SHIKSHA CLASSES

Sub. : Maths **Marks : 20**

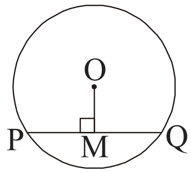
Std. : VIIIth - S.B.

Answer Paper

17. Circle : Chord and Arc

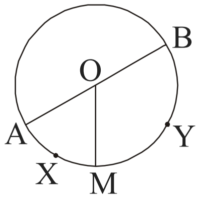
Q.1 : A) Select the most appropriate Alternative. 02

1) In the figure, if **l(PM) = 4 cm then l(PQ)** = _______.



Ans : c) 8 cm

2) In the figure, m(arc AXM) = 60^0 then $\angle$BOM = _________.



Ans : c) 120^0

: B) Solve the following. 01

1) Find diameter if radius of the circle is 5 cm.

Ans : Radius of the circle = 5 cm

Diameter = 2 × radius

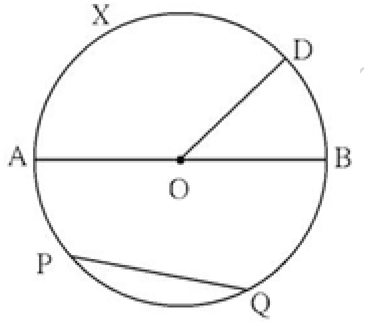
= 2 × 5 cm

= 10 cm

Q.2 : A) Solve any one of the following. (Activity) 02

1) In the adjoining figure O is the centre of the circle.

With reference to the figure fill in the blanks.



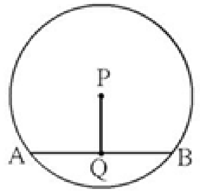
i) Seg OD is **radius** of the circle.

ii) Seg AB is **diameter** of the circle.

iii) Seg PQ is **Chord** of the circle.

iv) **$\angle$DOB** is the central angle.

2) In a circle with centre P, chord AB is drawn of length 13 cm, seg PQ $\perp$ chord AB, then find l(QB).



Ans : l(AB) = 13 cm .... (Given)

seg PQ $\perp$ chord $\boxed{AB}$

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

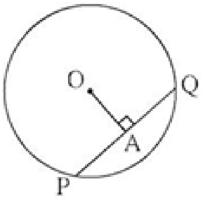
$\therefore l(QB) = \frac{1}{2}\ \boxed{l(AB)}$

$\therefore l(QB) = \frac{1}{2} \times \boxed{13}$

$\therefore l(QB) = \boxed{6.5}$ cm.

: **B) Solve any one of the following.** 02

1) In a circle with centre O, seg PQ is a chord of length 7 cm. seg OA $\perp$ chord PQ, then find l(AP).

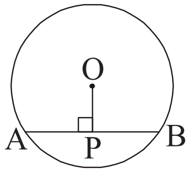


Ans : Seg OA $\perp$ chord PQ, $\therefore$ point A is midpoint of chord PQ

$$\therefore\ l(PA) = \frac{1}{2}\, l(PQ) = \frac{1}{2} \times 7$$

$= 3.5$ cm

2) In figure 'O' in centre of the circle seg AB is the chord and seg OP $\perp$ chord AB. If l(AP) = 3x and l(PB) = 27 then find the valuve of x.



Ans : Seg OP $\perp$ chord AB ---(Given)

$\therefore\ l(AP) = l(PB)$ ---

[A perpendicular drawn from cetre of the circle to its chord bisects the chord.]

$\therefore\ 3x = 27$

$$\therefore\ x = \frac{27}{3}$$

$\therefore\ x = 9$

It is required answer.

Q.3 : **A) Solve any one of the following.(Activity)** 03

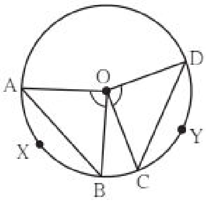
1) Activity : Draw a circle with centre O

2) Draw $\angle$COD and $\angle$AOB **of same easure. You will find that the arc AXB and arc CYD are congruent.**

3) Draw chords AB and CD.

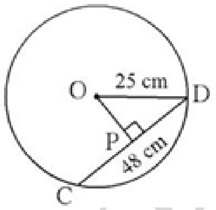
Write your obsevations.

Ans :



We observe that the length of chord AB and chord CD are equal (Same)

2) Radius of a circle with centre O is 25 cm. Find the distance of a chord from the centre if length of the chord is 48 cm.



Ans : l(OD) = 25 cm, l(CD) = 48 cm ... (Given)

seg OP $\perp$ chord CD

The perpendicular drawn from the centre of the circle to its chord bisects the chord.

$$\therefore\ l(PD) = \frac{1}{2}\ \boxed{l(CD)}$$

$$\therefore\ l(PD) = \frac{1}{2} \times \boxed{48}$$

$\therefore\ l(PD) = 24$ cm

In right angled ΔOPD,

by Pythagoras theorem,

$\therefore\ l(OD)^2 = l(OP)^2 + \boxed{l(PD)^2}$

$\therefore\ 25^2 = l(OP)^2 + \boxed{24^2}$

$\therefore\ 625 = l(OP)^2 + \boxed{576}$

$\therefore\ l(OP)^2 = 625 - \boxed{576}$

$\therefore\ l(OP)^2 = 49$

$\therefore\ l(OP) = \sqrt{49}$

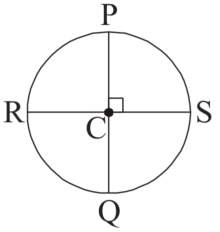
$\therefore\ l(OP) = 7$ cm

$\therefore$ Distance of the chord from the centre is 7 cm.

: **B) Solve any one of the following.** 03

1) The diameters PQ and RS of the circle

with centre C are perpendicular to each other at C. State, why arc PS and arc SQ are congruent. Write the other arcs which are congruent to arc PS



Ans : The diameters PQ and RS of a circle are perpendicular to each other at the centre C.

$\therefore m\angle PCS = m\angle SCQ = m\angle RCQ =$

$m\angle PCR = 90^0$

$m(\text{arc PS}) = m\angle PCS = 90^0$ ...(i)

$m(\text{arc QS}) = m\angle SCQ = 90^0$ ...(ii)

$m(\text{arc RQ}) = m\angle RCQ = 90^0$ ...(iii)

$m(\text{arc PR}) = m\angle PCR = 90^0$ ...(iv)

... [From (i) and (ii)]

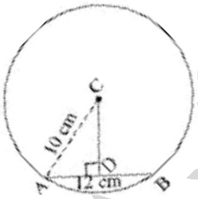
$\therefore$ arc PS $\cong$ arc SQ

From (i), (iii) and (iv),

arc RQ and PR are also congruent to arc PS

$\therefore$ arc PS $\cong$ arc RQ $\cong$ arc PR

2) **C is the centre of the circle whose radius is 10 cm. Find the distance of the chord from the centre if the length of the chord is 12 cm.**



Ans : Let seg AB be the chord and seg CD $\perp$ chord AB as shown.

$l(AD) = \frac{1}{2}\, l(AB)$ ---[The perpendicular drawn from the centre of the circle to its chord bisects the chord]

$\therefore l(AD) = \frac{1}{2} \times 12$

$\therefore l(AD) = 6$ cm

In right angled ΔCDA, by Pythagoras theorem,

$l(CA)^2 = l(CD)^2 + l(AD)^2$

$\therefore 10^2 = l(CD)^2 + 6^2$

$\therefore 100 = l(CD)^2 + 36$

$\therefore l(CD)^2 = 100 - 36$

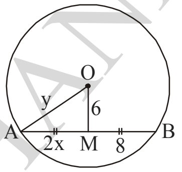
$\therefore l(CD)^2 = 64$

$\therefore l(CD) = \sqrt{64}$ $\therefore l(CD) = 8$ cm

$\therefore$ Distance of the chord from the centre is 8 cm.

Q.4 : Solve any one of the following. 04

1) **In figure, O is the centre of the circle, M is the midpoint of chord AB *l*(AM) = 2x, *l*(MB) = 8, *l*(OM) = 6 and *l*(OA) = y then find the values of x and y. Also find the length of the longest chord of the circle.**



Ans : M is mid point of AB

$\therefore l(AM) = l(MB)$

$\therefore 2x = 8$

$\therefore x = \frac{8}{2}$

$\therefore x = 4$

Now, In ΔAMO, M is midpoint of AB

So, OM $\perp$ chord AB

[$\because$ The segment joining the centre of a circle and midpoint of its chord is perpendicular to the chord.]

i.e. $\angle OMA = 90^0$

So, By Pythagoras theorem

$l(OA)^2 = l(AM)^2 + l(OM)^2$

$\therefore y^2 = (2x)^2 + (6)^2$

$\therefore y^2 = (8)^2 + 6^2$ $(\because 2x = 8)$

$\therefore y^2 = 64 + 36$

$y = \sqrt{100}$

$\therefore y = 10$

Thus, x = 4 and y = 10

Now, The length of the longest chord

= Diameter of the circle

= 2 × radius

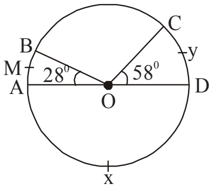
= 2 × y [OA = radius]

= 2 × 10

= 20

Hence, The longest chord = 20.

2) In figure 'O' is centre of the circle, $m\angle AOB = 28^0$, $m\angle COD = 58^0$, then find.



i) m(arc CYD) **ii) m(arc AMB)**

iii) m(arc ADC) **iv) m(arc BC)**

Ans : i) m(arc CYD) = $\angle COD$

= 58^0 (Central angle)

ii) m(arc AMB) = $\angle AOB$

= 28^0 (Central angle)

iii) m(arc ADC)

= m(arc AXD) + m(arc DC)

= $180^0 + 58^0$

= 238^0[∵ Arc AXD is a semicircular arc]

iv) m(arc BC)

= m (arc ACD) − m (arc AMB) −m (arc CYD)

= $180^0 - 28^0 - 58^0$

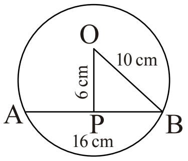
= $180^0 - 86^0$

= 94^0.

Q.5 : Solve any one of the following. 03

1) Radius of a circle with centre O is 10 cm. Find the length of the chord if the chord is at a distance of 6 cm from the centre.

Ans : Distance of the chord from the centre of the circle is the length of perpendicular drawn from the centre of the circle to the chord. AB is the chord of the circle with centre O. seg OP ⊥ chord AB.



Radius of the circle = l(OB) = 10 cm.

l(OP) = 6 cm. ΔOPB is a right angled triangle.

According to Pythagoras theorem,

$[l(OP)]^2 + [l(PB)]^2 = [l(OB)]^2$

$\therefore 6^2 + [l(PB)]^2 = 10^2$

$\therefore [l(PB)]^2 = 10^2 - 6^2$

$\therefore [l(PB)]^2 = (10 + 6)(10 - 6)$

$= 16 \times 4 = 64$

$\therefore l(PB) = 8$ cm.

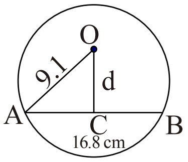
We know that, the perpendcular drawn from centre of the circle chord bisects the chord.

$\therefore l(AB) = 2 \times 8 = 16$

∴ length of chord AB is 16 cm.

2) The length of a chord of a circle of 16.8 cm, radius is 9.1 cm. Find its distance from the centre.

Ans : Let the centre of the circle be O. Seg AB is the chord of the circle, seg OM chord AB. The perpendicular drawn from the centre of the circle to its chord bisects the chord.



$$\therefore l(AC) = \frac{1}{2} l(AB)$$

$$\therefore l(AC) = \frac{1}{2} \times 16.8$$

$$\therefore l(AC) = 8.4 \text{ cm}$$

In right angled ΔOCA,

by Pythagoras theorem,

$\therefore l(OA)^2 = l(OC)^2 + l(AC)^2$

$\therefore (9.1)^2 = l(OC)^2 + 8.4^2$

$\therefore 82.81 = l(OC)^2 + 70.56$

$\therefore l(OC)^2 = 82.81 - 70.56$

$\therefore l(OC)^2 = 12.25$

$\therefore l(OC) = \sqrt{12.25}$

$\therefore l(OC) = 3.5$ cm

$\therefore$ The distance of the chord from the centre is 3.5 cm.

* * *

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