UDAAN

2026

Circles

MATHS LECTURE-1

BY-RITIK SIR

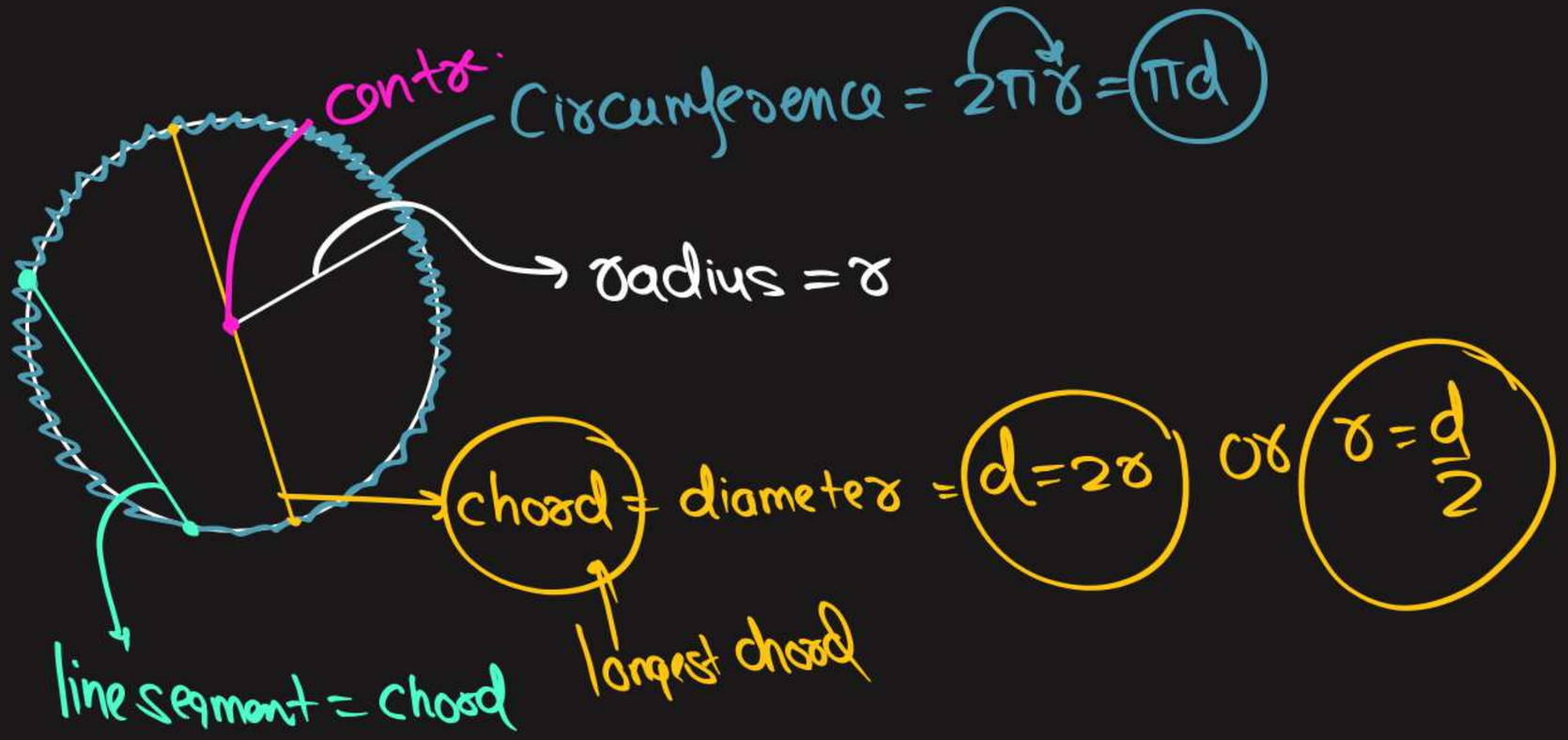
Topics *to be covered*

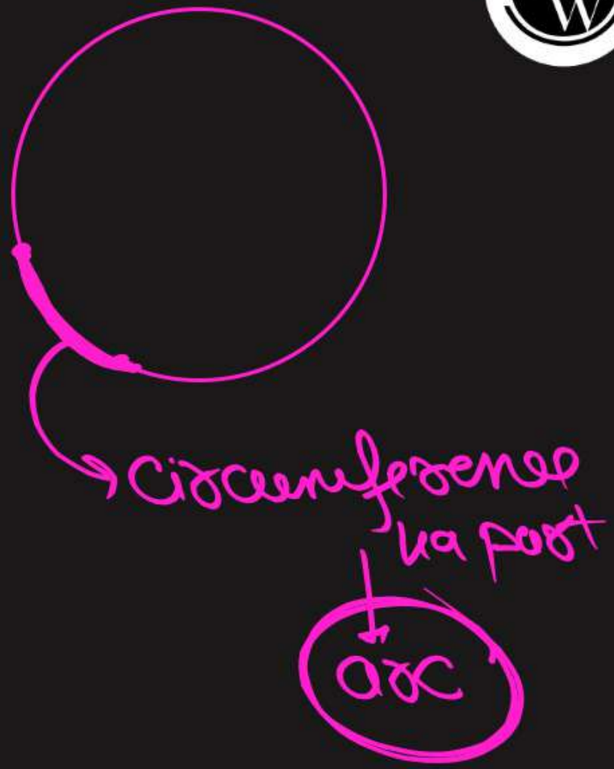
#Sochnaseekho

A Secant and Tangent

B Theorems 1, 2, 3, 4

NCERT



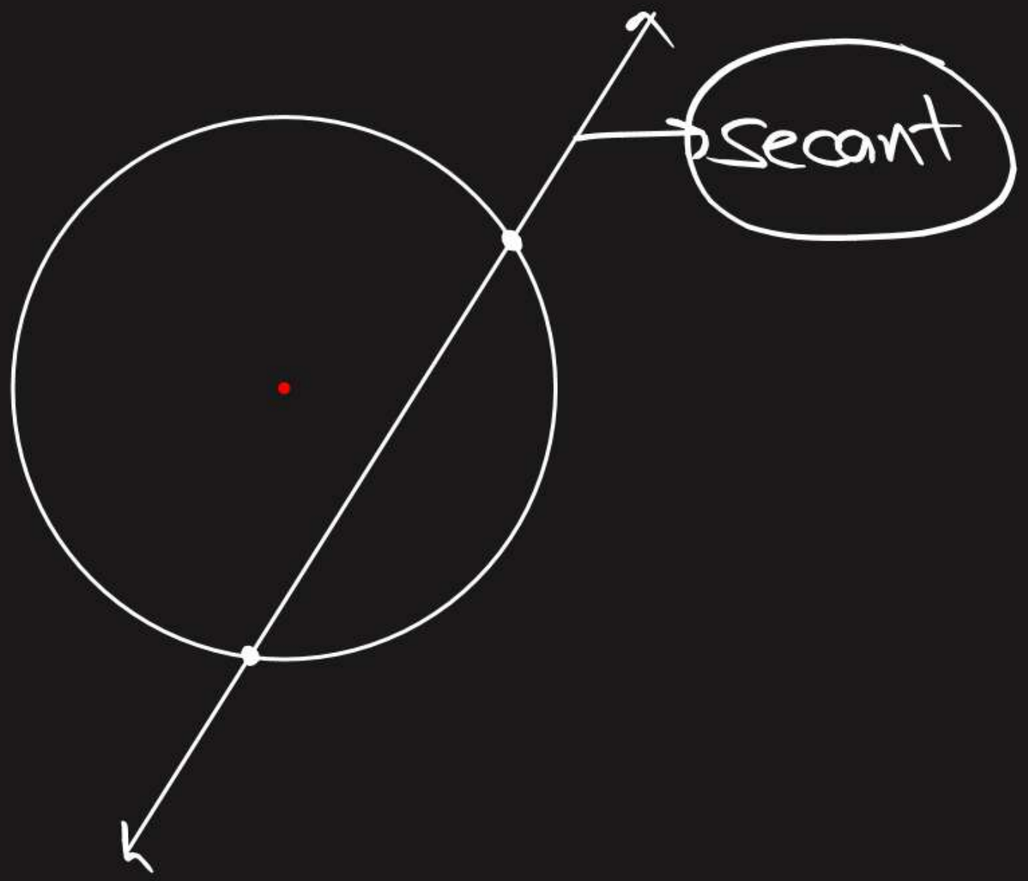


Defination: A circle is a collection of all those points in a plane which are at **fixed distance** from a **fixed point**.

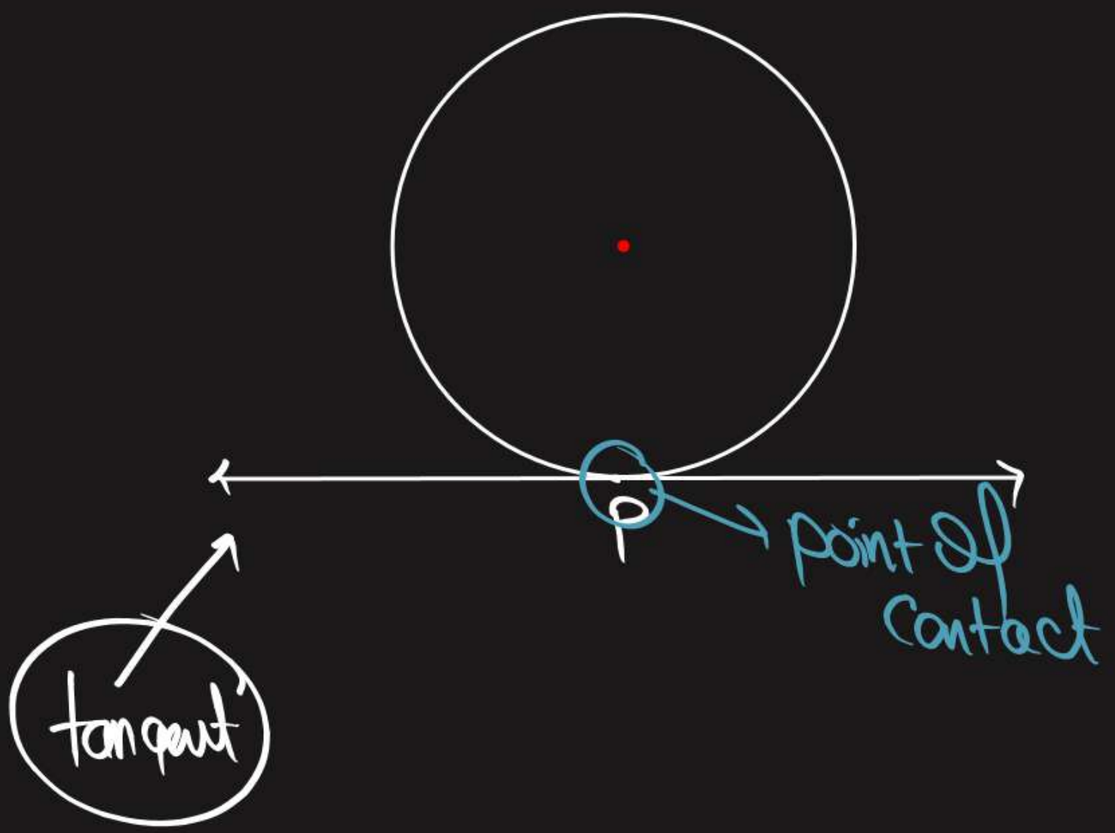
fixed distance → radius

fixed point → centre.

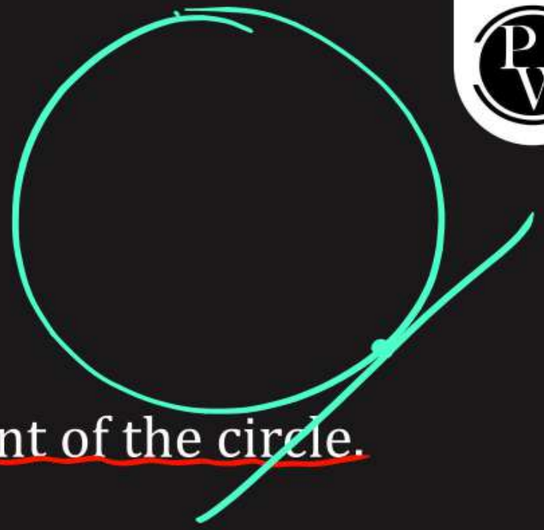
Secant



Tangent



SECANT AND TANGENT



SECANT:

- A line which intersects a circle in two distinct points is called a secant of the circle.

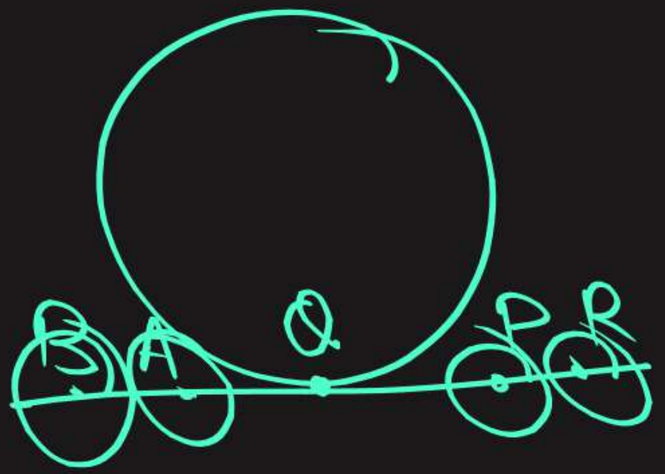
TANGENT:

- A tangent to a circle is a line that intersects the circle in exactly one point.
- The point is called the point of contact of the tangent and the line is said to touch the circle at this point.
- The word tangent is originated from the Latin word TANGERE which means 'to touch'.

SECANT AND TANGENT

NOTE:

- The point of contact is the only point which is common to the tangent and the circle and every other point on the tangent lies outside the circle. Thus, of all the points on a tangent to a circle, the point of contact is nearest to the center of the circle.



THEOREM 1

A tangent to a circle is perpendicular to the radius through the point of contact.

CBSE 2009, 12, 14, 15, 16

G: A C(O, r) and a tangent AB, point of point 'P'.

To p: OP ⊥ AB

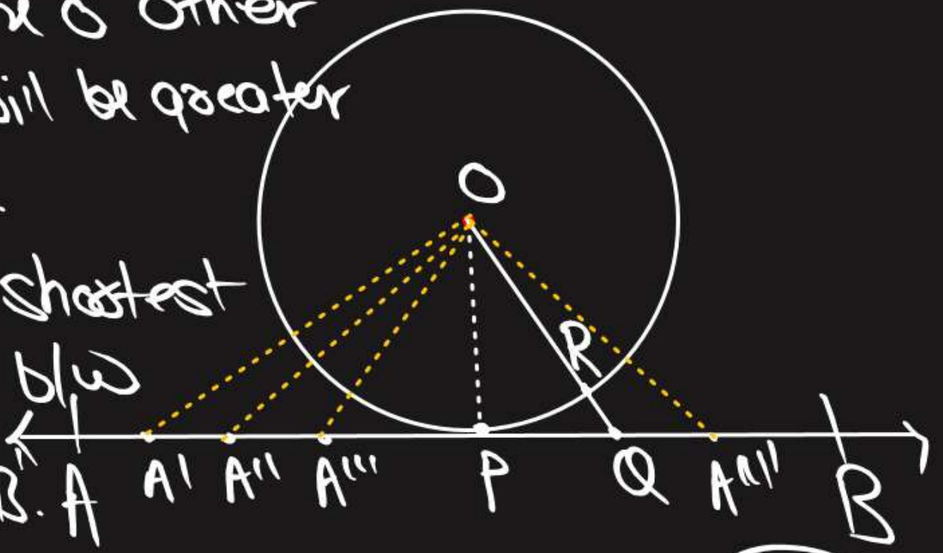
Proof: OQ > OR (Q lies outside the circle)

OR = OP

⇒ OQ > OP

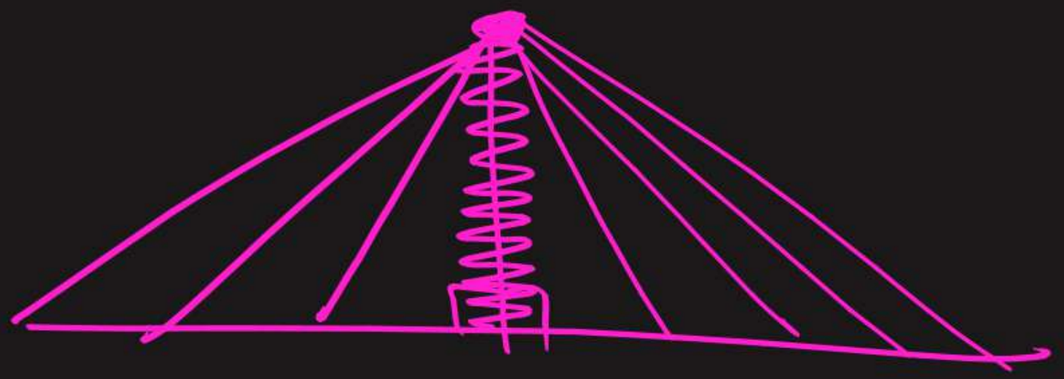
Any point and ist distance from centre 'O' other than 'p' will be greater than OP.

⇒ 'OP' is the shortest distance b/w 'O' and 'AB'.

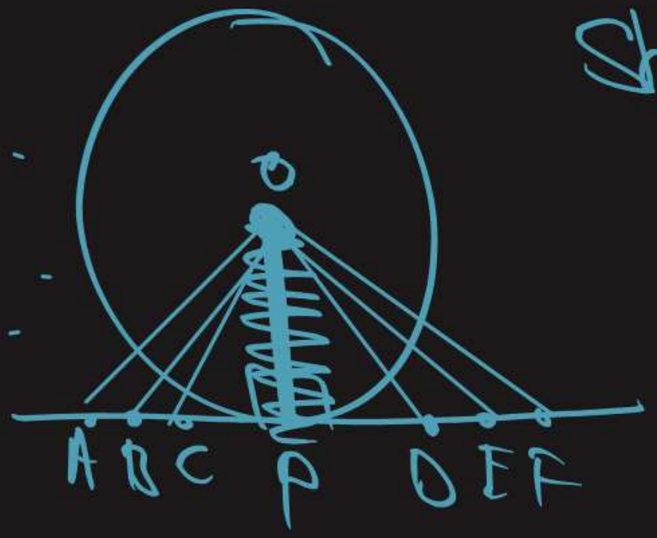


Similarly, OA', OA'', OA''', OA'''' >>> OP

also, shortest distance is ⊥ distance, ∴ OP ⊥ AB



Shortest distance is always perpendicular.



Shortest distance = OP → perpendicular distance.

THEOREM 2

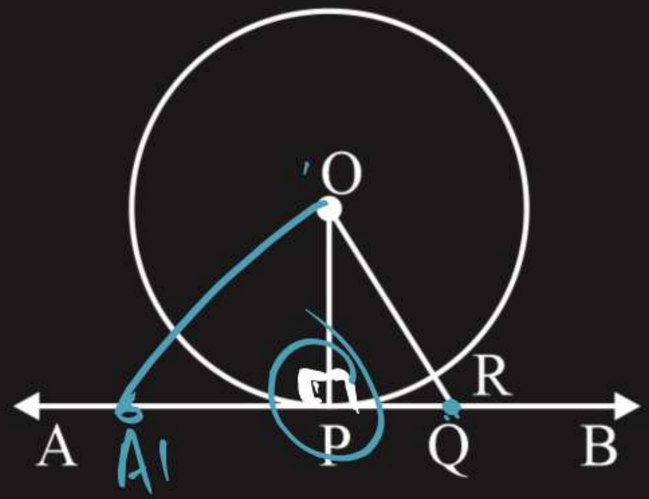
A line drawn through the end point of a radius and perpendicular to it is a tangent to the circle.

CBSE 2012, 13

line → tangent pasaw karna hai.

↓

ek hi point pay touch.



1. Shortest distance = OP (reason → ⊥ distance).
2. OP radius hai.

Given: A radius OP of a circle C (O, r) and a line APB, perpendicular to OP.

To Prove: AB is a tangent to the circle at the point P.

PROOF: Take a point Q, different from P, on the line AB.

Now, $OP \perp AB$.

$\Rightarrow$ Among all the line segments joining O to a point on AB OP is the shortest.

$\Rightarrow$ $OQ > OP$ and 'OP' is radius.

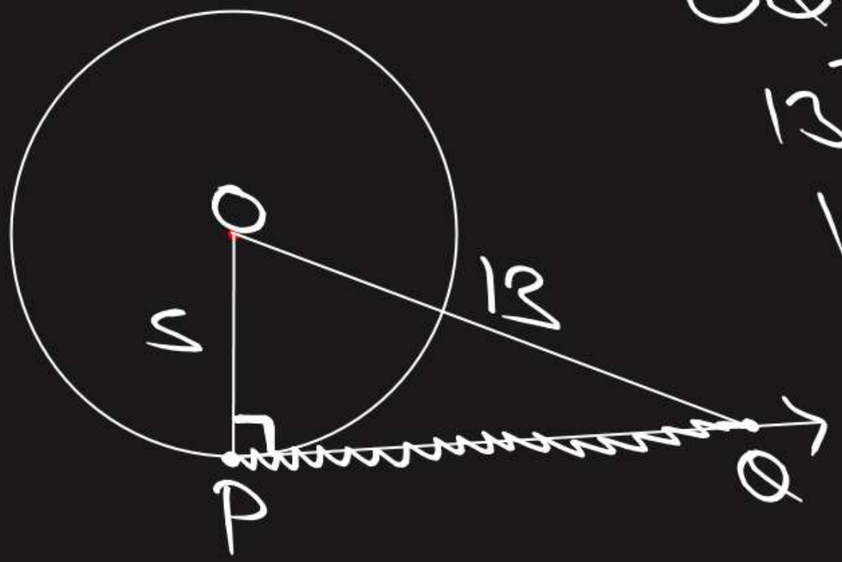
$\Rightarrow$ Q lies outside the circle.

Thus, every point on AB, other than P, lies outside the circle. This shows that AB meets the circle only at the point P.

Hence, AB is a tangent to the circle at P.

Point of contact:

#Q. A tangent PQ at a point P of a circle of radius 5 cm meets a line through the centre O at a point O so that OQ = 13 cm. Find the length of PQ.



$OQ^2 = OP^2 + PQ^2$

$13^2 = 5^2 + PQ^2$

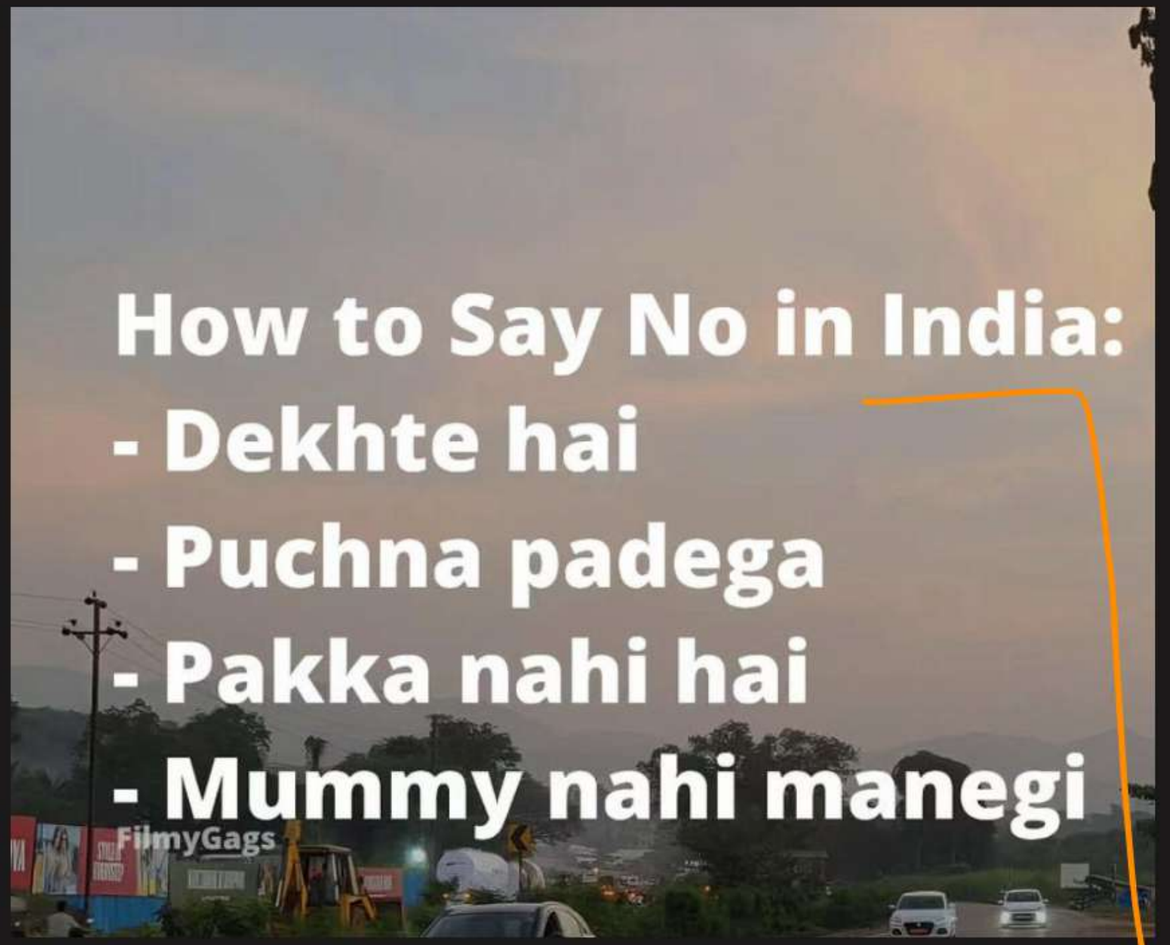
$169 - 25 = PQ^2$

$144 = PQ^2$

$\pm\sqrt{144} = PQ$

$\pm 12 = PQ$

$12 = PQ$ cm


How to Say No in India:
- Dekhte hai
- Puchna padega
- Pakka nahi hai
- Mummy nahi manegi
FilmyGags

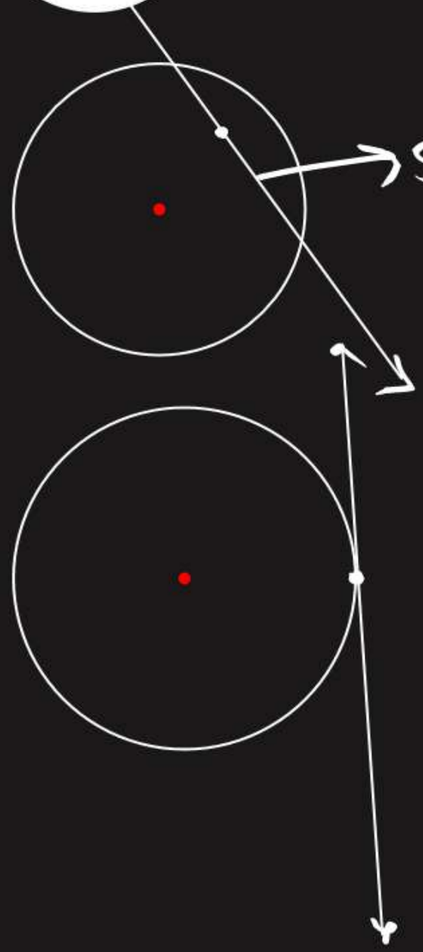
Naa

#Q. Show that tangent lies at the end points of a diameter of a circle are parallel.

CBSE 2014, 17

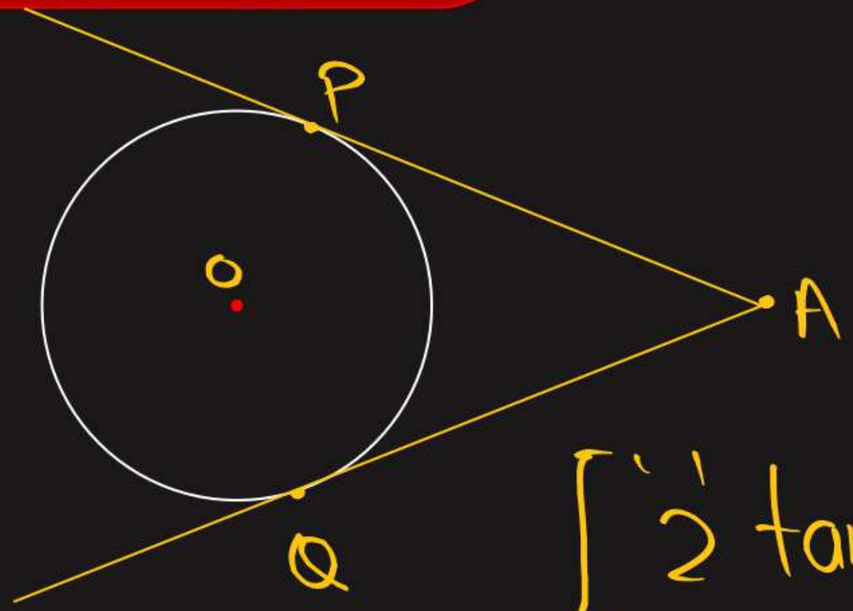
TANGENTS FROM A POINT TO A CIRCLE

#QT10



Secant → [0 tangents]

[1 tangent]



[2 tangents]

These facts can be summarized as follows:

(i) No tangent can be drawn to a circle from a point lying inside it.

(ii) One and only one tangent can be drawn to a circle at a point on the circle.

(iii) Two tangents can be drawn to a circle from a point lying outside it.

THEOREM 3

The lengths of two tangents drawn from an external point to a circle are equal.

CBSE 2008, 09, 10, 13, 14, 15, 16, 17, 18

G: AP and AB are tangents to a circle.

To p: AP = AB

Proof: In ΔAPO and ΔABO

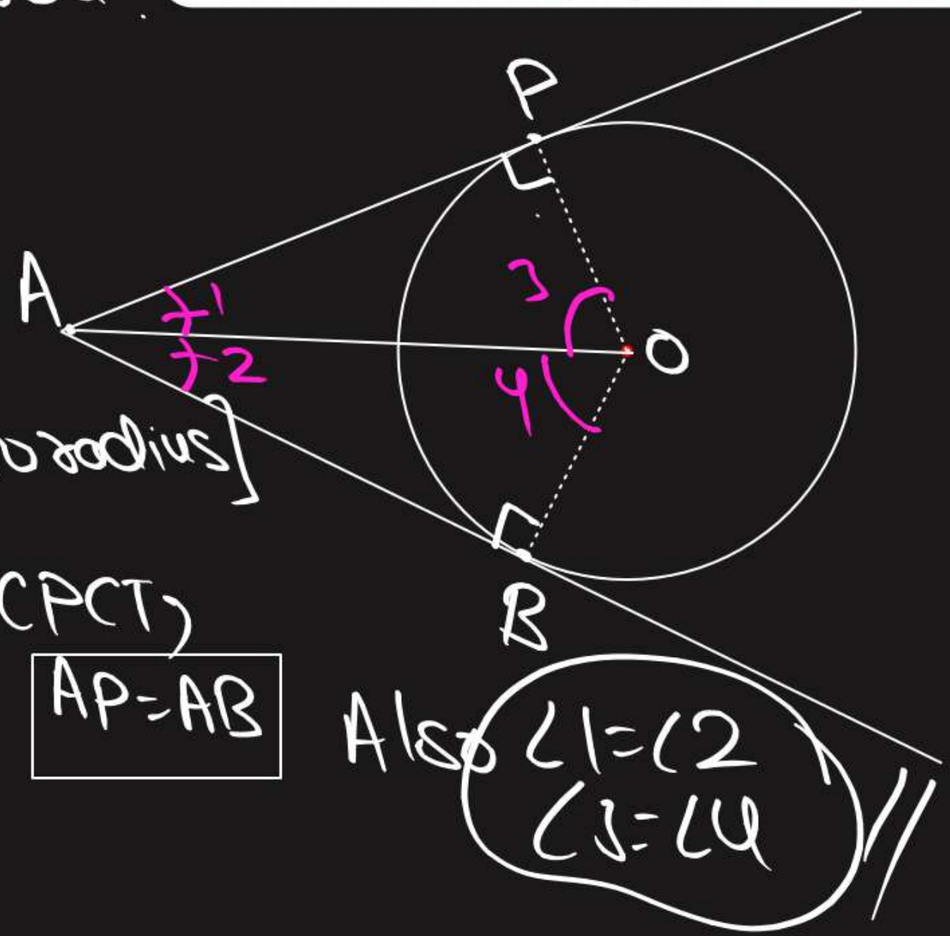
$OB = OP$ (radius)

$\angle OPA = \angle OBA$ (90°) [tangent is $\perp$ to radius]

$OA = AO$ (common)

By RHS, $\boxed{\Delta APO \cong \Delta ABO}$

By CPCT, $\boxed{AP = AB}$



Also $\angle 1 = \angle 2$

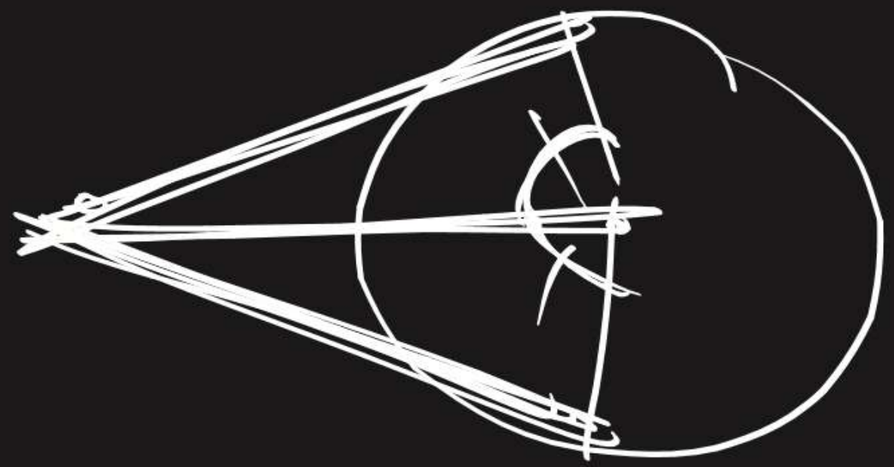
$\angle 3 = \angle 4$

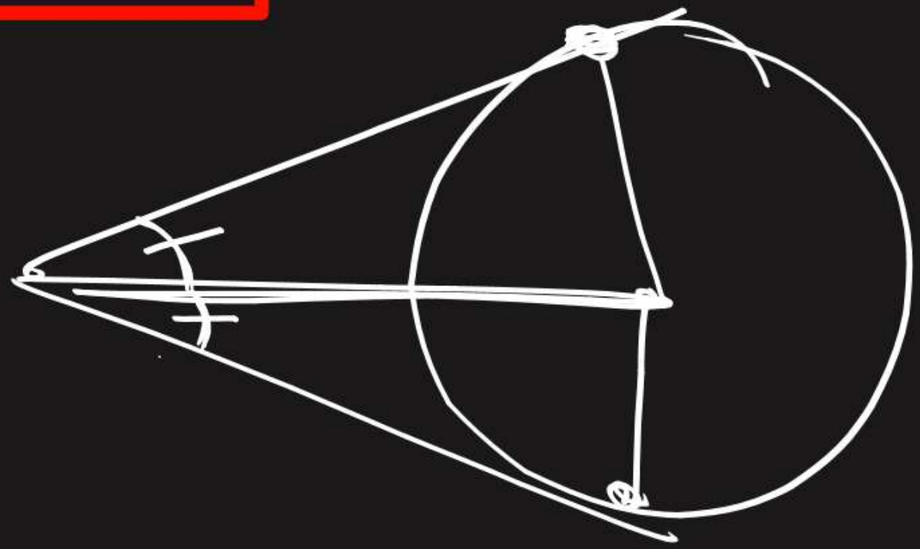
THEOREM 4

If two tangents are drawn to a circle from an external point, then:

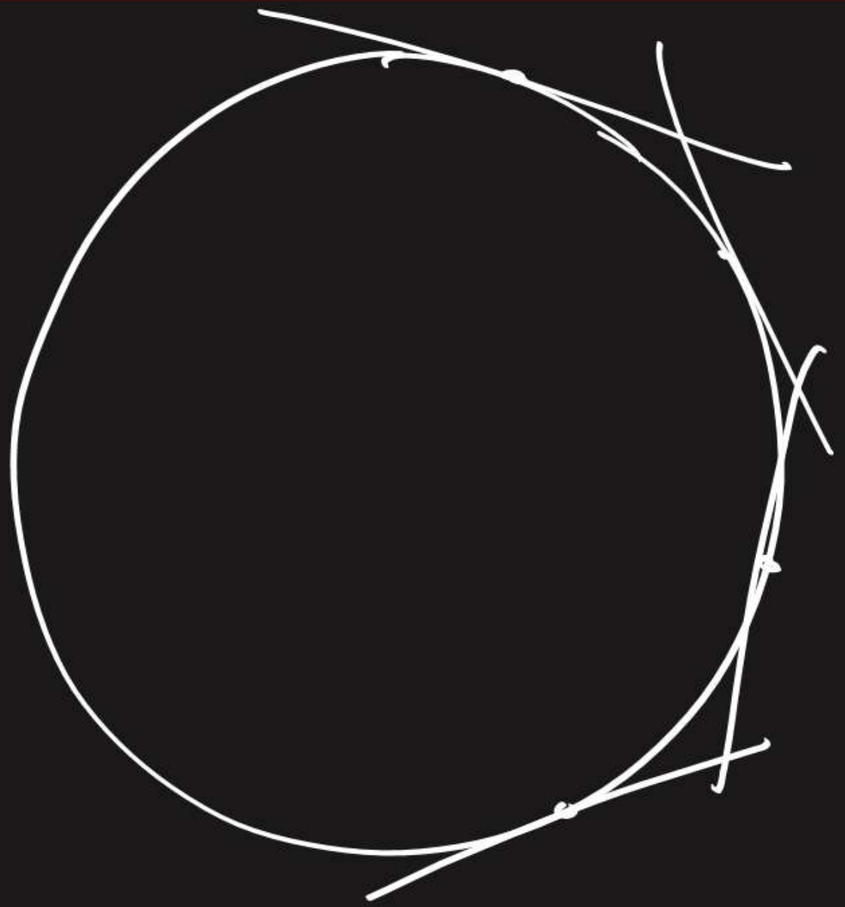
(i) they subtend equal angles at the centre,

(ii) they are equally inclined to the segment, joining the centre to that point i.e. the centre lies on the bisector of the angle between the tangents.





#Q. How many tangents can a circle have?



Infinite

#Q. Fill in the blanks :

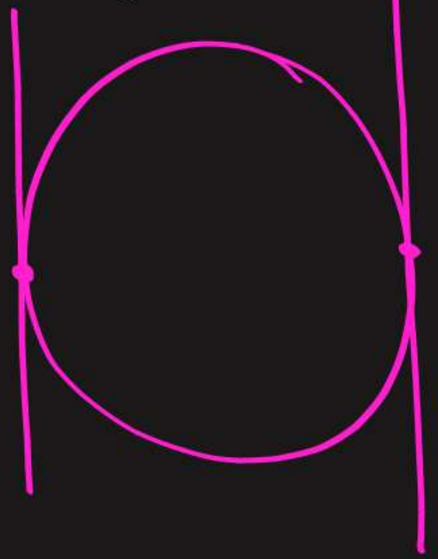
(i) The common point of a tangent and the circle is called _____. Point of contact.

(ii) A circle may have _____ parallel tangents. 2

(iii) A tangent to a circle intersects it in _____ point(s). 1

(iv) A line intersecting a circle in two points is called a _____. Secant.

(v) The angle between tangent at a point on a circle and the radius through the point is _____. 90°

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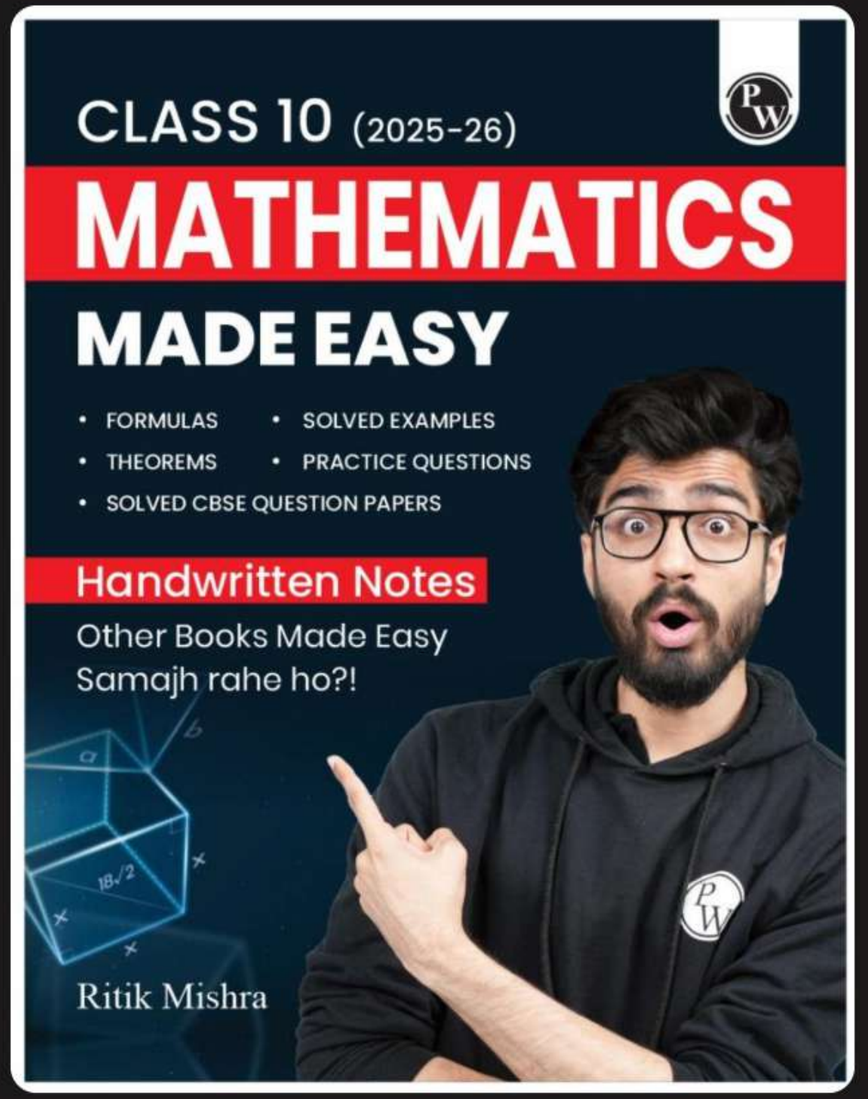
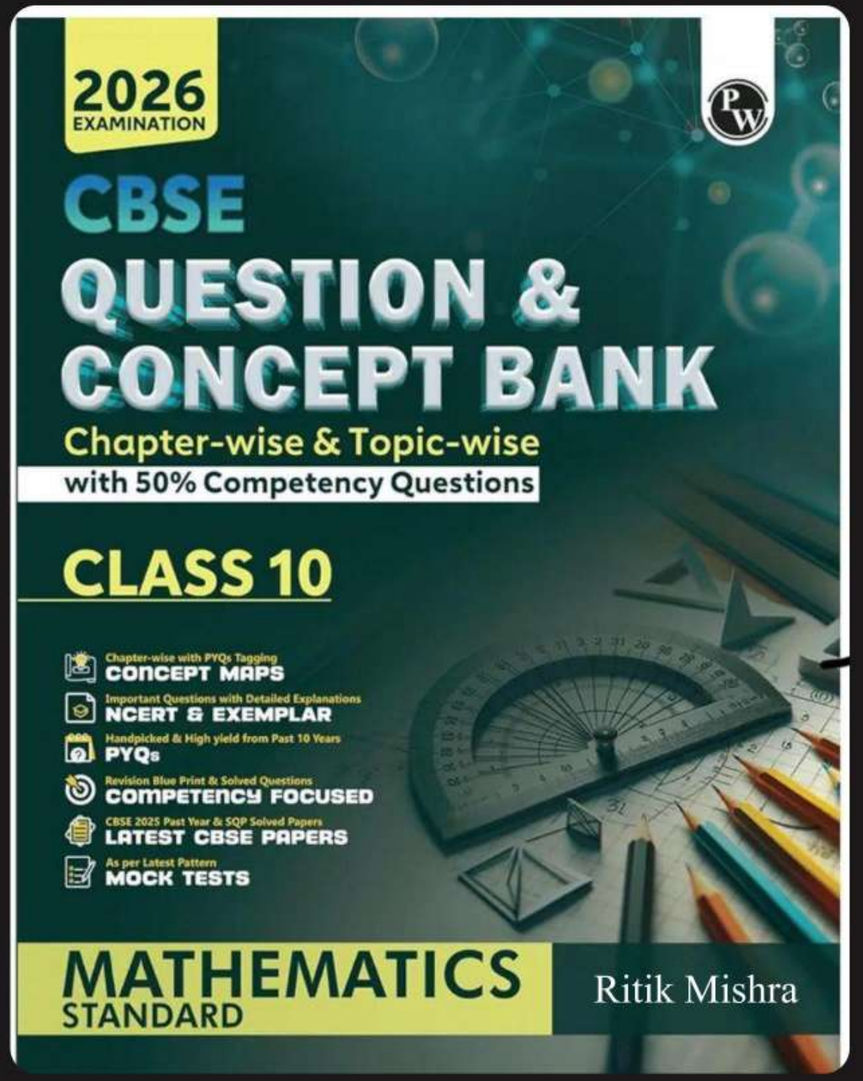


49 → Mcqs

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