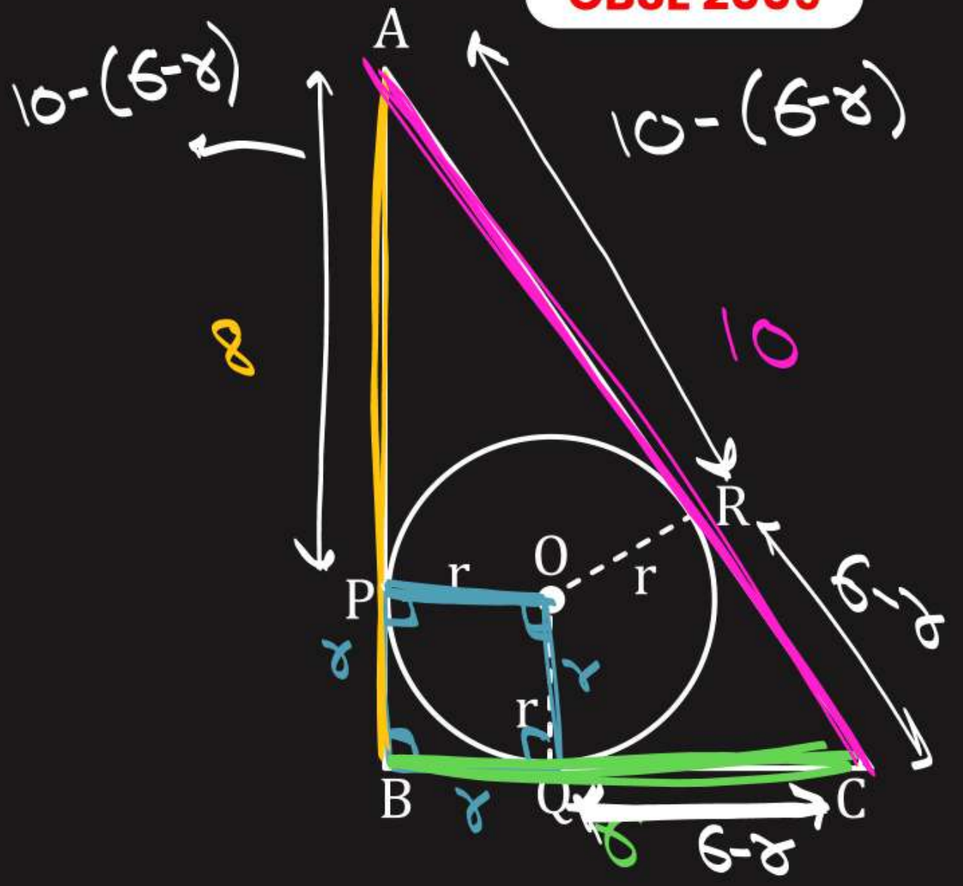
$8 = 10-6+r+r$

$8 = 4+2r$

$4 = 2r$

$2 = r$

CBSE 2009



#Q. a, b and c are the sides of a right triangle, where c is the hypotonus. A circle, of radius r, touches the sides of the triangle. Prove that, $r = \frac{a+b-c}{2}$.

CBSE 2016

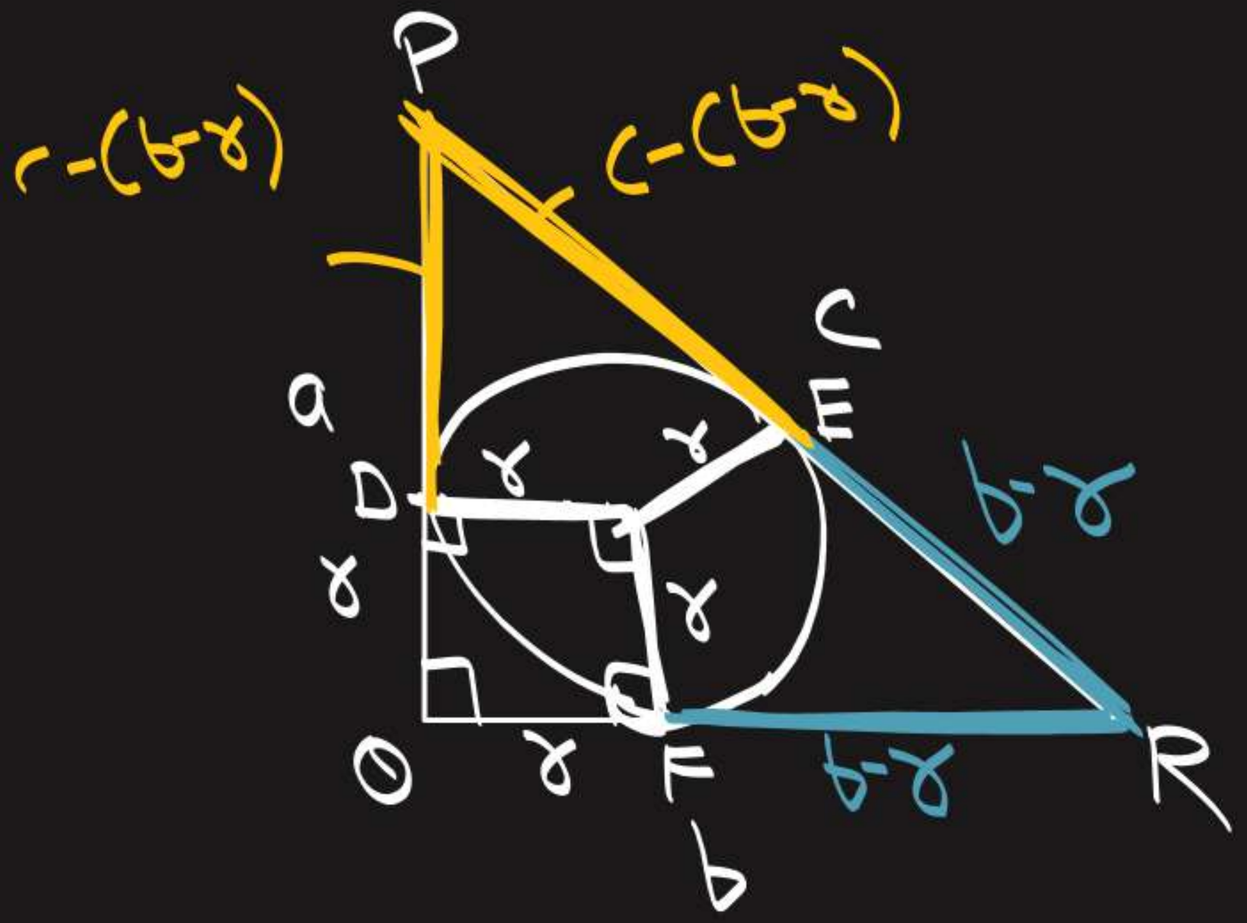
$PQ = PD + DQ$

$a = c - (b - r) + r$

$a = c - b + r + r$

$a + b - c = 2r$

$$\boxed{\frac{a+b-c}{2} = r}$$

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Par dost muje saare Phir Hera Pheri
jaise mile hai


Ab Samajh Aa Rha Hai Daily Life Ko
"Roz marra" kyu kehte hai
Likes
416

#Q. In the adjoining figure, AB is the chord of the larger circle touching the smaller circle. The centre of both the circles is O. If AB = 2r and OP = r, then the radius of larger circle is:

CBSE 2025

A 2r

B 3r

C $2\sqrt{2}$ r

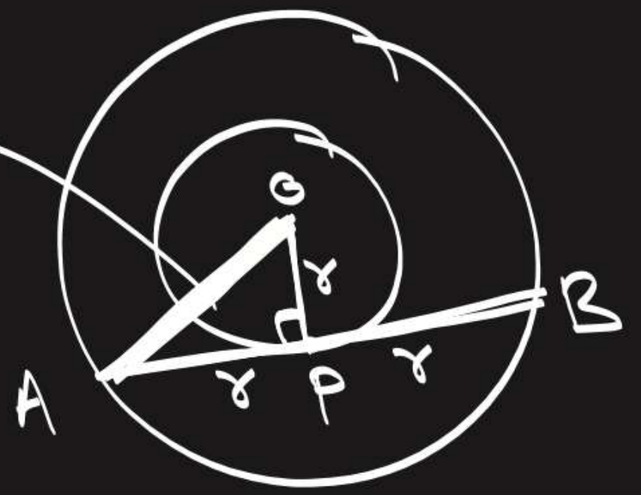
D $\sqrt{2}$ r

$OA^2 = OP^2 + AP^2$

$OA^2 = r^2 + r^2$

$OA = \sqrt{2r^2}$

$OA = \sqrt{2}r$



#Q. Assertion (A) : Tangents drawn at the end points of a diameter of a circle are always parallel to each other.

Reason (R) : The lengths of tangents drawn to a circle from a point outside the circle are always equal.

CBSE 2025

A. Both Assertion (A) and Reason (R) are true and Reason (R) is correct explanation of Assertion (A).

B. Both Assertion (A) and Reason (R) are true but Reason (R) is not the correct explanation of Assertion (A).

C. Assertion (A) is true but Reason (R) is false.

D. Assertion (A) is false but Reason (R) is true.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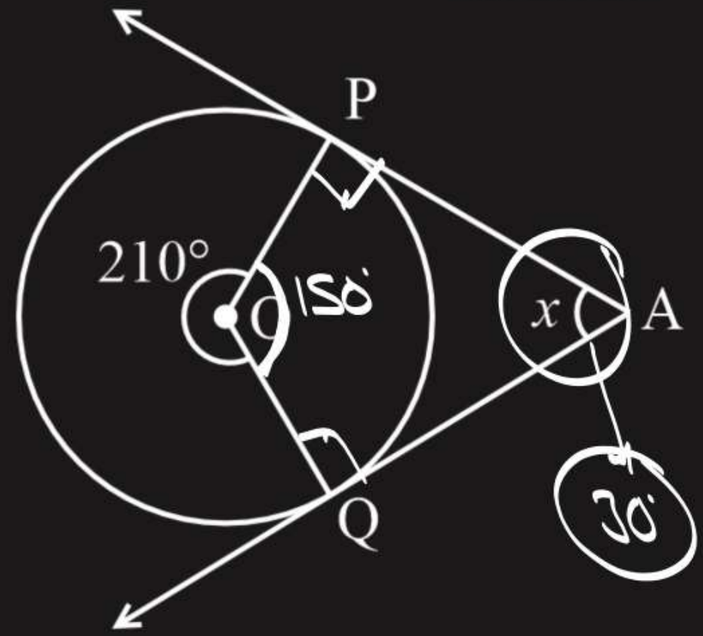
#Q. In the adjoining figure, AP and AQ are tangents to the circle with centre O. If reflex $\angle POQ = 210°$, the value of $2x$ is:

CBSE 2025



A $30°$

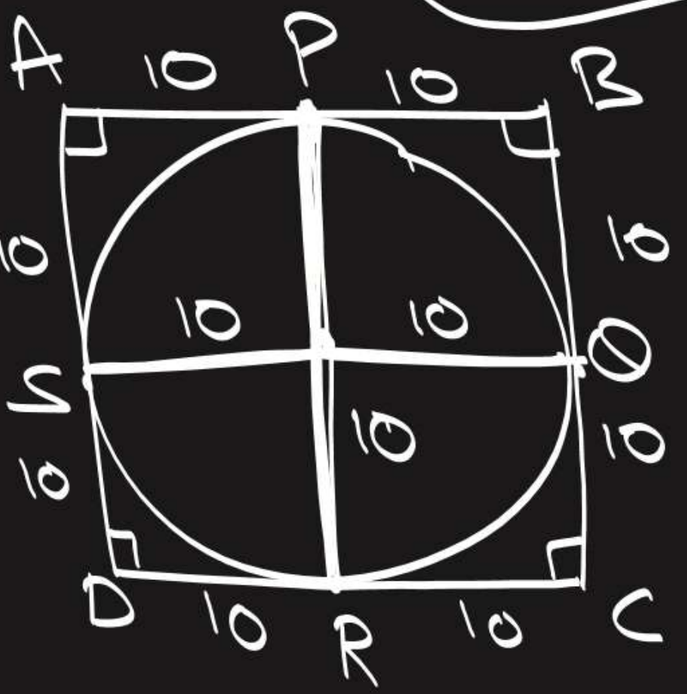
B $60°$

C $120°$

D $300°$

#Q. Rectangle ABCD circumscribes the circle of radius 10 cm. Prove that ABCD is a square. Hence, find the perimeter of ABCD.

CBSE 2025



G:

Top:

Proof:

AP = AS — (1)

BP = BQ — (2)

DR = DS — (3)

CR = CQ — (4)

AB + CD = AD + BC

∴ AB = CD, AD = BC — (5)

AD + AD = AD + AD

2AD = 2AD

AD = AD — (6)

(5) ← (6)

AB = BC = CD = AD

Also, all angles are 90°.

∴ ABCD is a square.

#GPY

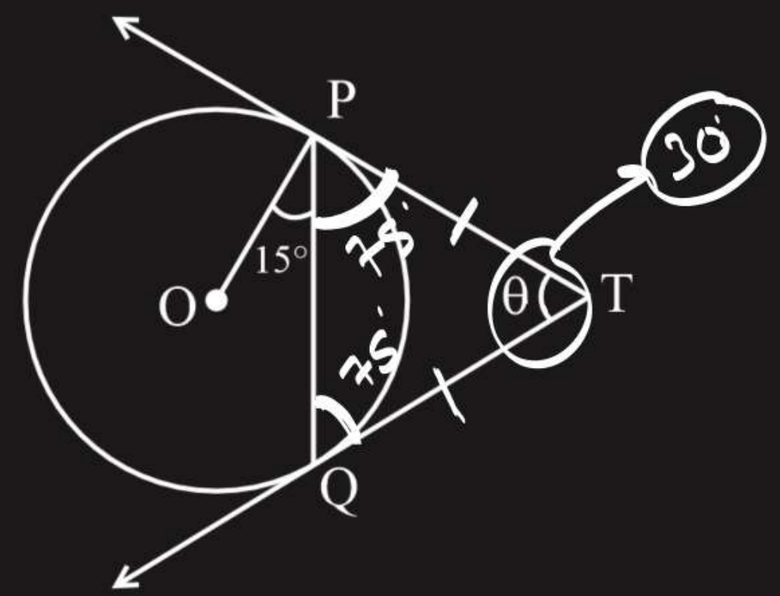
#Q. In the given figure, TP and TQ are two tangents to a circle with centre O. If $\angle OPQ = 15°$ and $\angle PTQ = \theta$, then find the value of $\sin 2\theta$.

CBSE 2025

$= \sin 2(30°)$

$= \sin 60°$

$= \frac{\sqrt{3}}{2}$



#Q. In the adjoining figure, PA and PB are tangents to a circle with centre O such that $\angle P = 90°$. If AB = $3\sqrt{2}$ cm, then the diameter of the circle is:

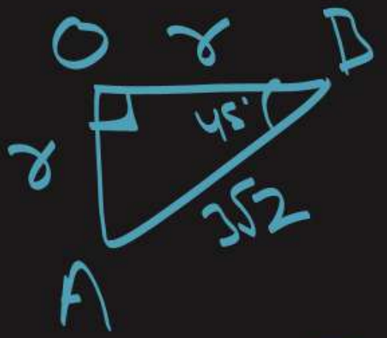
CBSE 2025

A $3\sqrt{2}$ cm

B $6\sqrt{2}$ cm

C 3 cm

D 6 cm



Tan 90

$r^2 + r^2 = (3\sqrt{2})^2$

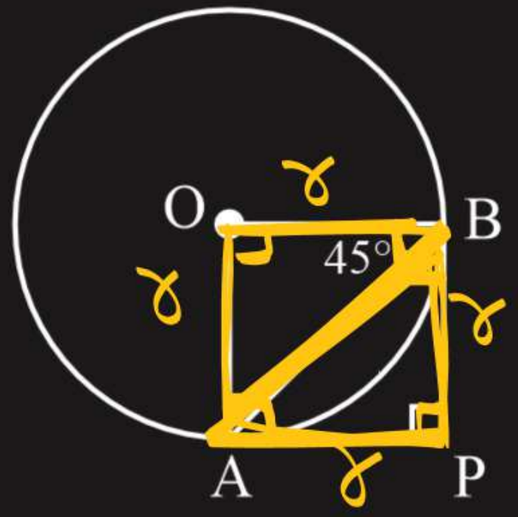
$2r^2 = 9 \cdot 2$

$r^2 = \frac{18}{2}$

$r^2 = 9$

$r = \pm 3$

$r = 3$



#Q. For a circle with centre O and radisu 5 cm, which of the following statements is true?

P : Distance between every pair of parallel tangents is 5 cm.

Q : Distance between every pair of parallel tangents is 10 cm.

R : Distance between every pair of parallel tangents must be between 5 cm and 10 cm.

S : There does not exist a point outside the circle from where length of tangent is 5 cm.

CBSE 2025

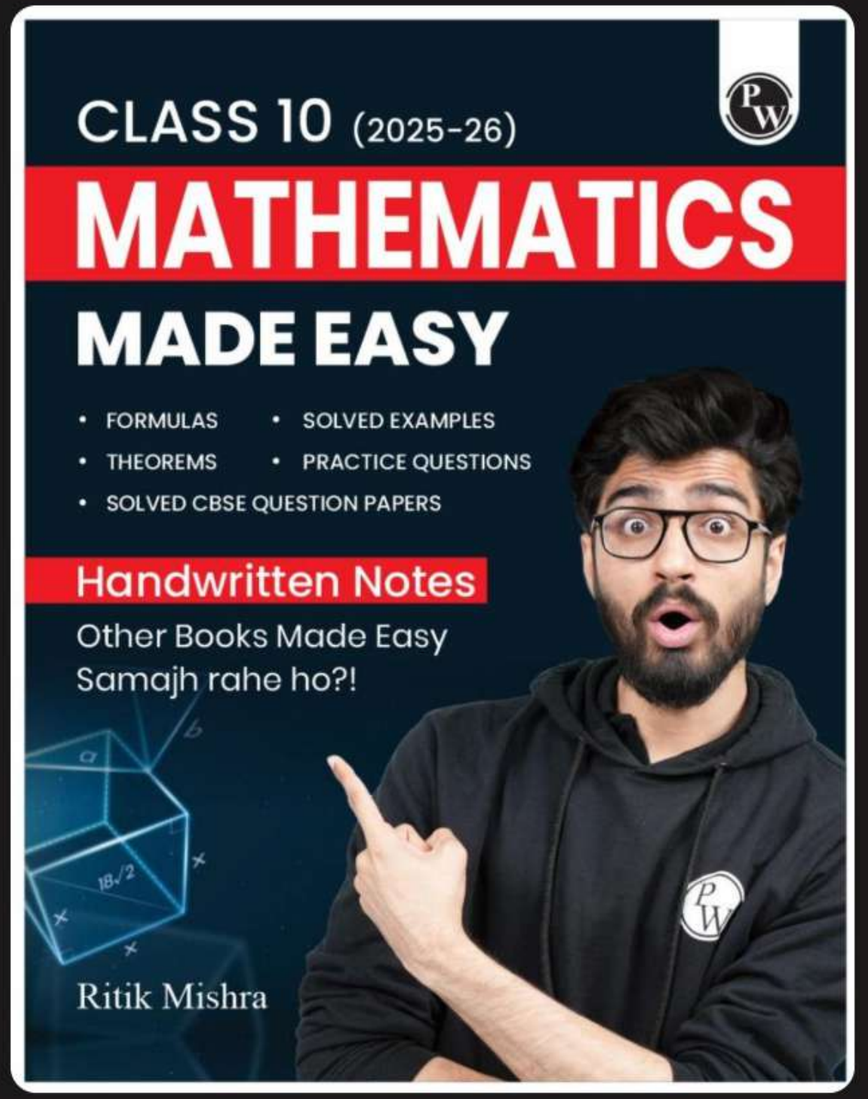
#GPW

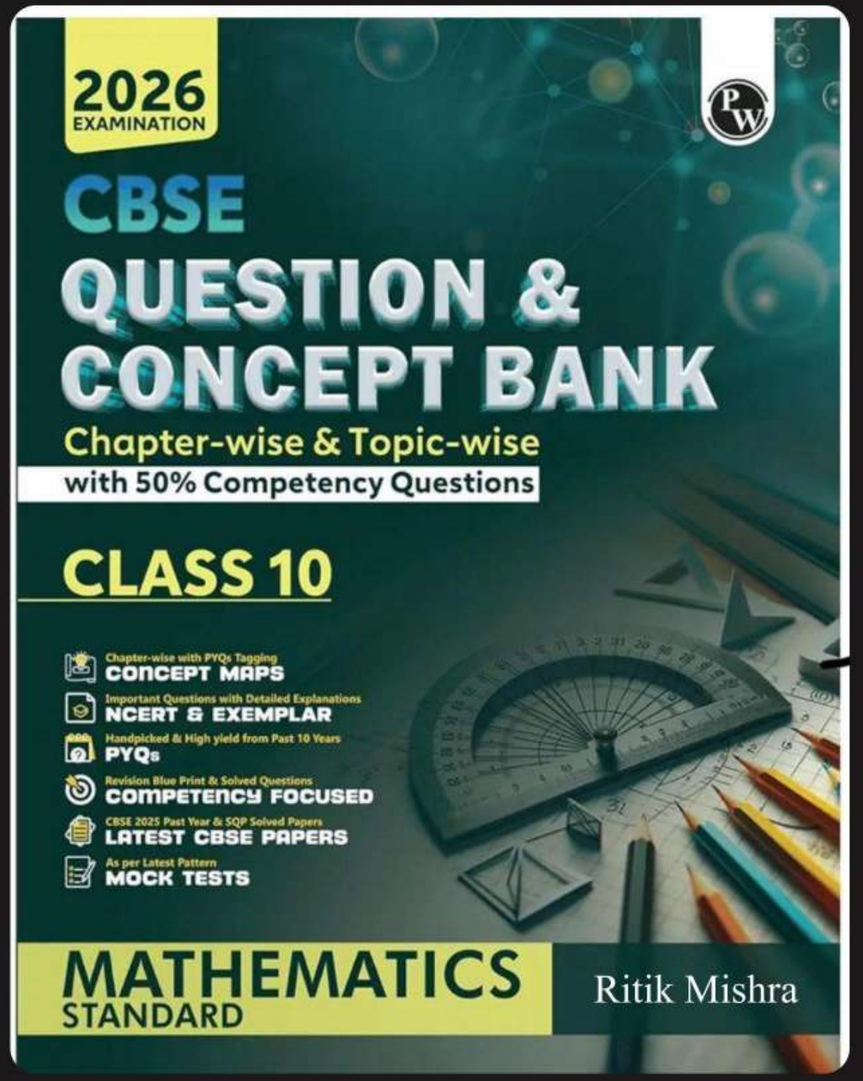
A P

B Q

C R

D S



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Thank You Babuaas ❤️🫂