UDAAN 2024

– FOR CLASS 10th STUDENTS

Lecture No.- 03

- Subject Name- Mathematics
- Chapter Name- Circles

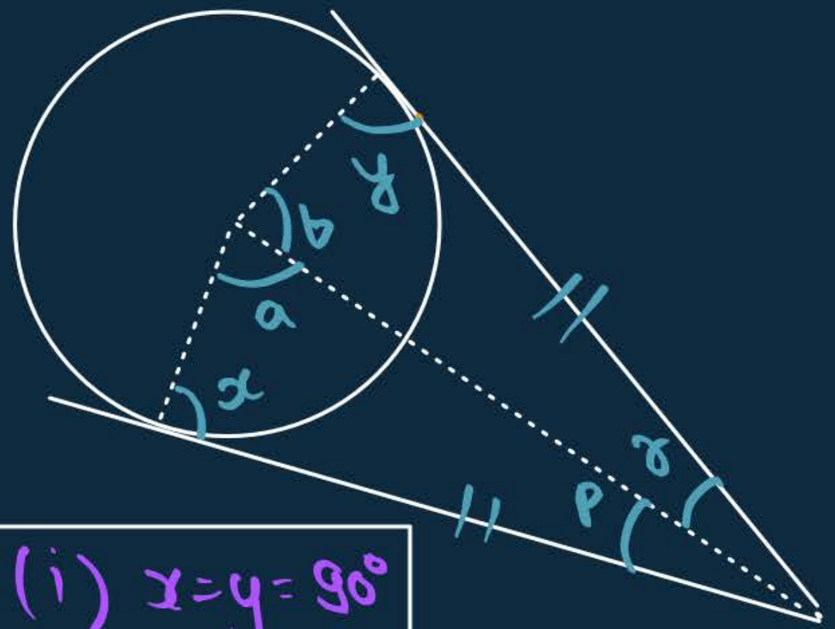
By- RITIK SIR

Topic to be Covered

Topic Important Question (Part II)

Recap of Previous Lecture

Topic Important Question (Part I)



(i) $x = y = 90^\circ$

(ii) $b = a$

(iii) $r = p$

Topic : Theorem 2

A line drawn through the end point of radius and perpendicular to it is a tangent to the circle.

Here, OP is the radius and the line APB is perpendicular to OP.

Let Q be any point on the line APB.

Since $OP \perp AB$ therefore,

$OP < OQ$ (Distance of point from a line is the shortest distance between any point on the line and the given point)

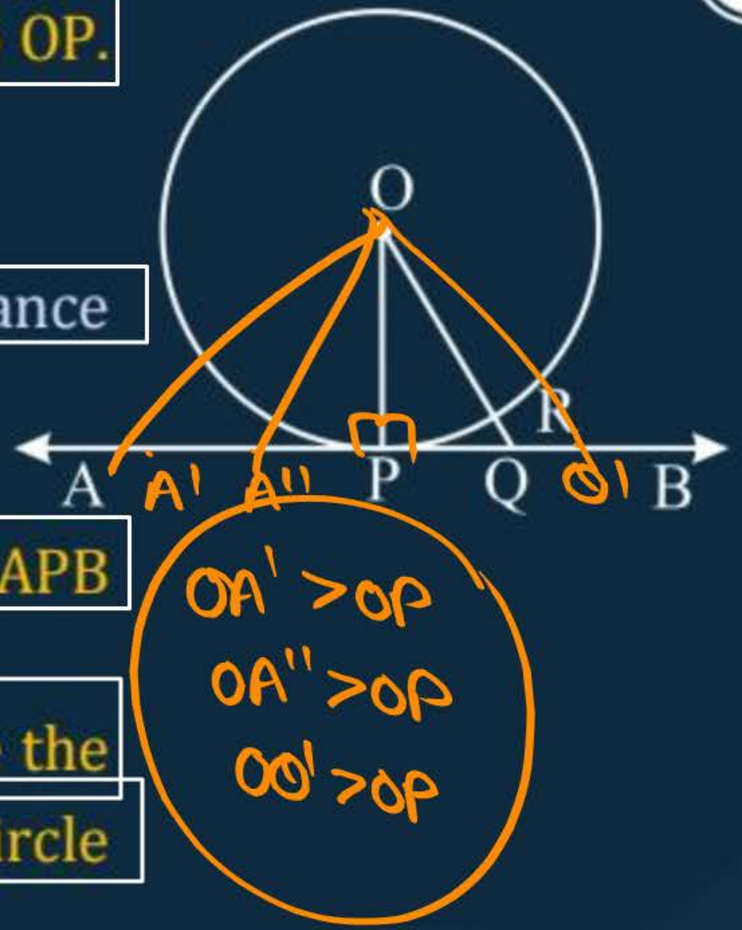
Therefore,

OP is shorter than any other line segment connecting line APB and Q.

Since OP is the radius of the circle therefore, Q lies outside the circle that means every point on line APB lies outside the circle except P.

This implies line APB meets the circle only and only at point P.

Therefore, APB is tangent to the given circle.



Topic : Circle

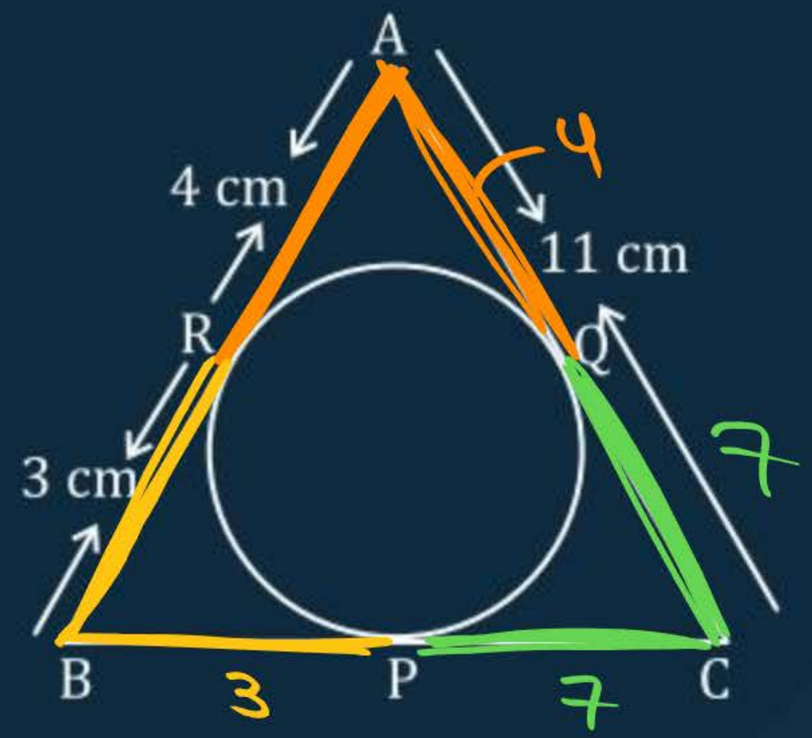
#Q. In figure, ΔABC is circumscribing a circle. Find the length of BC. [CBSE 2004]

A) 10 cm.

B) 12 cm.

C) 8 cm.

D) 9 cm.



Topic : Circle

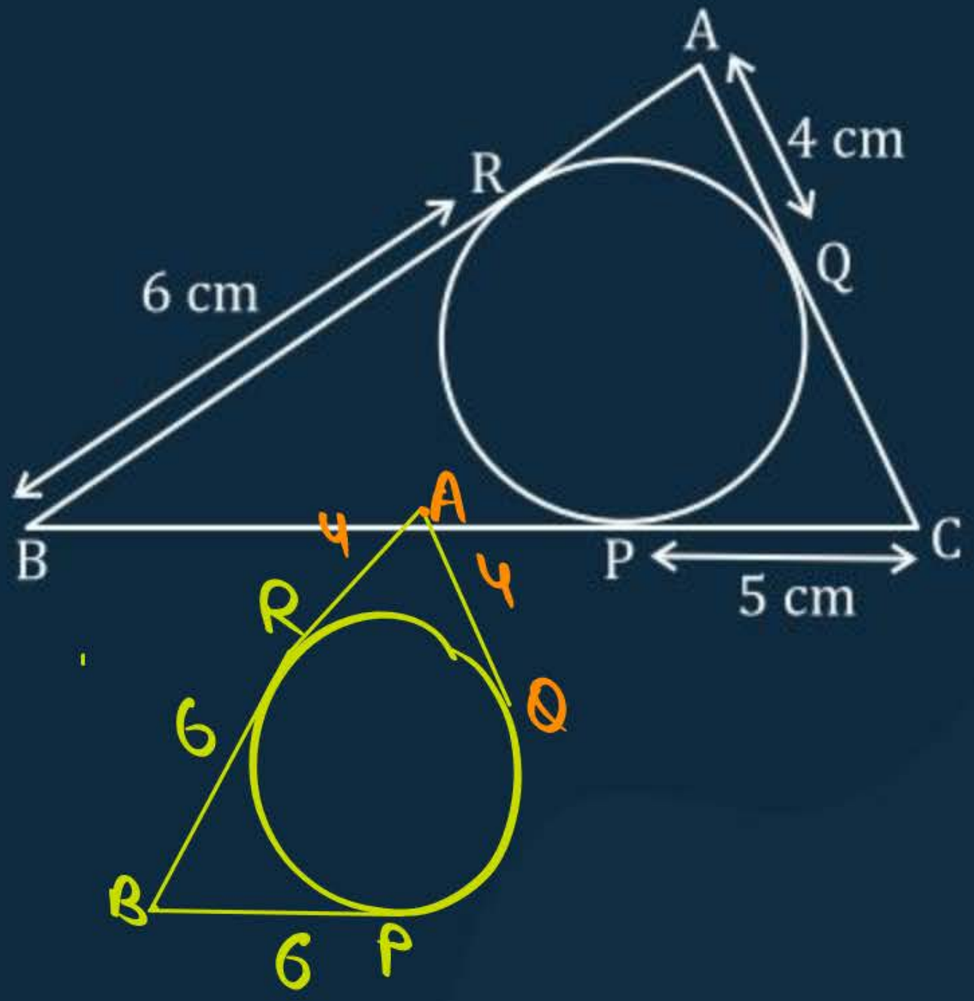
#Q. In figure, the perimeter of ΔABC is [CBSE 2004]

A 30 cm

B 60 cm

C 45 cm

D 15 cm



Topic : Circle

#Q. A circle is inscribed in a $\triangle ABC$ having sides 8 cm, 10 cm and 12 cm as shown in figure. Find AD, BE and CF. [CBSE 2001]

Sol:

AF = AD	=	x
BD = BE	=	y
CF = CE	=	z

$x + z = 10$

$x + y = 12$

$z + y = 8$

$10 - z + 8 - z = 12$

$18 - 2z = 12$

$18 - 12 = 2z$

$6 = 2z$

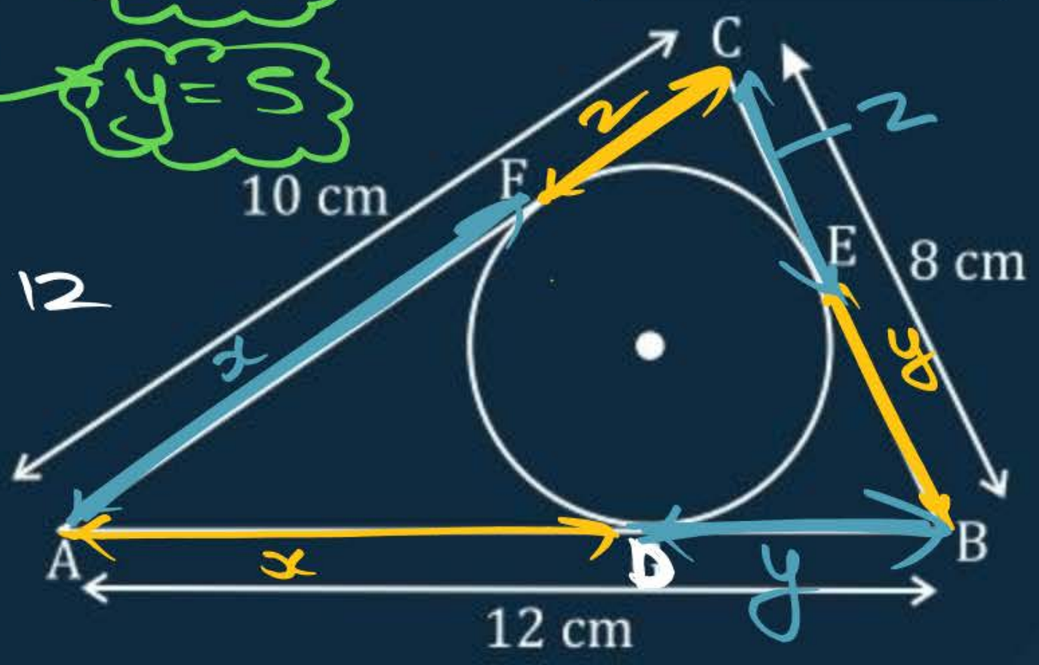
$3 = z$

$x = 10 - z$

$y = 8 - z$

$x = 7$

$y = 5$



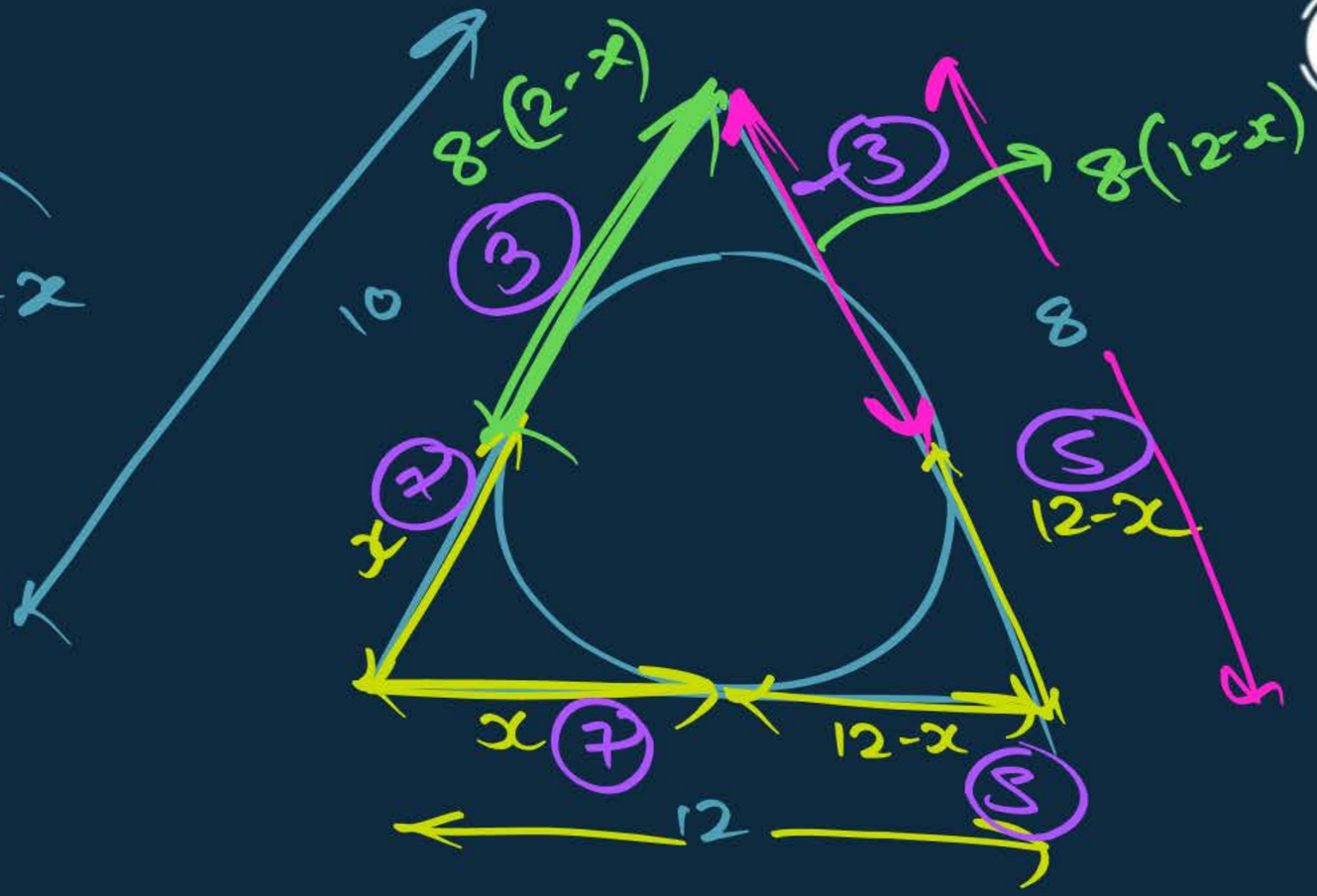
Method : 2

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

$$10 = 2x - 4$$

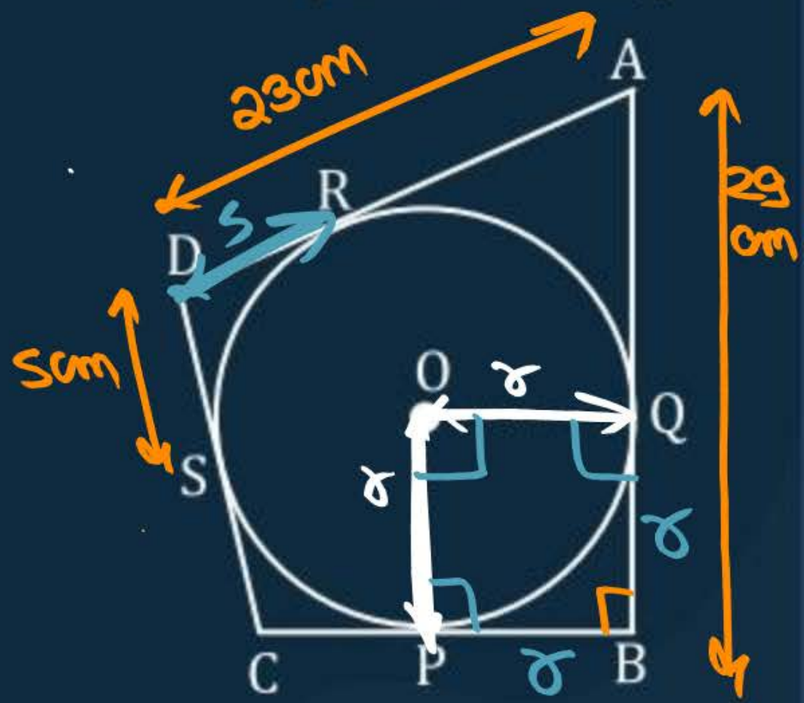
$$14 = 2x$$

$$7 = x$$



Topic : 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. [CBSE 2003]



$OP \perp PB$, $OQ \perp QB$ [tangent is ⊥ to the radius]

$\angle B = 90°$ [Given]

$OP = OQ = \gamma$

∴ OQBP is a square.

$DS = DR = 5$

$\Rightarrow AR = 18$

$\Rightarrow AQ = 18$

$\Rightarrow QB = 11$

tangents from external point

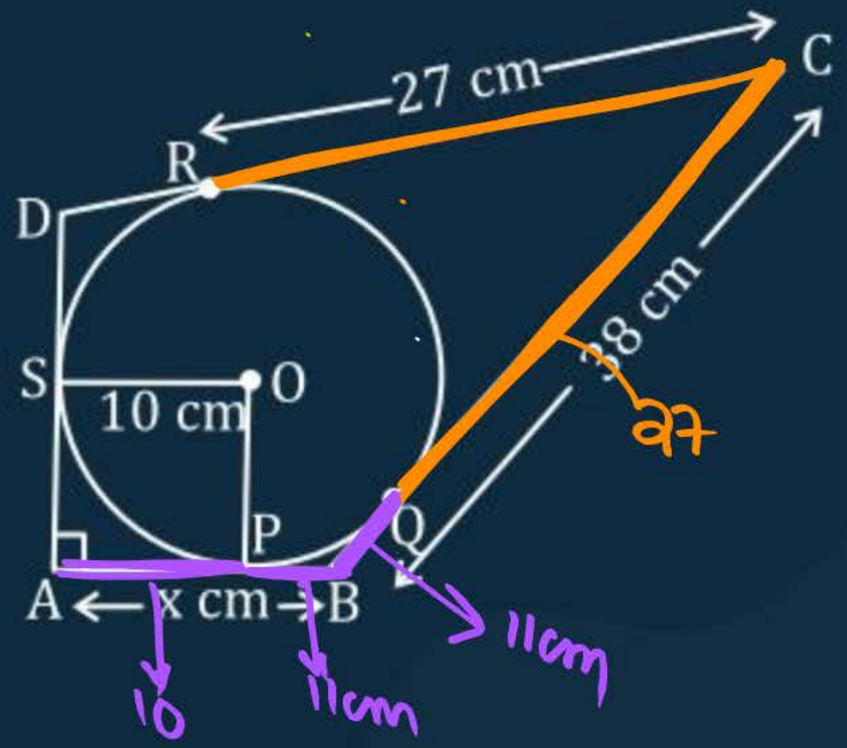
radius = 11cm

Topic : Circle

#Q. In the figure, quadrilateral ABCD is circumscribing a circle with centre O and AD ⊥ AB. If radius of incircle is 10 cm, then find the value of x.

[CBSE SQP, 2020-21]

x = 21 cm



Topic : Circle

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

[CBSE Term – II, 2016]

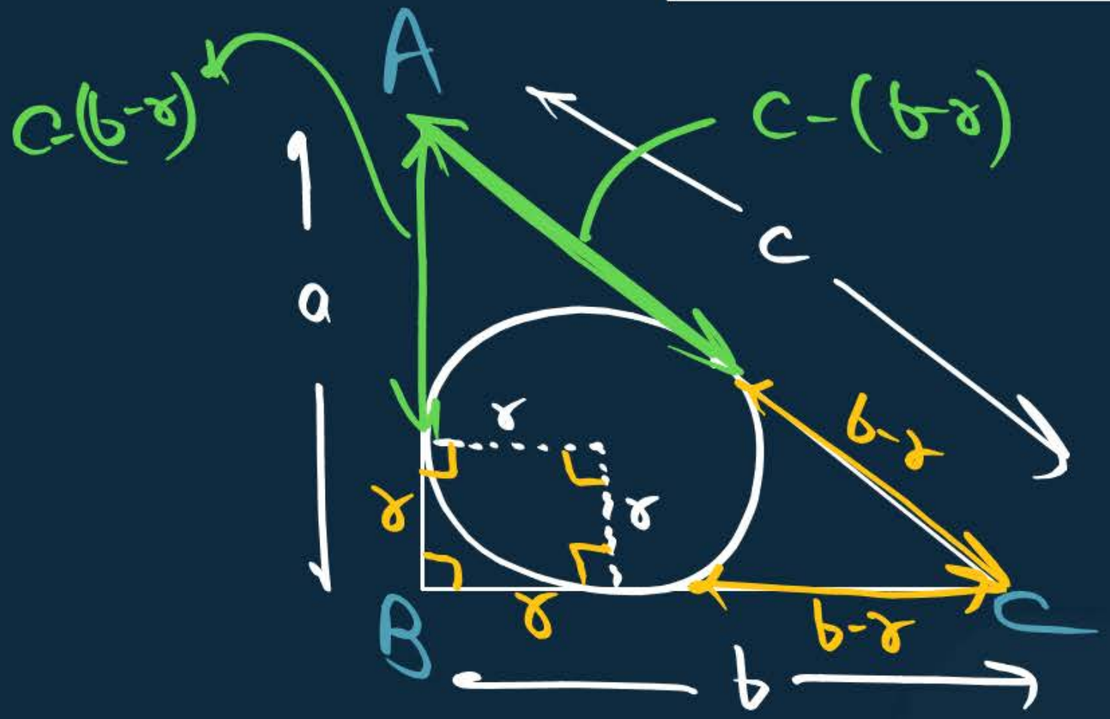
$a = r + c - (b - r)$

$a = r + c - b + r$

$a = 2r + c - b$

$a + b - c = 2r$

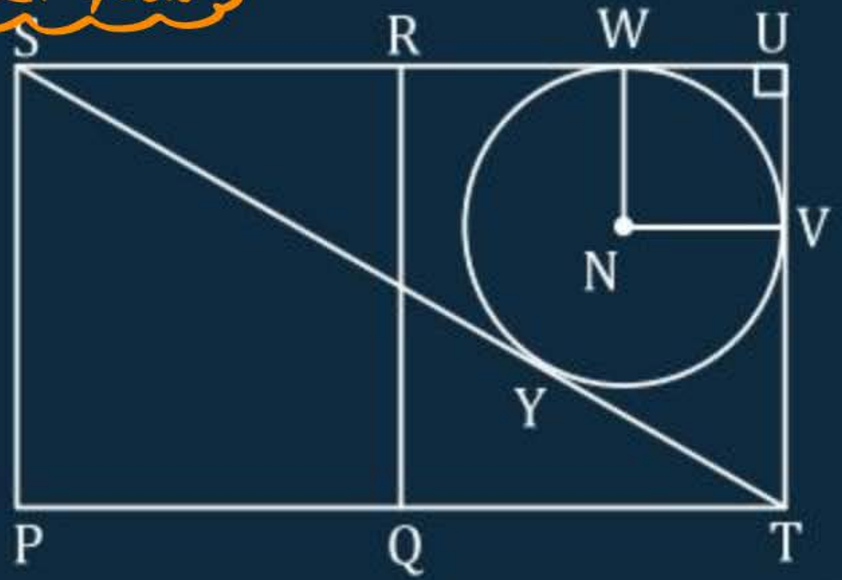
$\frac{a+b-c}{2} = r$

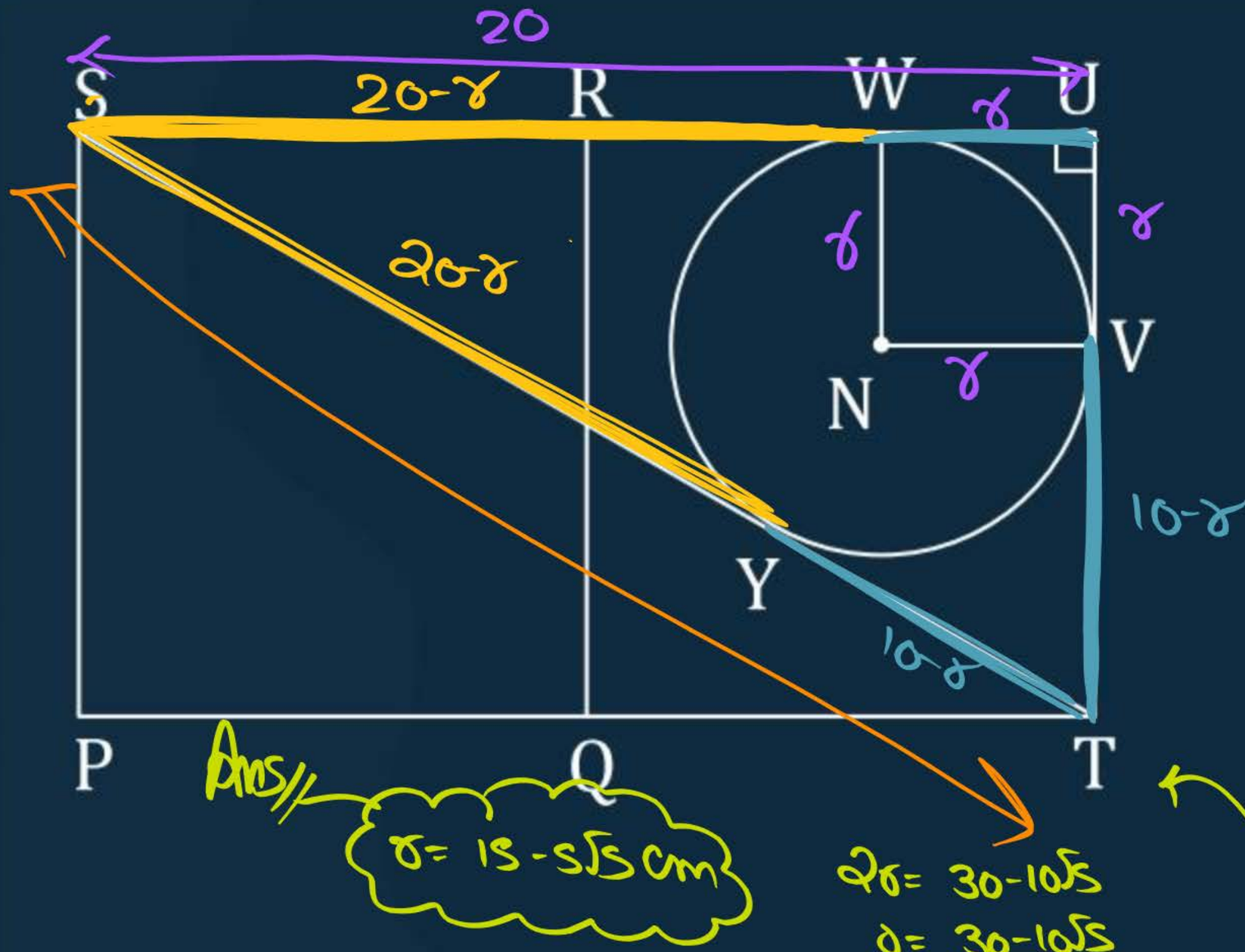


Topic : Circle

#Q. Shown below is a circle and 2 congruent squares (PQRS & QTUR). ST, SU and UT are tangents to the circle. The side length of the square is 10 cm. Find the radius of the circle. Show your work. [CBSE [redacted] Practice Sheet Questions]

Last year





$(SU)^2+(UT)^2=(ST)^2$

$400+100=(ST)^2$

$500=(ST)^2$

$\sqrt{500}=ST$

$\sqrt{5\times10\times10}=ST$

$10\sqrt{5}=ST$

10

$ST=SY+YT$

$10\sqrt{5}=20-\gamma+10-\gamma$

$10\sqrt{5}=-2\gamma+30$

$2\gamma=30-10\sqrt{5}$

$\gamma=\frac{30-10\sqrt{5}}{2}$

Ans// $\gamma=15-5\sqrt{5}$ cm

Topic : Circle

#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. [CBSE 2009]

Area of $\triangle ABC$ = A. of AOB + A. of BOC + A. of AOC

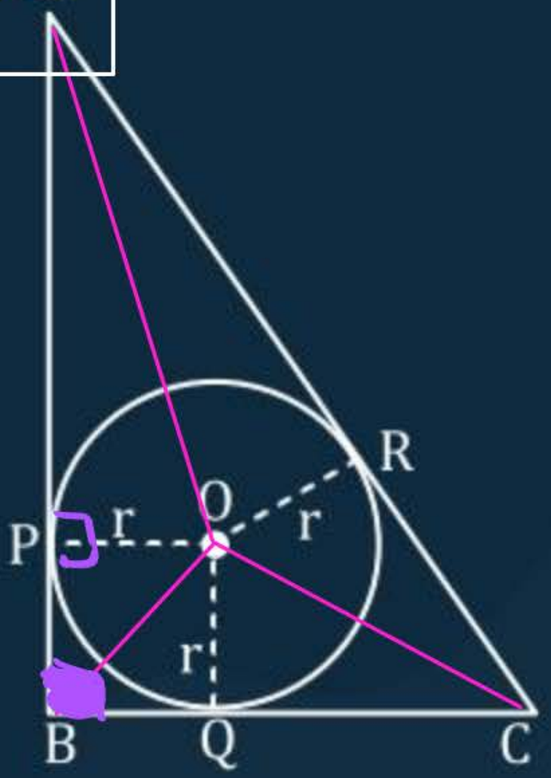
$\frac{1}{2} \times AB \times BC = \frac{1}{2} \times AB \times OP + \frac{1}{2} \times BC \times OQ + \frac{1}{2} \times AC \times OR$

$\frac{1}{2} \times 8 \times 6 = \frac{1}{2} \times 8 \times r + \frac{1}{2} \times 6 \times r + \frac{1}{2} \times 10 \times r$

$24 = \frac{1}{2} \times r [8+6+10]$

$48 = r[24]$

$r = 2\text{cm}$



Topic : Circle

Heron's Formula

#Q. In the figure, a ΔABC is drawn to circumscribe a circle of radius 3 cm, such that the segments BD and DC are respectively 6 cm and 9 cm of lengths 6 cm and 9 cm. If the area of ΔABC is 54 cm^2, then find the lengths of sides AB and AC. [2011D, 2011OD, 2015 OD]

Ar.of ΔABC = Ar.of ΔAOB + Ar.of ΔBOC + Ar.of ΔAOC

$54 = \frac{1}{2} \times AB \times OP + \frac{1}{2} \times BC \times OD + \frac{1}{2} \times AC \times OQ$

$54 = \frac{1}{2} \times AB \times 3 + \frac{1}{2} \times BC \times 3 + \frac{1}{2} \times AC \times 3$

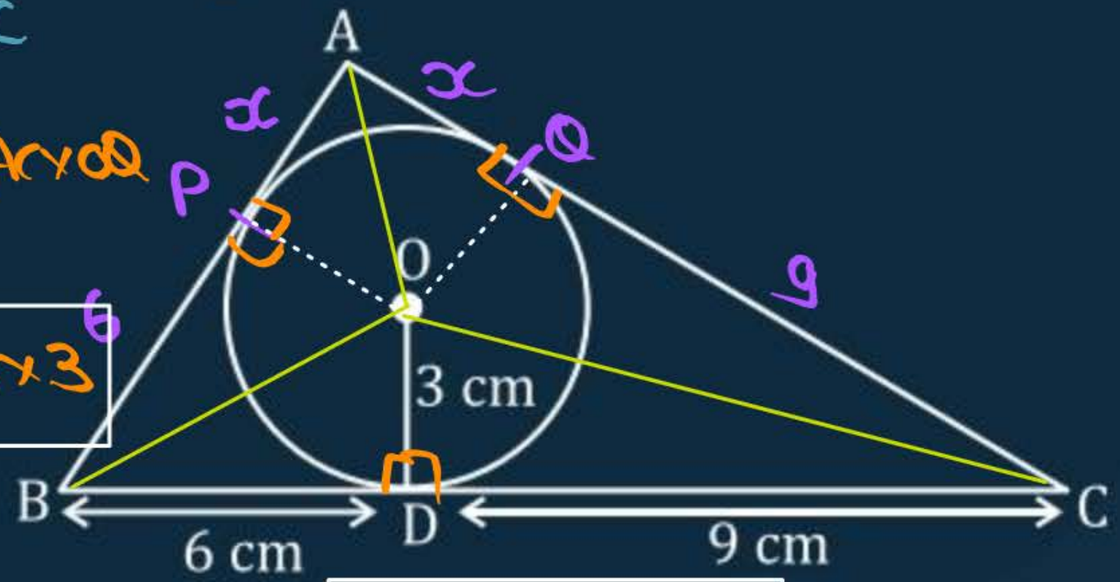
$54 = \frac{1}{2} \times 3 \left[AB + BC + AC \right]$

$\frac{54 \times 2}{3} = 6 + x + 15 + 9 + x$

$36 = 30 + 2x$

$6 = 2x$

$3 = x$

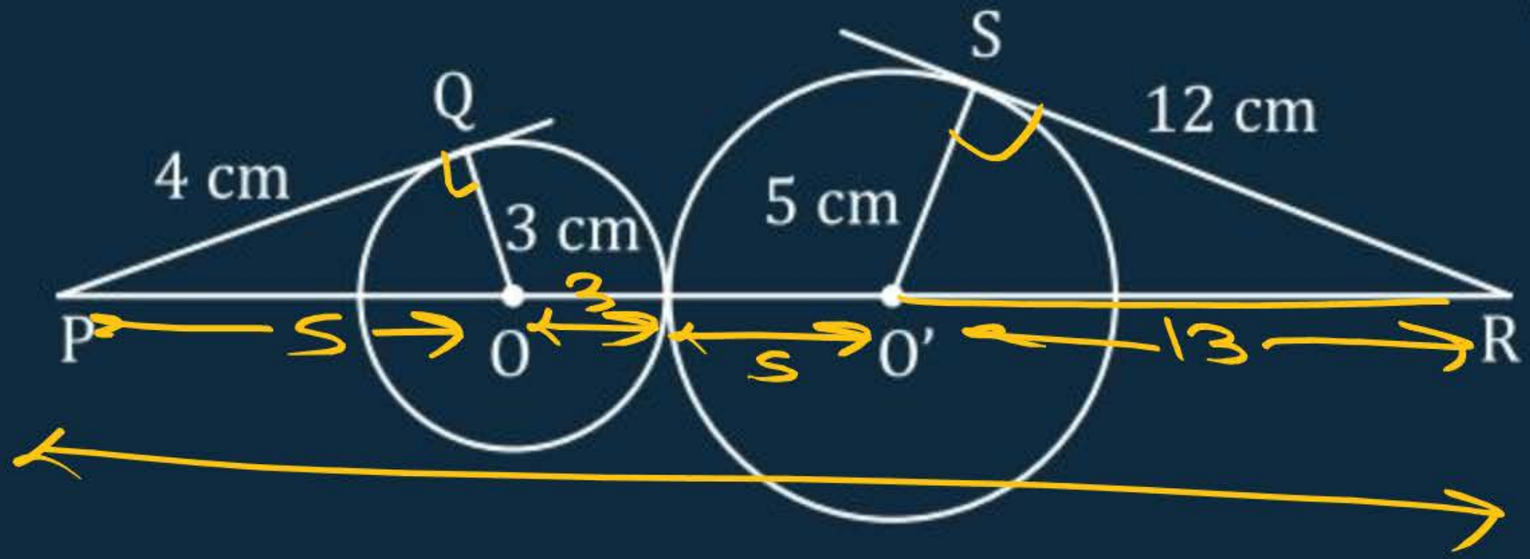


$\therefore$ AB = 9cm — Ans//

AC = 12cm

Topic : Circle

#Q. In fig. PR =



A 20 cm

B 26 cm

C 24 cm

D 28 cm

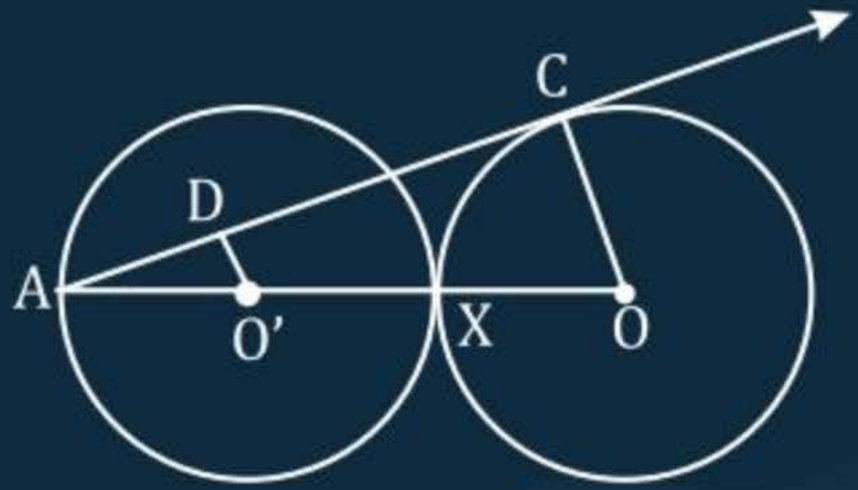
Topic : Circle

Hint → similarity

#Q. In the figure, two equal circles, with centres O and O′, touch each other A at X. OO′ produced meets the circle with centre O′ at A. AC is tangent to the circle with centre O, at the point C. O′D is perpendicular to AC. Find the value of $\frac{DO'}{CO}$.

[2016 OD]

H.W



Topic : Circle

#Q. In figure, AB is a chord of length 16 cm of a circle of radius 10 cm. The tangents at A and B intersect at a point P. Find the length of PA. [CBSE 2010]

HW

Hint : ① Trigonometry

② Similarity

③ Pythagoras theorem

Topic : Circle

last year

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

[CBSE [redacted] Practice Sheet Questions]

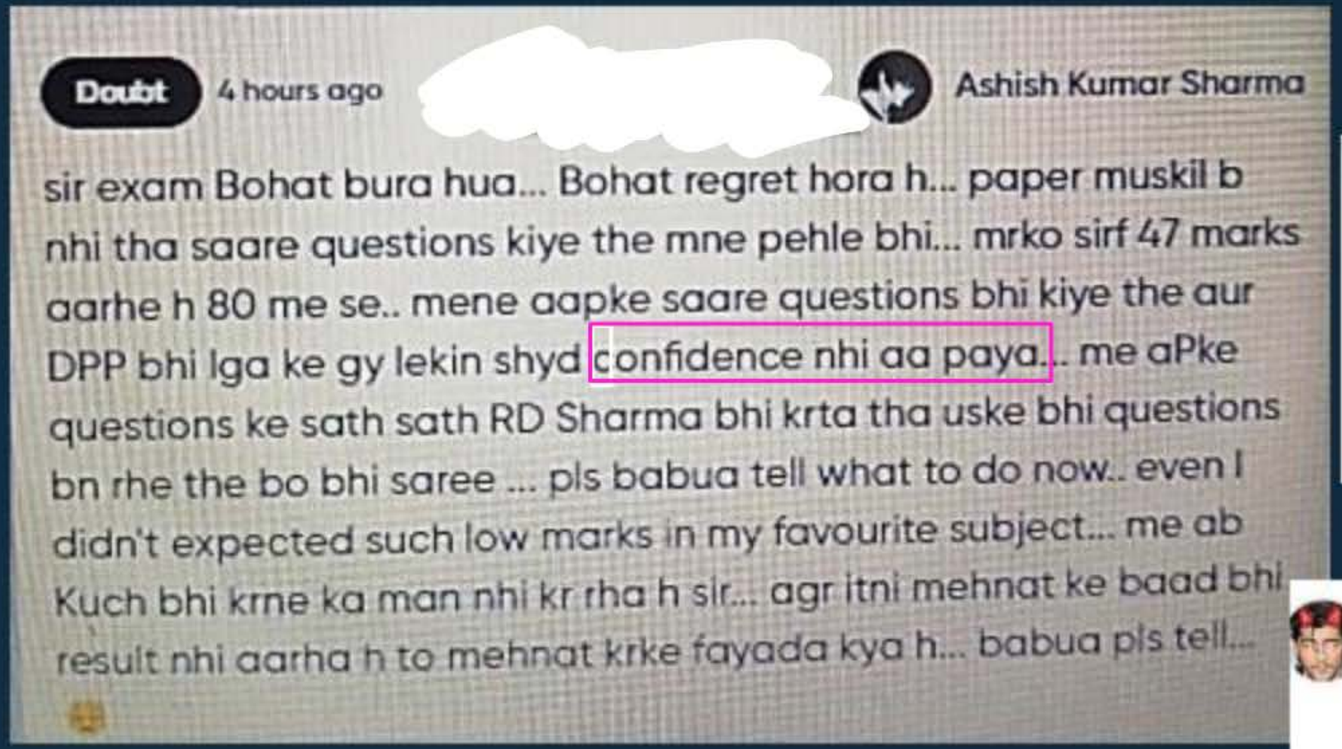
H.W

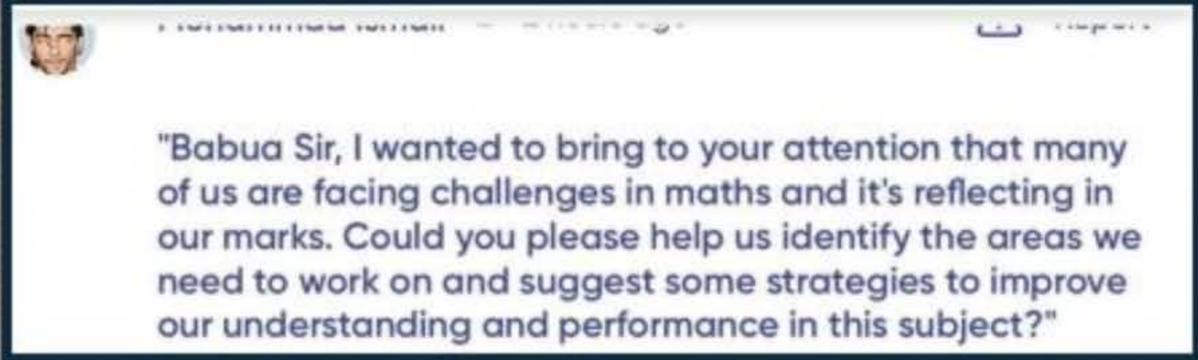
A All three tangents are equal in length

B Both the points lie on one of the tangents.

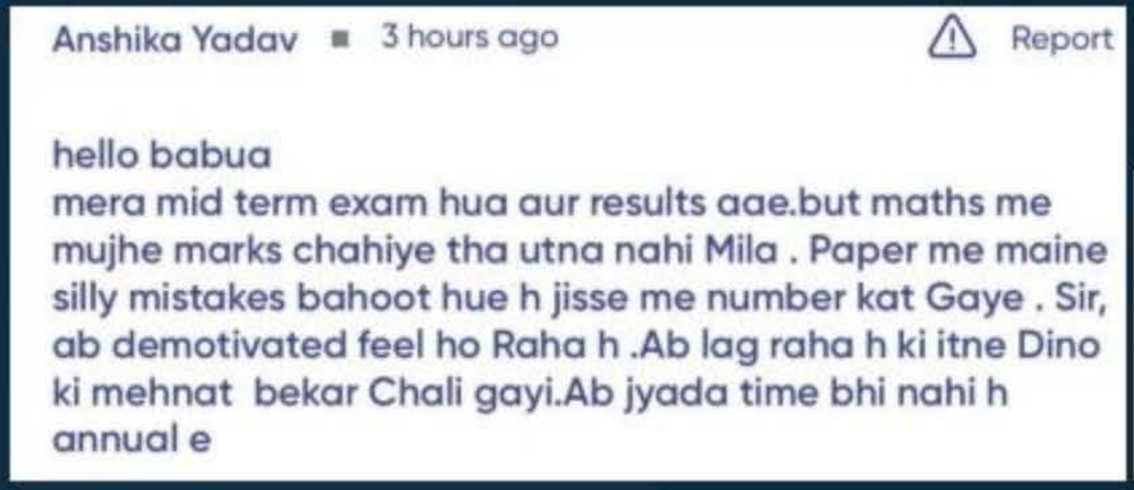
C The tangnets and the circle have two common points in total

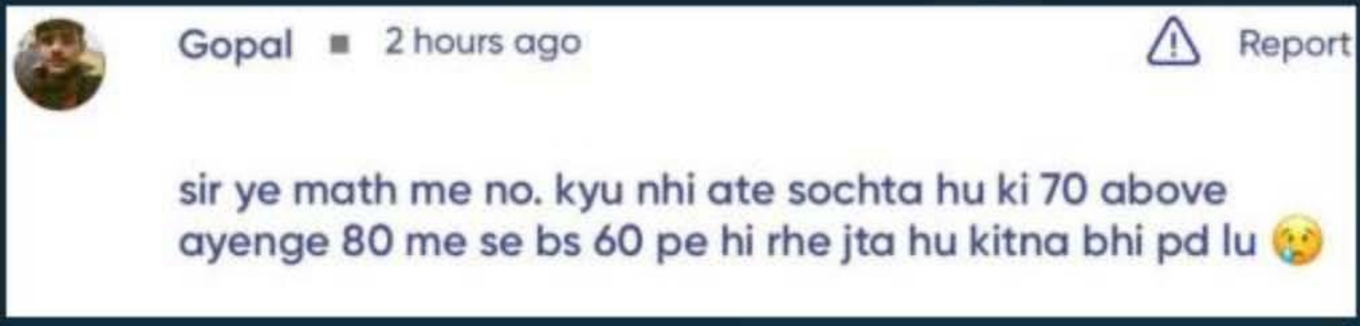
D Such a situation is not possible as with 2 points, there will be 4 tangent to the cirlce

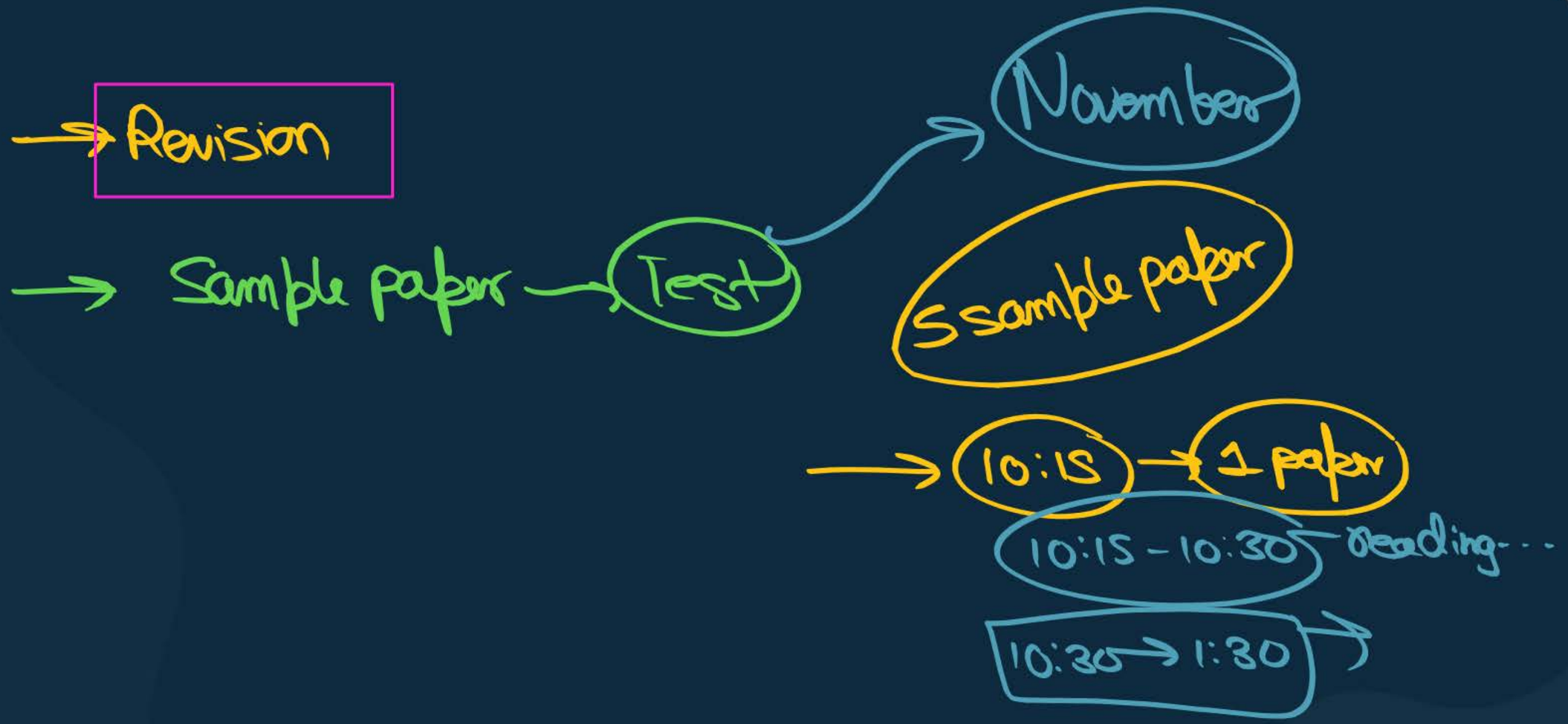

Doubt
4 hours ago
Ashish Kumar Sharma
sir exam Bohat bura hua... Bohat regret hora h... paper muskil b nhi tha saare questions kiye the mne pehle bhi... mrko sirf 47 marks aarhe h 80 me se.. mene aapke saare questions bhi kiye the aur DPP bhi lga ke gy lekin shyd confidence nhi aa paya... me aPke questions ke sath sath RD Sharma bhi krta tha uske bhi questions bn rhe the bo bhi saree ... pls babua tell what to do now.. even I didn't expected such low marks in my favourite subject... me ab Kuch bhi krne ka man nhi kr rha h sir... agr itni mehnat ke baad bhi result nhi aarha h to mehnat krke fayada kya h... babua pls tell...


"Babua Sir, I wanted to bring to your attention that many of us are facing challenges in maths and it's reflecting in our marks. Could you please help us identify the areas we need to work on and suggest some strategies to improve our understanding and performance in this subject?"


Mohammad Ismail ■ 2 hours ago
Report
"Sir, I think we need to work on our maths skills a bit more as I noticed some areas where we struggled during our recent class. Can you please guide us on how to improve and what topics we should focus on more?"


Anshika Yadav ■ 3 hours ago
Report
hello babua
mera mid term exam hua aur results aae.but maths me mujhe marks chahiye tha utna nahi Mila . Paper me maine silly mistakes bahoot hue h jisse me number kat Gaye . Sir, ab demotivated feel ho Raha h .Ab lag raha h ki itne Dino ki mehnat bekar Chali gayi.Ab jyada time bhi nahi h annual e


Gopal ■ 2 hours ago
Report
sir ye math me no. kyu nhi ate sochta hu ki 70 above ayenge 80 me se bs 60 pe hi rhe jta hu kitna bhi pd lu


Revision
Sample paper
Test
November
5 sample paper
10:15
1 paper
10:15 - 10:30
Reading...
10:30 → 1:30


THANK
YOU