

Time : 2 Hrs.

Marks : 40

Q.1 A) Solve Multiple choice questions.

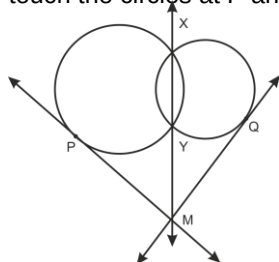
(4)

- Using Euler's formula, find V, if E = 30, F = 12.
a. 42 b. 18 c. 21 d. 20
- To draw a tangent to a circle without using its centre we use
(a) inscribed angle theorem
(b) isosceles triangle theorem
(c) property of alternate angle test
(d) property of angles in alternate segment
- The longest chord of a circle is 7.8 cm. What is the radius of the circle?
a. 3.9 b. 7.8 c. 15.6 d. 8
- Slope of a line parallel to x-axis is
a. Zero b. One c. Not defined d. None of these

B) Solve the following questions.

(4)

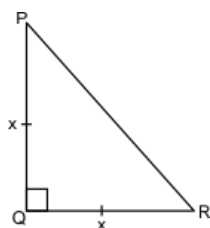
- If $\sin \theta = \frac{20}{29}$ then find $\cos \theta$
- Show that points P(- 2, 3), Q(1, 2), R(4, 1) are collinear.
- Ratio of corresponding sides of two similar triangles is 4:7 then find the ratio of their areas = ?
- In figure, two circles intersect each other in points X and Y. Tangents drawn from a point M on line XY touch the circles at P and Q. Prove that, seg PM $\cong$ seg QM.



Q.2 A) Complete the following Activities. (Any two)

(4)

- A side of an isosceles right angled triangle is x. Find its hypotenuse.



In $\triangle PQR$, $\angle PQR = 90^\circ$
and $PQ = QR = x$
 $\therefore PR^2 = \underline{\hspace{2cm}}$
 $\hspace{2.5cm} = \underline{\hspace{2cm}}$
 $\therefore PR^2 = \underline{\hspace{2cm}}$

... [Pythagoras theorem]

$$\therefore PR = \text{_____ units}$$

... [Taking square root]

$$\therefore \text{The length of hypotenuse is _____ units.}$$

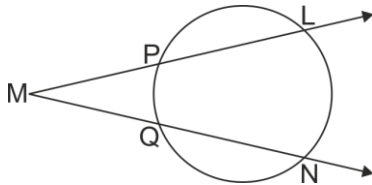
- 2) In the figure $m(\text{arc LN}) = 110^\circ$, $m(\text{arc PQ}) = 50^\circ$ then complete the following activity to find $\angle LMN$.

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

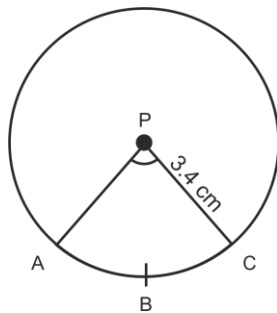
$$\therefore \angle LMN = \frac{1}{2} [\text{_____} - 50^\circ]$$

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

$$\therefore \angle LMN = \text{_____}$$



3)



In figure, radius of circle is 3.4 cm and perimeter of sector P-ABC is 12.8 cm. Find $A(P-ABC)$.

Given	: Radius of circle	=	r	=	3.4 cm
	Perimeter of sector	=		=	12.8 cm
	: Perimeter = length of the arc + $2r$				

$$\therefore \text{Length of arc} = 12.8 - 2 \times 3.4$$

$$\therefore l = 12.8 - 6.8$$

$$\therefore l = \text{_____ cm}$$

$$\text{area of sector} = \text{_____}$$

$$= \text{_____}$$

$$= \frac{1}{2} \times l \times r$$

$$= \text{_____ cm}^2$$

$$A(P-ABC) \text{ is } \text{_____ cm}^2$$

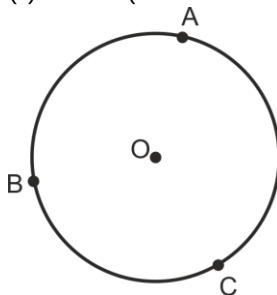
B) Solve the following questions. (Any four)

(8)

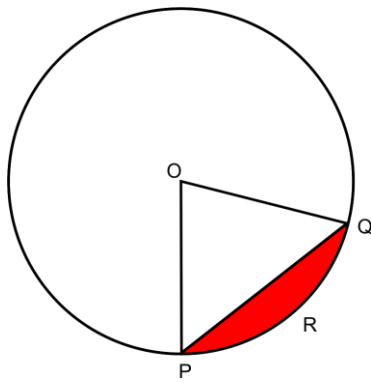
- 1) A, B, C are any points on the circle with centre O.

(i) Write the names of all arcs formed due to these points.

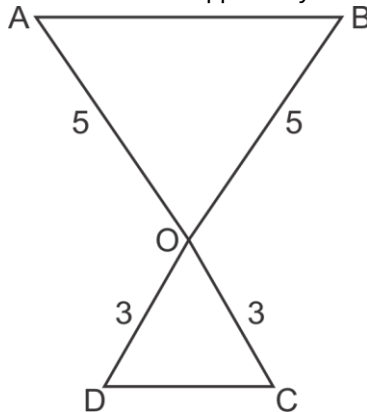
(ii) If $m(\text{arc BC}) = 110^\circ$ and $m(\text{arc AB}) = 125^\circ$, find measures of all remaining arcs.



- 2) In the figure, if O is the centre of the circle, PQ is a chord. $\angle POQ = 90^\circ$, area of shaded region is 114 cm^2 , find the radius of the circle. ($\pi = 3.14$)



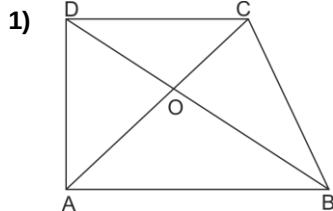
- 3) In the following figure, indicate whether the triangle are similar or not.
Give reason in support of your answer.



- 4) If $A(3, 5)$, $B(7, 9)$ and point Q divides seg AB in the ratio 2 : 3 then find co-ordinates of point Q.
- 5) In $\triangle LMN$, $l = 5$, $m = 13$, $n = 12$. State whether $\triangle LMN$ is a right-angled triangle or not.

Q.3 A) Complete the following activity. (Any one)

(3)



In the given figure, ABCD is a trapezium in which $AB \parallel DC$. If $2AB = 3DC$, find the ratio of the areas of $\triangle AOB$ and $\triangle COD$.

$$\frac{AB}{DC} = \frac{3}{2}$$

To find : area $\triangle AOB$: area of $\triangle COD$

Proof : In $\triangle AOB$ and $\triangle COD$

$$\angle AOB = \angle COD$$

$$\angle OAB = \underline{\hspace{2cm}}$$

(alternate angles)

$$\therefore \triangle AOB \sim \triangle COD$$

$$\frac{\text{area } \triangle AOB}{\text{area } \triangle COD} = \underline{\hspace{2cm}} = \frac{3^2}{2^2} = \underline{\hspace{2cm}}$$

Ratio in the areas of $\triangle AOB$ and $\triangle COD$

- 2) Some plastic balls of radius 1 cm were melted and cast into a tube. The thickness, length and outer radius of the tube were 2 cm, 90 cm and 30 cm respectively. How many balls were melted to make the tube?

$$\text{Tube} = \underline{\hspace{2cm}}$$

$$\text{Radius} = \underline{\hspace{2cm}}$$

$$\therefore \hspace{10cm} = 30 - 2$$

$$\therefore \hspace{10cm} = \underline{\hspace{2cm}}$$

$$\text{Number of balls} = \underline{\hspace{2cm}}$$

$$\therefore$$

$$\begin{aligned}
 &= \frac{\pi(r_1^2 - r_2^2)h}{\frac{4}{3}\pi r^3} \\
 \therefore &= \frac{(900 - 784) \times 90 \times 3}{4} \\
 \therefore &= \frac{116 \times 90 \times 3}{4} \\
 \therefore &= 7920
 \end{aligned}$$

B) Solve the following questions. (Any two)

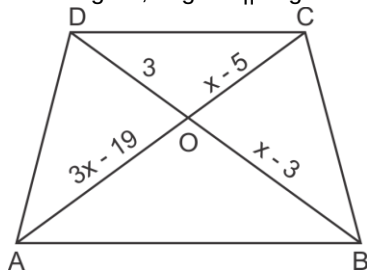
(6)

- 1) Construct tangents to a circle from a point outside the circle.
- 2) If point (x, y) is equidistant from points (7, 1) and (3, 5), show that $y = x - 2$.
- 3) Prove that $\frac{\sin \theta - 2 \sin^3 \theta}{2 \cos^3 \theta - \cos \theta} = \tan \theta$
- 4) $\triangle ABC$ is an equilateral triangle. Point P is on base BC such that $PC = \frac{1}{3}BC$, if $AB = 6$ cm find AP.

Q.4 Solve the following questions. (Any two)

(8)

- 1) In the figure, seg AB || seg DC. Using the information given find the value of x.



- 2) $\triangle XYZ \sim \triangle PYR$; In $\triangle XYZ$, $\angle Y = 60^\circ$, $XY = 4.5$ cm, $YZ = 5.1$ cm and $\frac{XY}{PY} = \frac{4}{7}$. Construct $\triangle XYZ$ and $\triangle PYR$.
- 3) Draw circles with centres A, B and C each of radius 3 cm, such that each circle touches the other two circles.

Q.5 Solve the following questions. (Any one)

(3)

- 1) The diameter and length of a roller is 120 cm and 84 cm respectively. To level the ground, 200 rotations of the roller are required. Find the expenditure to level the ground at the rate of Rs. 10 per sq.m.
- 2) **Prove :** $\frac{\operatorname{cosec} \theta}{\operatorname{cosec} \theta - 1} + \frac{\operatorname{cosec} \theta}{\operatorname{cosec} \theta + 1} = 2 \sec^2 \theta$