



2027

I'M UP AND DOWN, AND ROUND & ROUND

Lecture – 6

CLASS-9TH

MATHS

Ritik Sir



Topics To Be Covered

- 1 Questions on theorems (Jo Abhi Tak Padhi)
- 2 Theorem 9 and its corollary!

Kya haal chaal?

I'm Up and Down, and Round & Round

Lecture - 6

THEOREM 2

Equal chords of a circle subtend equal angles at the centre of the circle.

THEOREM 3

Chords of a circle that subtend equal angles at the centre are equal.

THEOREM 4

The line joining the centre of a circle and the midpoint of a chord of the circle is perpendicular to the chord.

THEOREM 5

The perpendicular from the centre of a circle to a chord of the circle bisects the chord.

THEOREM 6

Chords of a circle having the same length are all at the same distance from the centre of the circle.

THEOREM 7

Chords of a circle that are equidistant from the centre have equal length.

THEOREM 8



Let AB and DE be two chords of a circle with centre C .

Suppose $AB > DE$.

Then the distance from C to AB is less than the distance from C to DE .



QUESTIONS

Explain why the following statement is true: If the perpendicular distance of a chord from the centre is d and the radius is r , then the chord length is $2\sqrt{r^2 - d^2}$.

$\triangle AOM$, (By PT)

$\therefore M$ is the mid. point.
(T.5)

$$r^2 = d^2 + AM^2$$

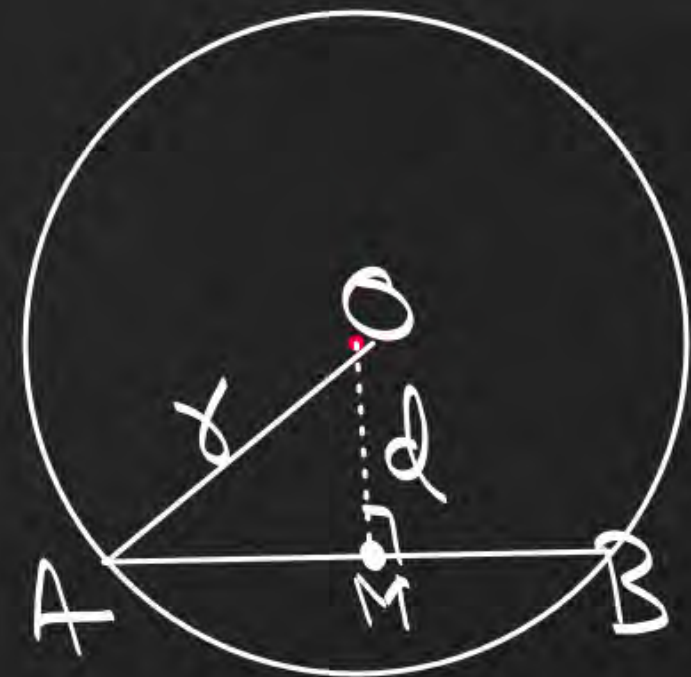
$$r^2 - d^2 = AM^2$$

$$AB = 2AM$$

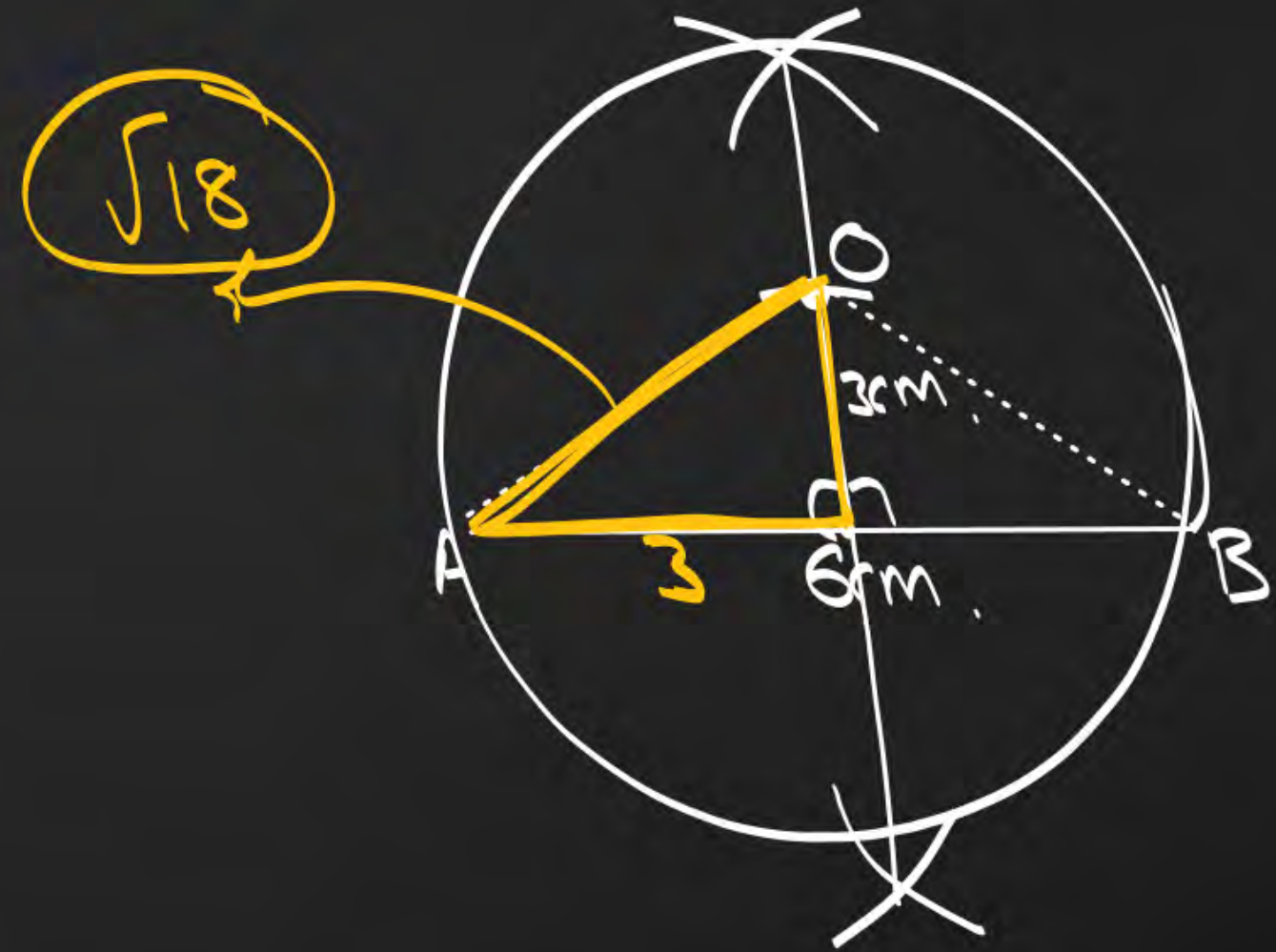
$$= 2\sqrt{r^2 - d^2}$$

$$\sqrt{r^2 - d^2} = AM$$

H.P



Draw a circle in which a chord of 6 cm length stands at a distance of 3 cm from the centre.

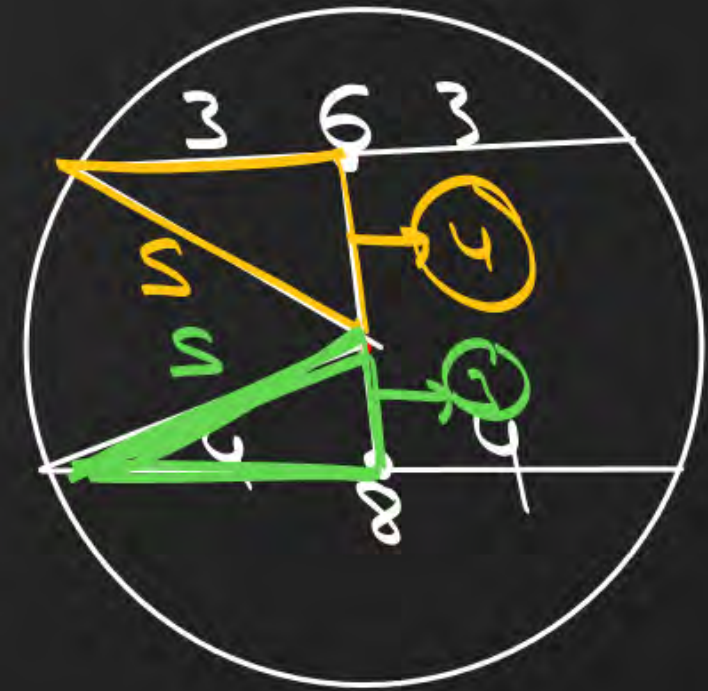


QUESTIONS



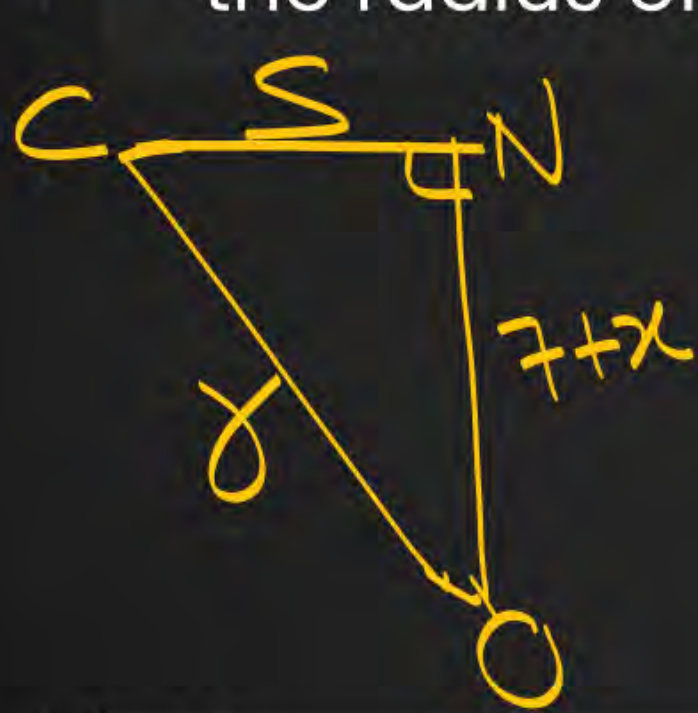
Two parallel chords of lengths 6 cm and 8 cm are on opposite sides of the centre of a circle. If the radius of the circle is 5 cm, find the distance between the midpoints of the chords.

7 cm



QUESTIONS

Two parallel chords of lengths 10 cm and 24 cm are on the same side of the centre of a circle. The distance between the chords is 7 cm. Find the radius of the circle.



$$r^2 = 5^2 + (7+x)^2 \quad \text{--- (1)}$$



$$r^2 = 12^2 + x^2 \quad \text{--- (2)}$$

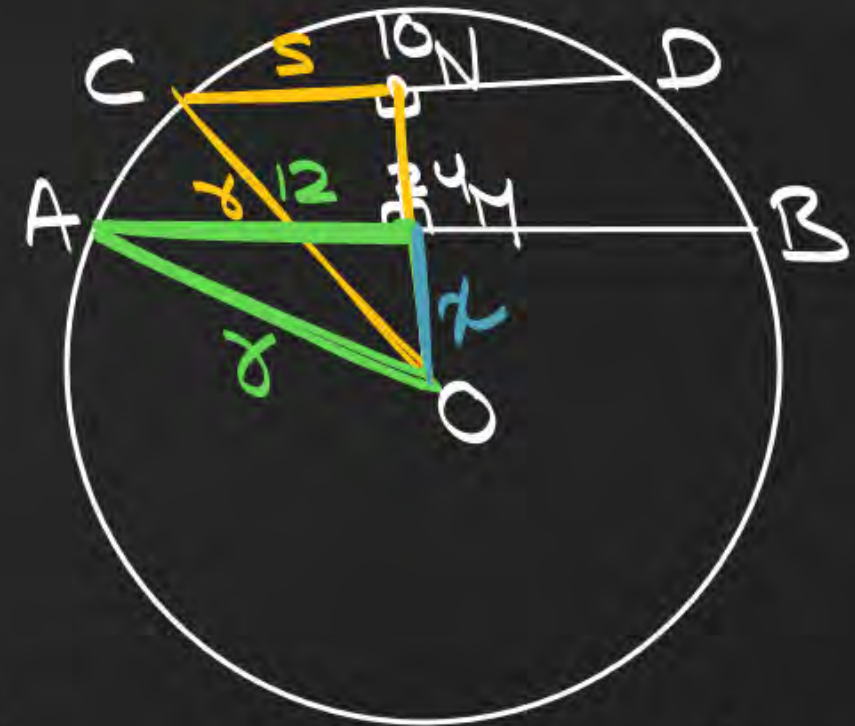
$$\downarrow$$

$$r^2 = 144 + 2x$$

$$r^2 = 169$$

$$r = \pm \sqrt{169}$$

$$= r = 13 \text{ cm} \quad \text{Ans.}$$



$$5^2 + (7+x)^2 = 12^2 + x^2$$

$$25 + 49 + \cancel{x^2} + 14x = 144 + \cancel{x^2}$$

$$74 + 14x = 144$$

$$14x = 144 - 74$$

$$14x = 70$$

$$\boxed{x = 5}$$

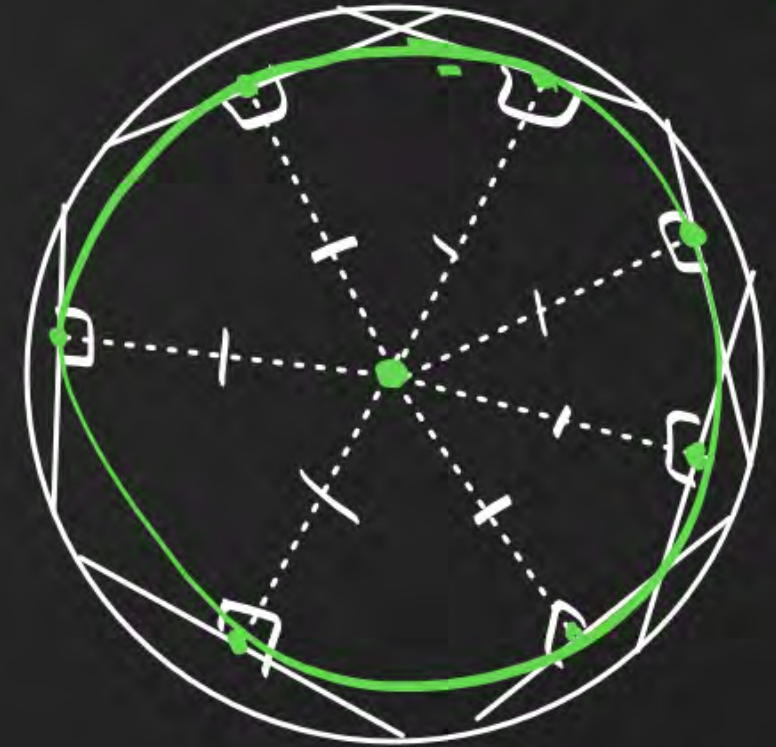
QUESTIONS



Consider all chords of a circle of a fixed length. What is the shape formed by the midpoints of all these chords?

Circle

focus

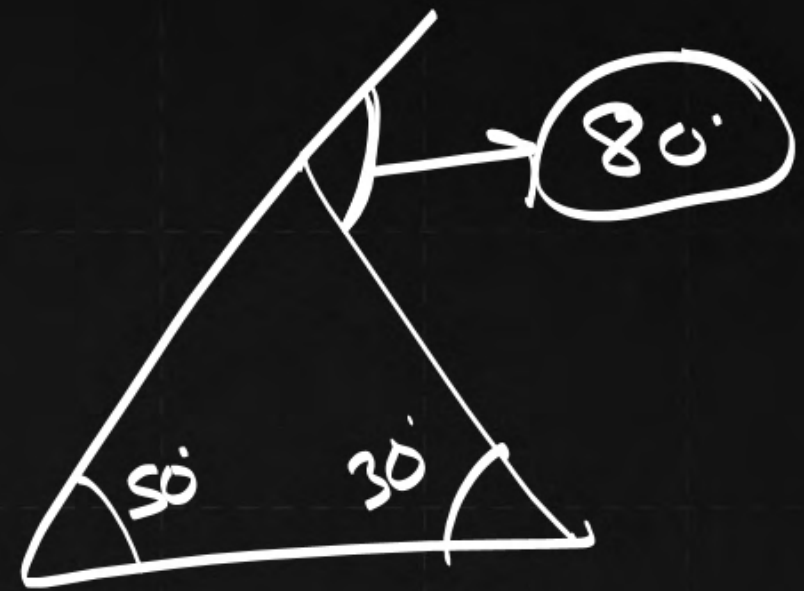


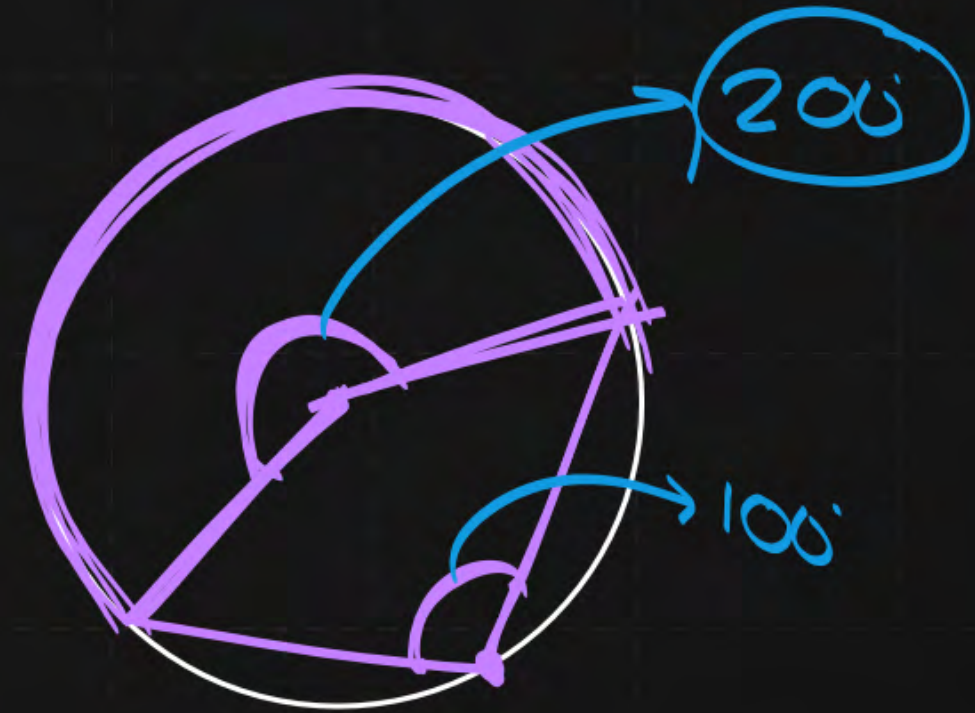
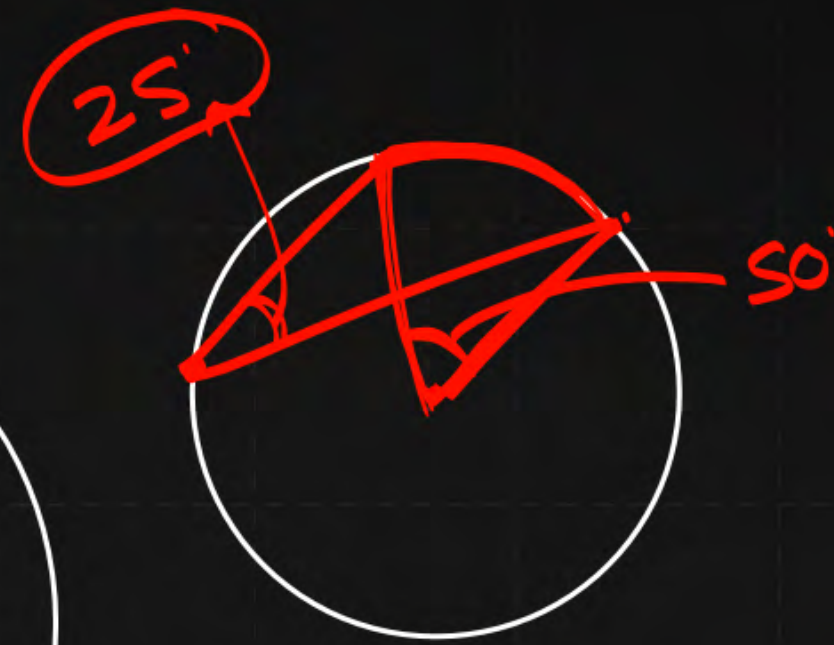
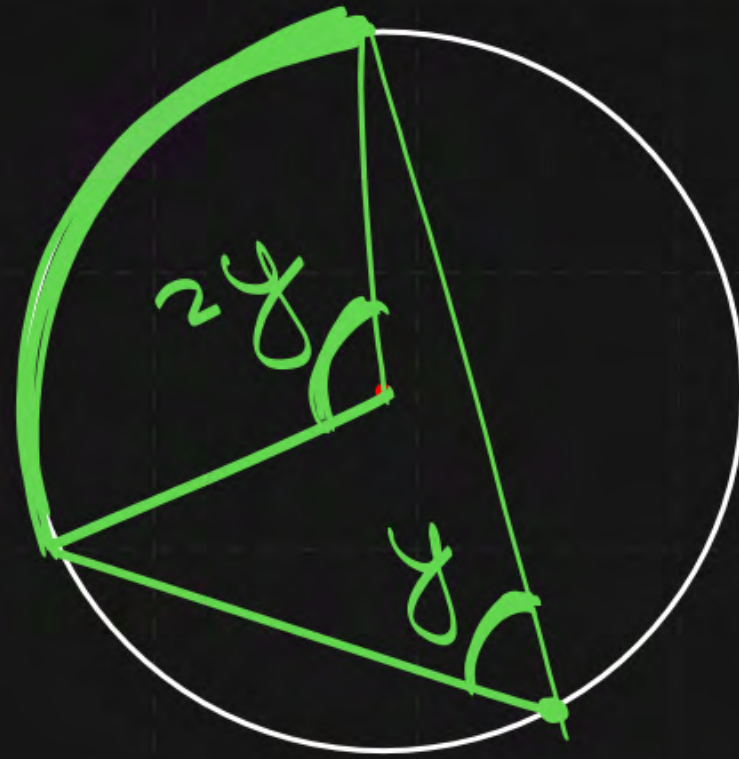
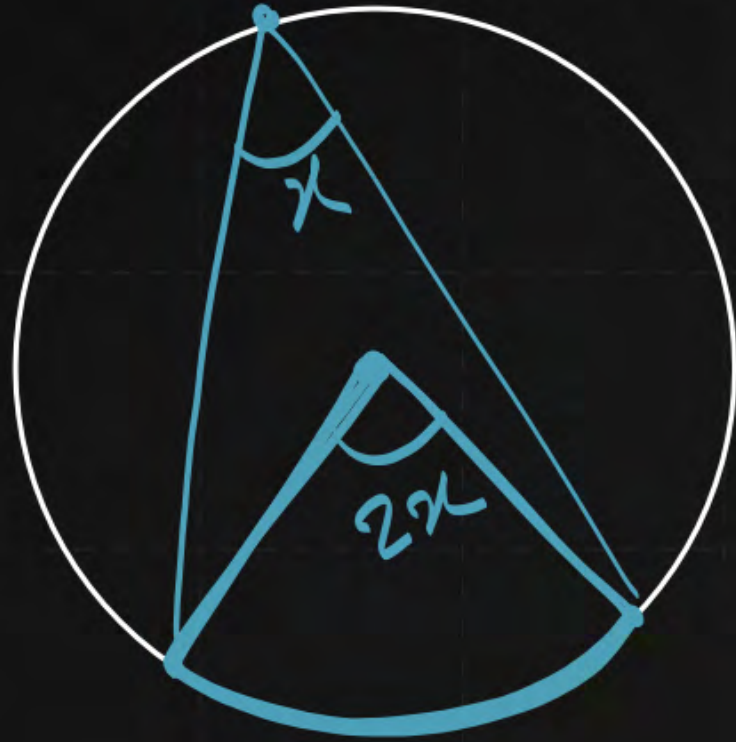
CTR (Exterior angle property).



$$z = x + y.$$

Ex





Top: $\angle AOB = 2\angle ACB$.



Proof: $\because OA = OC$

$\Rightarrow \angle OCA = \angle OAC = x$

Similarly, $\angle OCB = \angle OBC = y$

(Angles opp. to equal sides)

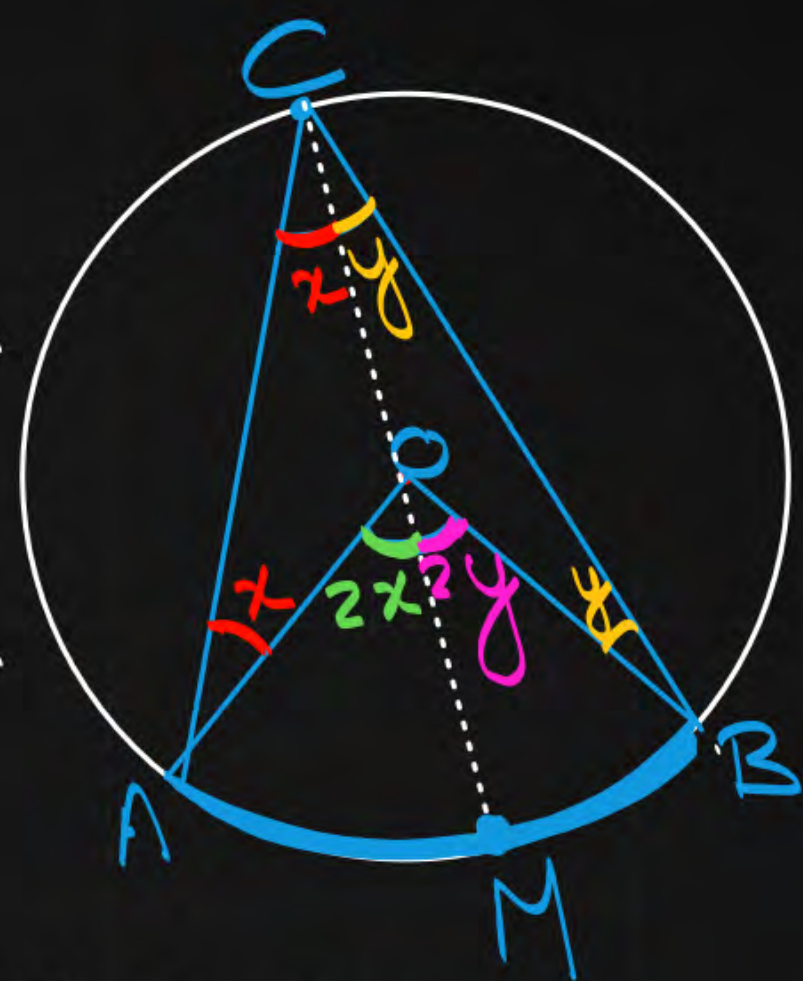
Now, $\angle AOM = 2x$

and $\angle BOM = 2y$

[Exterior angle property]

$\angle ACB = x + y$

$\angle AOB = 2x + 2y = 2(x + y)$



hence, $\angle AOB = 2\angle ACB$

THEOREM 9



The angle subtended by an arc at the centre of the circle is double the angle subtended by the arc at any point on the circle outside the arc.



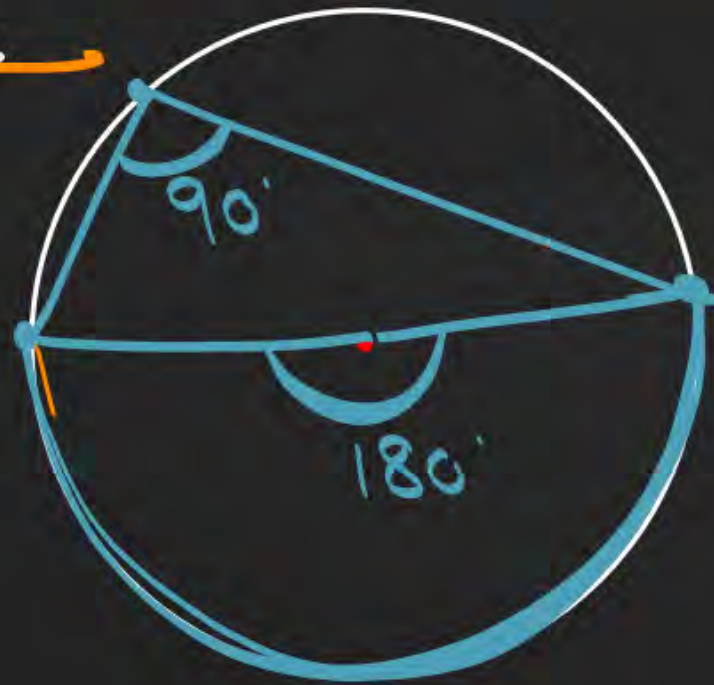
COROLLARY



The angle subtended by a diameter at any point on the circle is 90° .

Corollary:

A corollary is a fact that follows immediately from an already proved result.



QUESTIONS



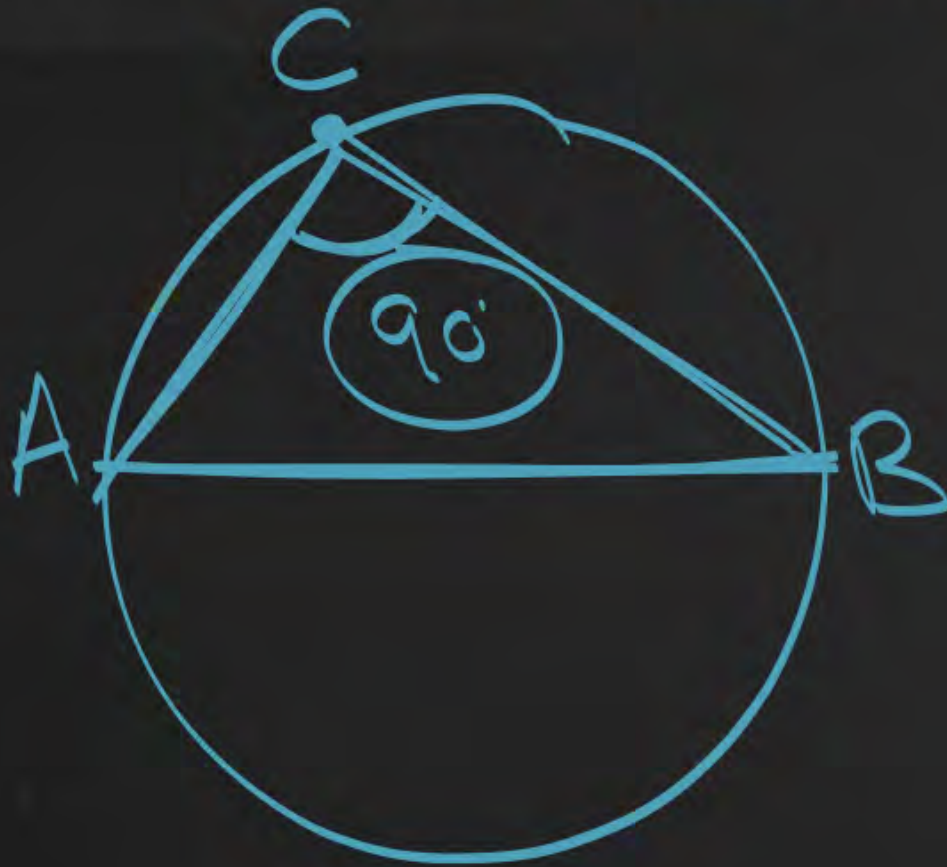
An arc of a circle subtends an angle of 70° at the centre. What is the measure of the angle subtended by the arc at a point on the circle?



QUESTIONS



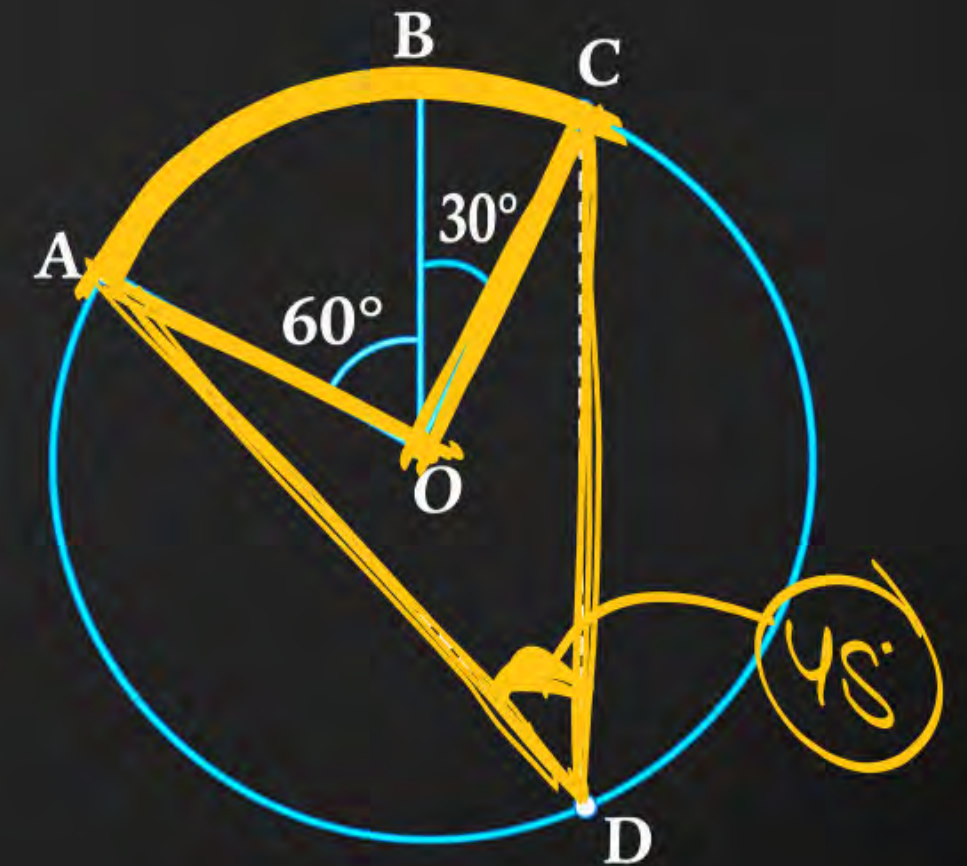
The diameter of a circle is AB. Point C is on the circumference.
What is the measure of $\angle ACB$? Explain your reason.



T.q $\rightarrow$ Statement

QUESTIONS

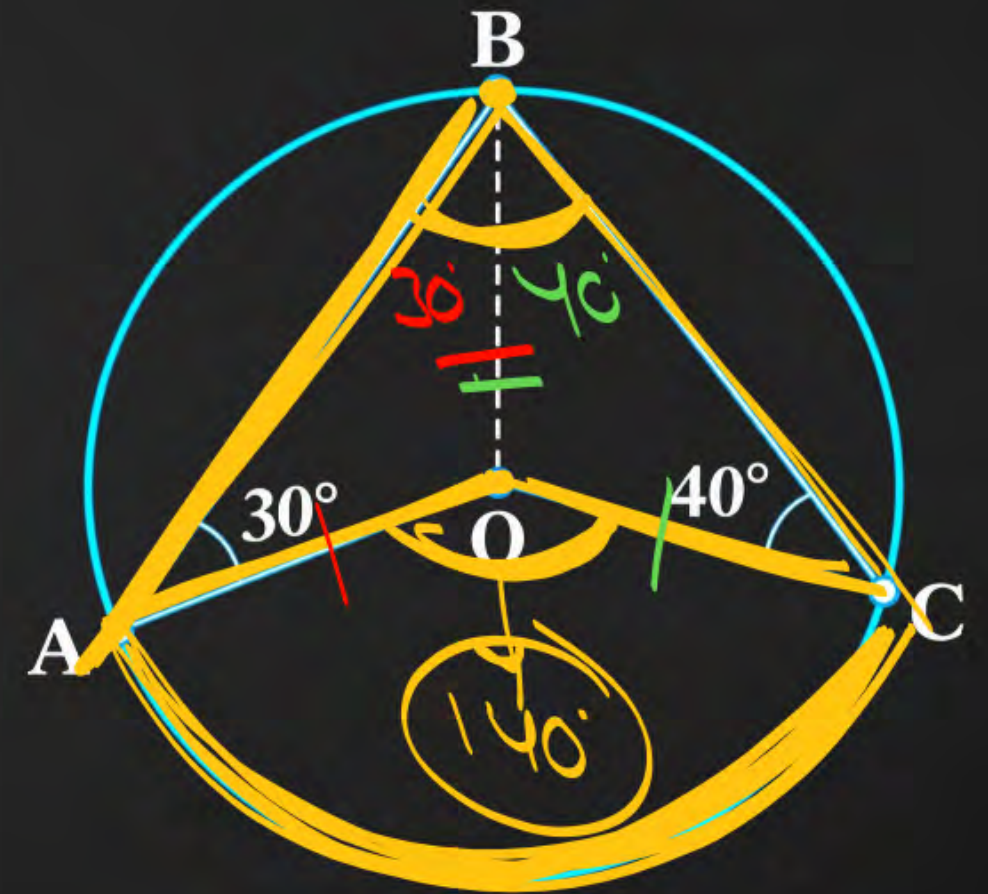
A, B and C are three points on a circle with centre O such that $\angle BOC = 30^\circ$ and $\angle AOB = 60^\circ$. If D is a point on the circle other than arc ABC, find $\angle ADC$.



QUESTIONS



Calculate the measure of $\angle AOC$.



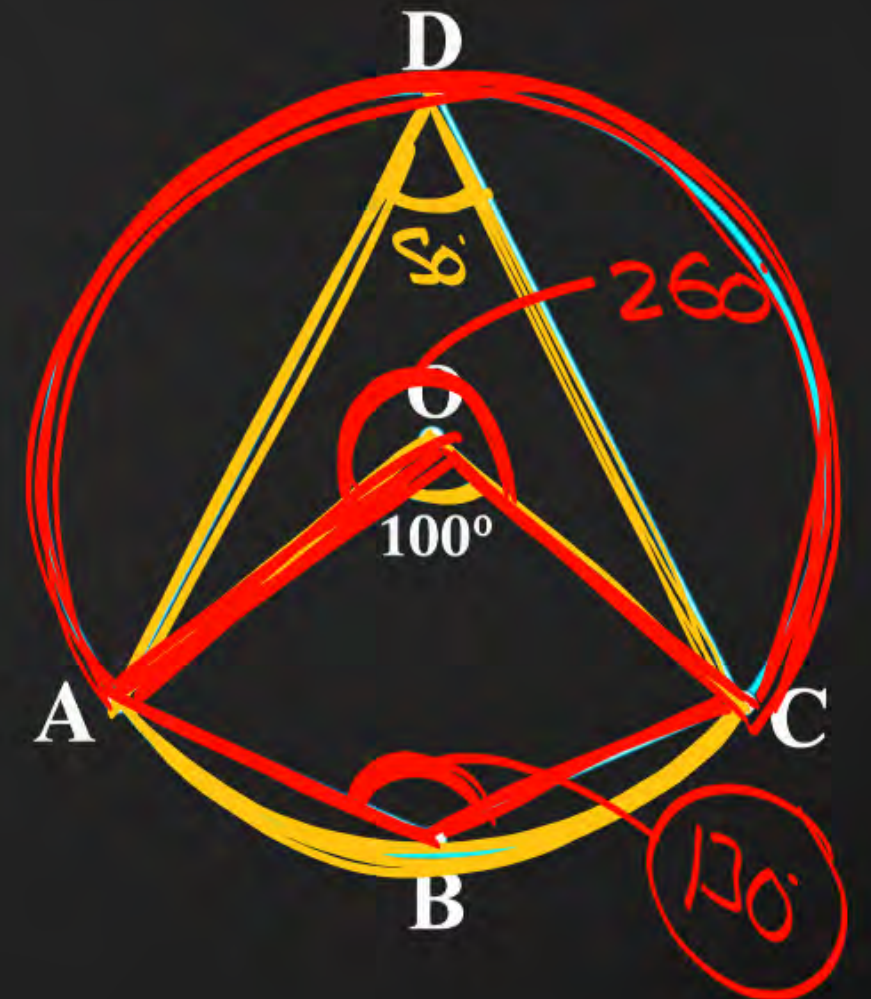
QUESTIONS



O is the centre of the circle and the measure of arc ABC is 100° .
Determine $\angle ADC$ and $\angle ABC$.

So

130°



QUESTIONS



$\angle PQR = 100^\circ$, where P, Q and R are points on a circle with centre O. Find

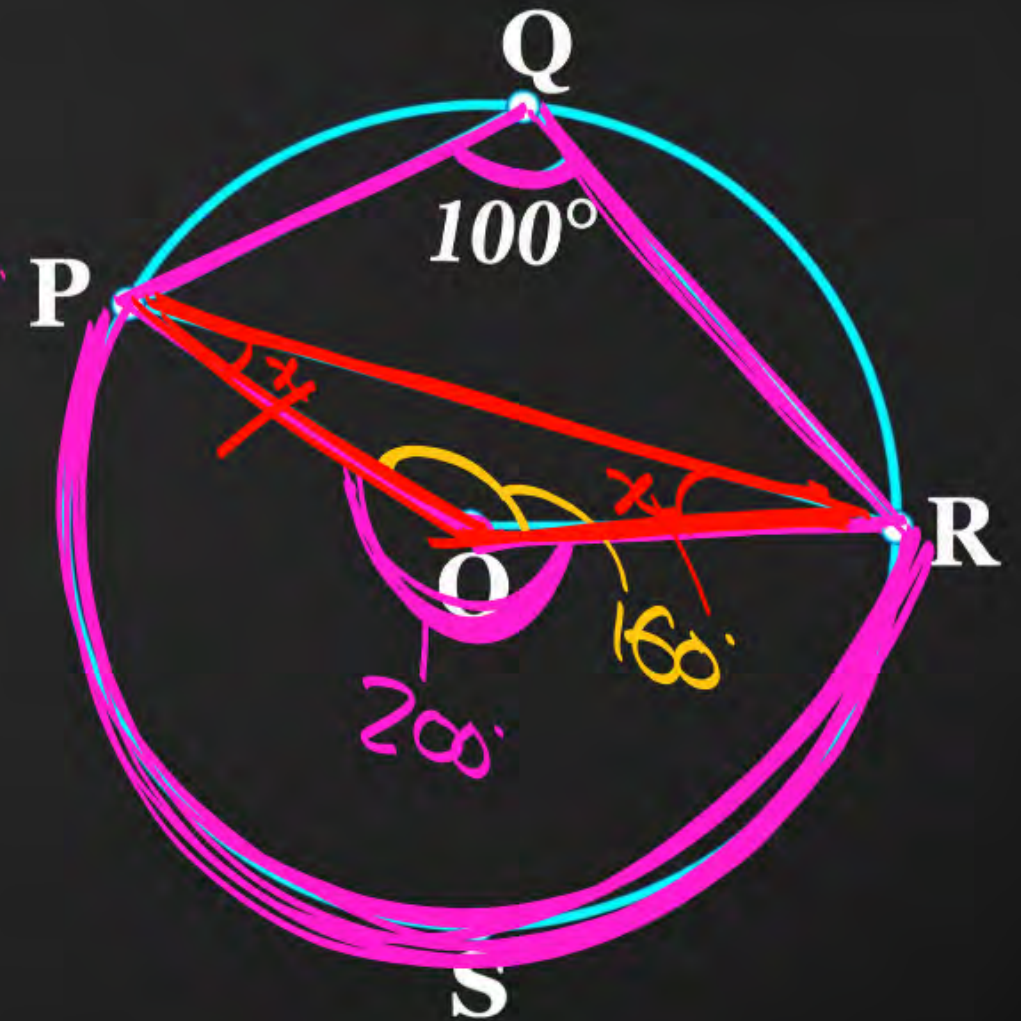
$\angle OPR$.

10°

$$x + x + 160 = 180$$

$$2x = 20^\circ$$

$$x = 10$$



QUESTIONS

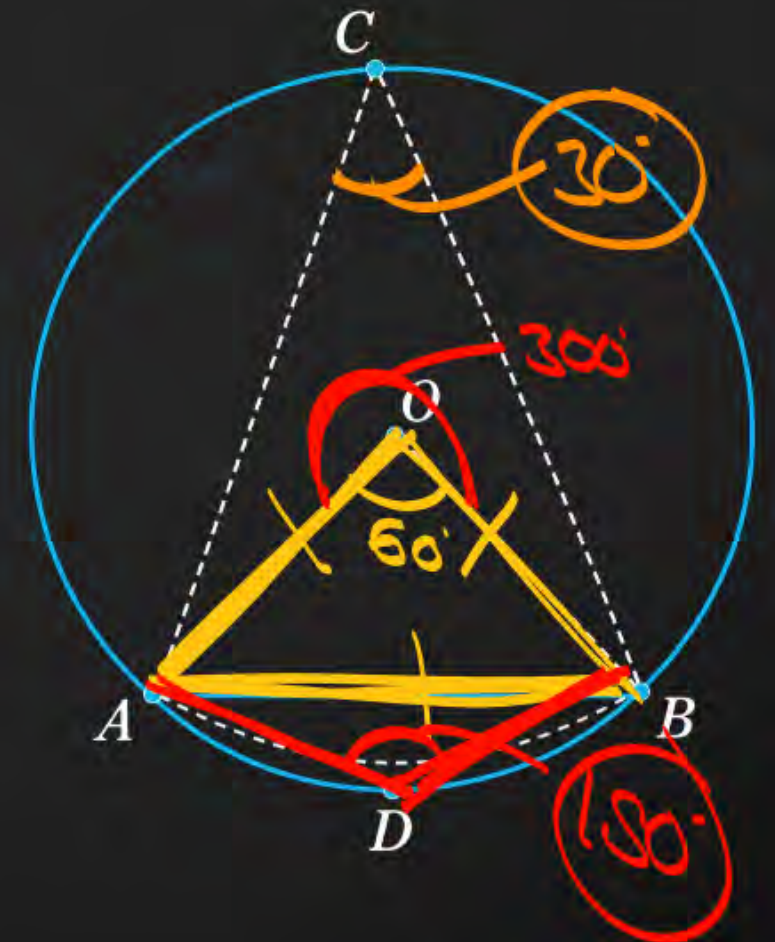
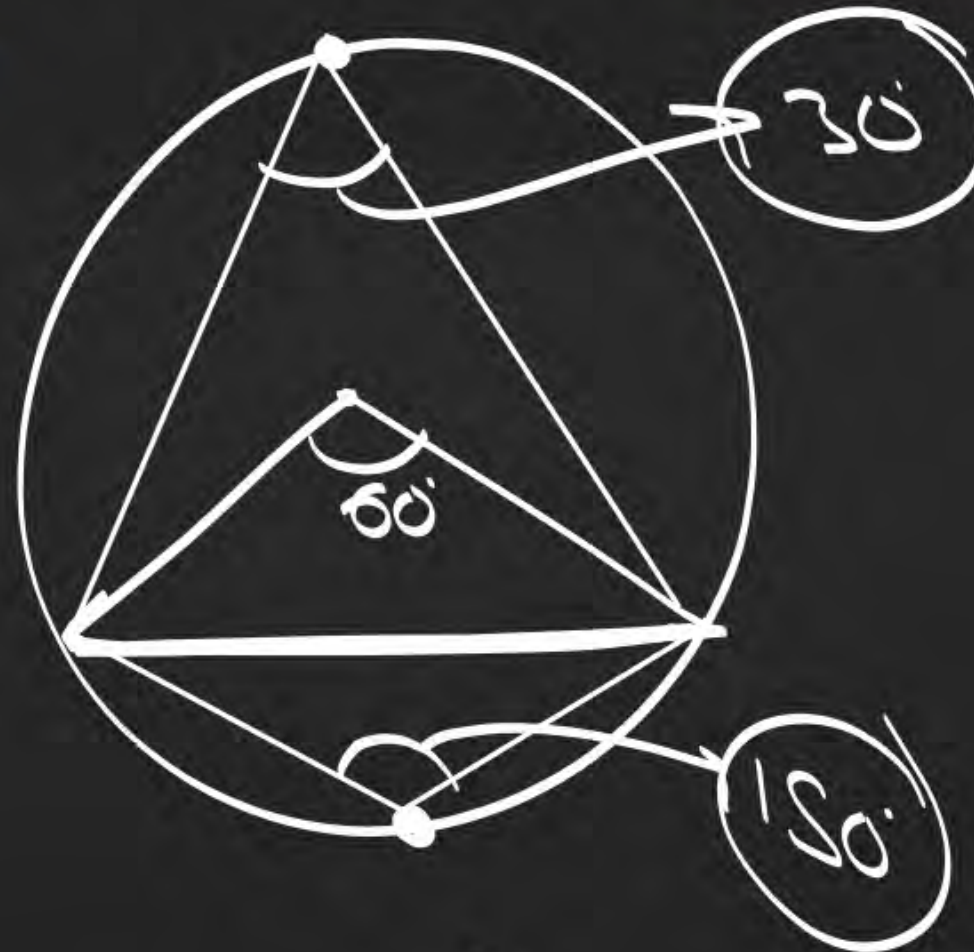
A chord of a circle is equal to the radius of the circle find the angle subtended by the chord at a point on the minor arc and also at a point on the major arc.

~~A~~ 150°

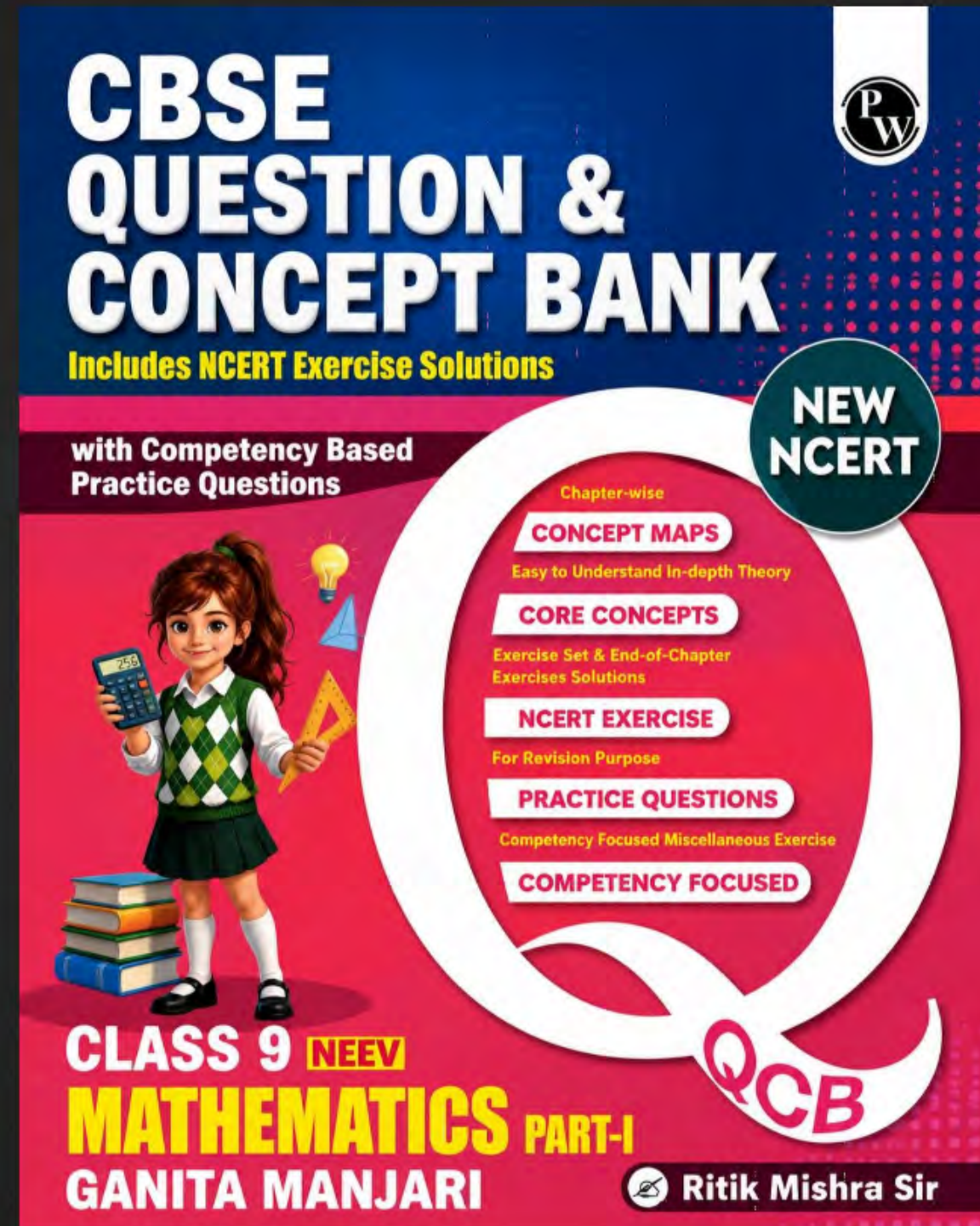
~~B~~ 120°

~~C~~ 160°

~~D~~ 140°



FOR QUESTION PRACTICE



Thank You !

- *Work Hard.*
- *Dream big.*
- *Never give up.*