KIRAN TUTORIALS **Seat No.**

Std 10 (English) **Mathematics Part - II** **Date 05-10-20**

Time 1HRS **Chapter 3.,3.00** **Marks 20**

Q.1 Multiple Choice Questions **5**

1 Seg PA and seg PB are the tangents to the circle with centre O. A and B are the points of contacts. If PA = 5cm, what is the length of PB?

a. 10 b. 5 c. 2.5 d. - 10

Ans Option b.
Hint : Tangent segments theorem

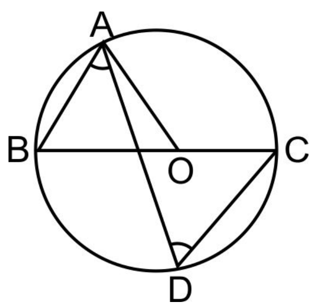
2 Seg XZ is a diameter of a circle. Point Y lies in its interior. How many of the following statements are true?

i. It is not possible that ∠XYZ is an acute angle.
ii. ∠XYZ can't be a right angle.
iii. ∠XYZ is an obtuse angle.
iv. Can't make a definite statement for measure of ∠XYZ.

a. Only one b. Only two c. Only three d. All

Ans Option c.

3



If AB ∥ CD in the given figure, O is the centre of the circle. If ∠BAD =60°, then ∠ADC is equal to

a. 30^0 b. 45^0 c. 60^0 d. 120^0

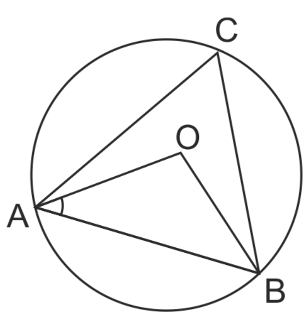
Ans Option c.

4 Two circles having radius 2.1 cm and 2.4 cm touch each other externally. The distance between their centres is?

a. 0.3 cm b. 4.5 cm c. 4.4 cm d. 0.2 cm

Ans Option b.
Hint : $r_1 + r_2$

5



In the given figure. O is the center of the circle. If ∠OAB = 40^0 , then ∠ACB is equal to

a. 50^0 b. 40^0 c.60^0 d. 70^0

Ans Option a.

Hint : $\angle ACE = \frac{1}{2} \angle AOB$

Q.2 **Attempt the following (Activity)(Any One)** **2**

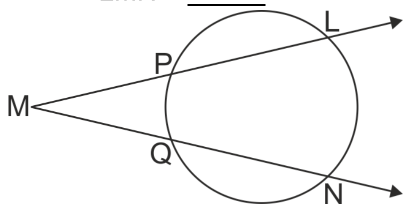
1 In the figure m (arc LN) = 110°, m (arc PQ) = 50° then complete the following activity to find ∠LMN.

$\angle LMN = \frac{1}{2}$ [m (arc LN) - [_____]

∴ $\angle LMN = \frac{1}{2}$ [_____ - 50°]

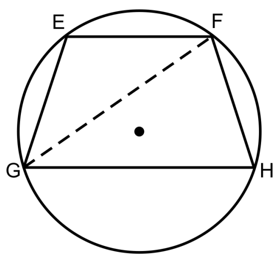
∴ $\angle LMN = \frac{1}{2} \times$ _____

∴ $\angle LMN =$ _____



Ans 1) m (arc PQ) 2) 110° 3) 60° 4) 30°

2



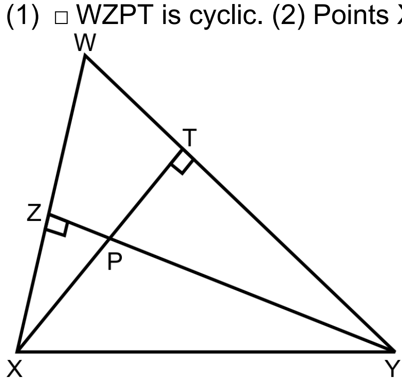
In chord EF || chord GH. Prove that, chord EG ≅ chord FH.
Fill in the blanks and write the proof.

Proof : Draw seg GF.
∠EFG = ∠FGH ... [_____] (I)
∠EFG = _____ ... [inscribed angle theorem] (II)
∠FGH = _____ ... [inscribed angle theorem] (III)
∴ m(arc EG) = _____ ... [from (I), (II), (III)]
∴ chord EG ≅ chord FH... [_____]

Ans 1) alternate angles 2) $\frac{1}{2} \times$ m(arc EG) 3) $\frac{1}{2} \times$ m(arc FH) 4) m(arc FH) 5) congruent arc of congruent chords

Q.3 **Answer the following (Any Two)** **4**

1 In altitudes YZ and XT of Δ WXY intersect at P. Prove that,
(1) □ WZPT is cyclic. (2) Points X, Z, T, Y are concyclic.

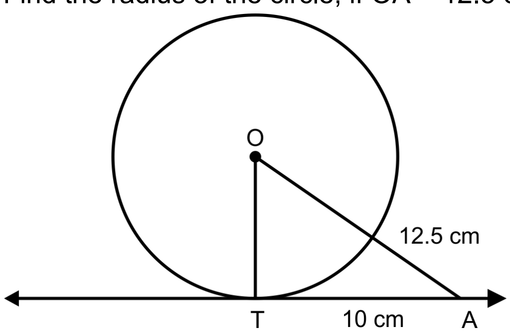


Ans Given:

YZ ⊥ XW
XT ⊥ WY
∴ ∠WTX = 90°
∠WTP= 90° ... (T- P- X) I
i.e ∠WZP = 90° ... II
In □ WZPT,
∠WZP + ∠WTP = 180° ... [from I and II]
∴ □ WZPT is a cyclic quadrilateral [If opposite angles of a quadrilateral are supplementary than the quadrilateral is a cyclic quadrilateral]

Since □ WZPT is a cyclic quadrilateral points
Similarly, ∠XZY and ∠XTY = 90° + 90° = 180°
Also, ∠XZY and ∠XTY are on same side of seg XY
If two points on a given line subtend equal angles at two distinct points which lie on the same side of the line, then the four points are concyclic.
∴ Points X, Z, T, Y are concyclic.

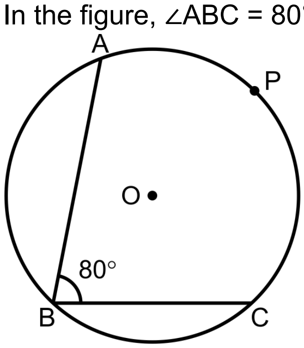
2 In the figure, line AT is a tangent to the circle with centre O. T is the point of contact. Find the radius of the circle, if OA = 12.5 cm and AT = 10 cm.



Ans Tangent segment is perpendicular to the radius from the point of contact.

∴ ∠OTA = 90°
By Pythagoras' theorem,
$OA^2 = OT^2 + TA^2$
∴ $(12.5)^2 = OT^2 + (10)^2$
∴ $OT^2 = (12.5)^2 - (10)^2$
$= (12.5 + 10)(12.5 - 10)$ ... $[a^2 - b^2 = (a + b)(a - b)]$
$= 22.5 \times 2.5 = 56.25$
∴ OT= 7.5 ... (Taking square root of both the sides)
The radius (OT) of the circle is 7.5 cm.

3 In the figure, ∠ABC = 80°. Find m (arc APC).



Ans By inscribed angle theorem,

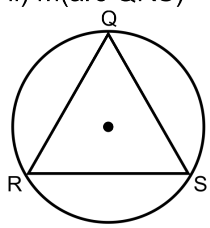
$\angle ABC = \frac{1}{2} m$ (arc APC)

$\therefore$ $80° = \frac{1}{2} m$ (arc APC)

$\therefore$ m (arc APC) = $80° \times 2$

$\therefore$ m (arc APC) = $160°$

4 In fig, Δ QRS is an equilateral triangle. Prove that,
i) arc RS $\cong$ arc QS $\cong$ arc QR
ii) m(arc QRS) = 240^0.



Ans In Δ QRS,

side QR $\cong$ side RS $\cong$ side QS ... (sides of equilateral triangle)

$\therefore$ arc RQ $\cong$ arc QS $\cong$ arc RS ... (arc of same or congruent circles are equal if related chords are congruent)

Let arc RQ = arc QS = arc RS = x^0

we know that,

arc RQ + arc QS + arc RS = 360^0 ... (measure of circle is 360^0)

$\therefore$ $x^0 + x^0 + x^0 = 360^0$

$\therefore$ $3x = 360^0$

$\therefore$ $x = 120^0$

$\therefore$ arc RQ = arc QS = arc RS = 120^0

$\therefore$ arc (QRS) = arc (QR) + arc (RS)

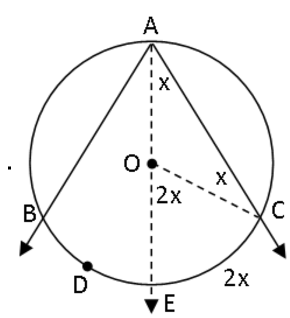
$= 120^0 + 120^0$

$\therefore$ $\text{arc}\left(\text{QRS}\right) = 240^0$

Q.4 **Solve the following (Any Three)** **9**

1 Prove: Inscribed angle theorem

Ans



Given : In a circle with centre O, $\angle$BAC is inscribed in arc BAC.
Arc BDC is intercepted by the angle.

To prove : $\angle BAC = \frac{1}{2}$ m(arc BDC)

Construction: Draw ray AO. It intersects the circle at E. Draw radius OC.

Proof : In $\triangle$ AOC,

Side OA $\cong$ side OC ... radii of the same circle.

$\therefore$ $\angle OAC = \angle OCA$ ... theorem of isosceles triangle.

Let ∠OAC = ∠OCA = x ... (I)

Now, ∠EOC = ∠OAC + ∠OCA ... exterior angle theorem of a triangle.

= x° + x° = 2x°

But ∠EOC is a central angle.

∴ m(arc EC) = 2x° ... definition of measure of an arc ..... (II)

∴ from (I) and (II).

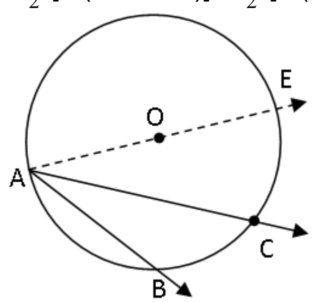
∠OAC = ∠EAC = $\frac{1}{2}$ m(arc EC) ... (III)

Similarly, drawing seg OB, we can prove ∠EAB = $\frac{1}{2}$ m(arc BE) ... (IV)

∴ ∠EAC + ∠EAB = $\frac{1}{2}$ m(arc EC)+ $\frac{1}{2}$ m(arc BE) ... from (III) and (IV)

∴ ∠BAC = $\frac{1}{2}$ [m(arc EC) + m(arc BE)]

= $\frac{1}{2}$ [m(arc BEC)] = $\frac{1}{2}$ [m(arc BDC)] ... (V)



∠BAC = ∠BAE - ∠CAE

= $\frac{1}{2}$ [m(arc BCE)] - $\frac{1}{2}$ [m(arc CE)] ... from (III)

= $\frac{1}{2}$ [m(arc BCE)] - $\frac{1}{2}$ [m(arc CE)]

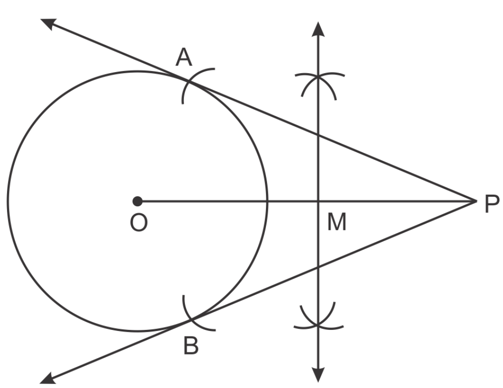
= $\frac{1}{2}$ [m(arc BC)] ... (VI)

The above theorem can also be stated as follows.

The measure of an angle subtended by an arc at a point on the circle
is half of the measure of the angle subtended by the arc at the centre.

2 Draw a circle with centre O and radius 3.5 cm. Take point P at a distance of 5.7 cm. from the centre. Draw a tangent to the circle from point P.

Ans

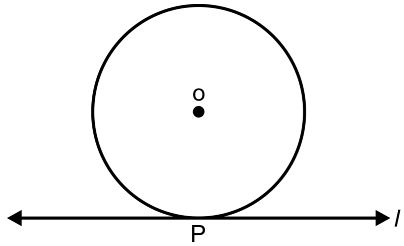


3 Line l touches a circle with centre O at point P. If radius of the circle is 9 cm, answer the following.

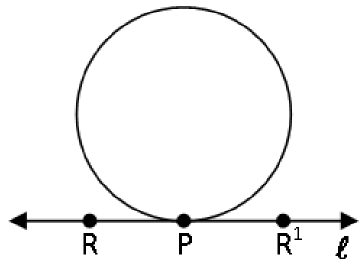
(1) What is d(O, P) = ? Why ?

(2) If d(O, Q) = 8 cm, where does the point Q lie ?

(3) If d(O,R) = 15 cm, How many locations of point R are line on line l ? At what distance will each of them be from point P ?



Ans

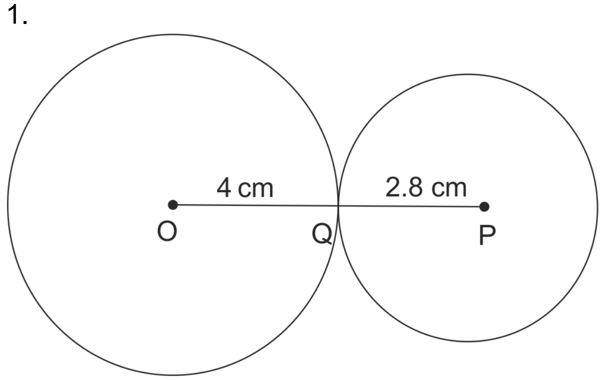


Given: Radius = 9cm, d (PR) = 15 cm.
To find: 1) d (O, P)
Solution: **OP = 9cm** ... [Radius of circle]
Since d (O, Q) = 8cm,
d (O, Q) < radius of circle
∴ **Point Q can lie anywhere in the interior of circle**
It is given that d (OR) = 15 cm.
∴ Point R can lie on either two sides of point P on line l as shown in the figure
By Pythagoras theorem:
$OR^2 = OP^2 + PR^2$
$15^2 = 9^2 + PR^2$
$PR^2 = 225 - 81$
$PR^2 = 144$
PR = 12 cm.

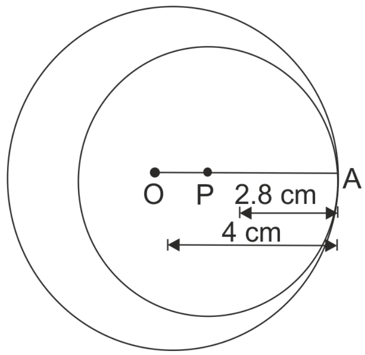
4 If radii of two circles are 4 cm and 2.8 cm. Draw figure of these circles touching each other - (i) externally (ii) internally.

Ans

1.



2.



5 □ MRPN is cyclic, ∠R=(5x - 13)°, ∠N = (4x + 4)°. Find measures of ∠R and∠N.

Ans Given: □ MRPN is a cyclic quadrilateral.
∠R = (5x - 13)°
∠N = (4x + 4)°
To find: ∠R and ∠N
Solution: □ MRPN is a cyclic quadrilateral. ... [given]

∴ ∠R + ∠N = 180° ... [opposite angles of a cyclic quadrilateral are supplementary]

∴ 5x - 13 + 4x + 4 = 180°
9x = 180 + 9
9x = 189°
x = 21°
∠R = 5x - 13
∴ = 5(21) - 13
= 105 - 13
= 92°
∠N = 4x + 4
= 4(21) + 4
= 84 + 4
= 88

∴ **∠R = 92°** and **∠N = 88°**