

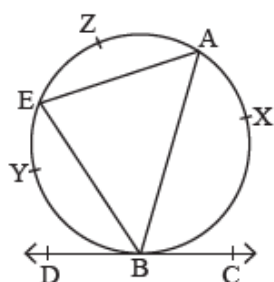
GEOMETRY PRELIM: PAPER 1

Q.1 A) Solve Multiple choice questions.

(4)

- 1) $\triangle ABC \sim \triangle DEC$, $AC = 48$ and $BC : CE = 2.3$, then $CD = ?$
 (a) 27 (b) 72 (c) 70 (d) None
- 2) Two circles intersect each other such that each circle passes through the centre of the other. If the distance between their centres is 12, what is the radius of each circle?
 (a) 6 cm (b) 12 cm (c) 24 cm (d) can't say

- 3) In the figure, $m\angle ABC = \frac{1}{2} \times \dots\dots\dots$



- (a) $m(\text{arc } \angle AXB)$ (b) $m\angle ABD$ (c) $m(\text{arc } \angle AED)$ (d) $m\angle AED$

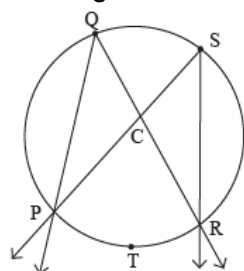
- 4) $\frac{1}{2\pi r} = \dots\dots\dots$
 (a) $\frac{\theta}{360}$ (b) $\frac{A}{\pi r^2}$ (c) both (a) and (b) (d) none



B) Solve the following questions.

(4)

- 1) Find the slopes of the lines passing through the given points.
 $T(0, -3)$, $S(0, 4)$
- 2) In the figure if $\angle PQR = 50^\circ$ then find $\angle PSR$.



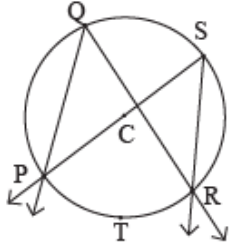
- 3) If radius of a circle is 5 cm, then find the length of longest chord of a circle.
- 4) Prove that $\frac{\sin (90 - A)}{\cos A} = \frac{\sin (90 - A)}{\cos A}$

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

(4)



- 1) Prove that angles inscribed in the same arc are congruent.



Given: In a circle with centre C, $\angle PQR$ and $\angle PSR$ are inscribed in same arc PQR. Arc PTR is intercepted by the angles.

To prove: $\angle PQR = \angle PSR$

Proof:

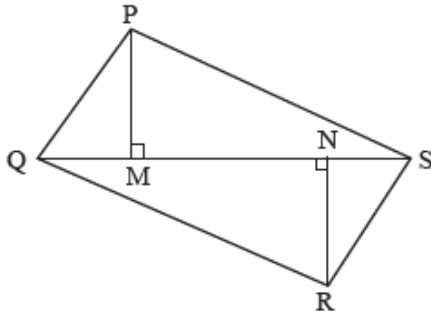
$$m\angle PQR = \frac{1}{2} \times [m(\text{arc PTR})] \quad \dots \text{(I) } \underline{\hspace{2cm}}$$

$$\therefore \underline{\hspace{2cm}} = \frac{1}{2} \times [m(\text{arc PTR})] \quad \dots \text{(II) } \underline{\hspace{2cm}}$$

$$\underline{\hspace{2cm}} = m\angle PSR \quad \text{[By (I) and (II)]}$$

$$\therefore \angle PQR \cong \angle PSR$$

- 2) In fig. $PM = 10$ cm, $A(\triangle PQS) = 100$ sqcm $A(\triangle QRS) = 110$ sqcm then $NR = ?$



$\triangle PQS$ and $\triangle QRS$ having seg QS common base.

Areas of two triangles whose base are common, are in proportion of their corresponding heights.

$$\therefore \frac{A(\triangle PQS)}{A(\triangle QRS)} = \frac{PM}{NR}$$

$$\therefore \frac{100}{110} = \frac{10}{NR}$$

$$\therefore NR = \frac{1100}{100}$$

$$\therefore NR = \underline{\hspace{2cm}} \text{ cm}$$

- 3) A sector of a circle with 10 cm radius has a central angle of 18° . Complete the following activity to find the area and length of the sector.

$$\begin{aligned} \text{Area of sector} &= \frac{\theta}{360} \times \underline{\hspace{2cm}} \\ &= \frac{18}{360} \times 3.14 \times (10)^2 \end{aligned}$$

$$\therefore \text{Area of sector} = \underline{\hspace{2cm}}$$

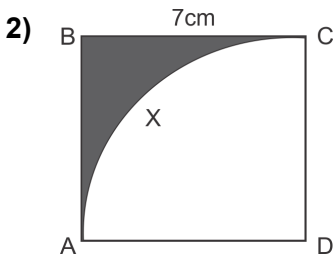
$$\begin{aligned} \text{Length of arc} &= \frac{\theta}{360} \times 2 \underline{\hspace{2cm}} \\ &= \frac{18}{360} \times 3.14 \times (10)^2 \end{aligned}$$

$$\therefore \text{Length of arc} = \underline{\hspace{2cm}}$$

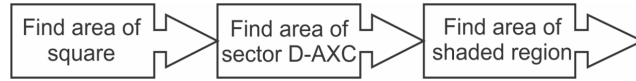
B) Solve the following questions. (Any four)

(8)

1) In a quadrilateral, ABCD $\angle B = \angle D = 90^\circ$. Prove that : $2AC^2 - BC^2 = AB^2 + AD^2 + DC^2$



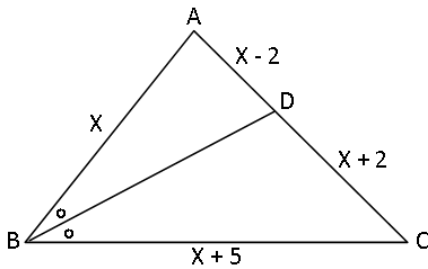
Side of square ABCD is 7 cm. With D as the centre and DA as radius, arc AXC is drawn. Find the area of the shaded region with the help of the following flow chart.



3) Do sides 7 cm, 24 cm, 25 cm form a right angled triangle? Given reason.

4) Draw circles with centres A, B and C each of radius 3 cm, such that each circle touches the other two circles.

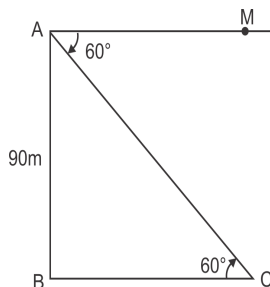
5) In $\triangle ABC$, seg BD bisects $\angle ABC$. If $AB = x$, $BC = x + 5$, $AD = x - 2$, $DC = x + 2$, then find the value of x.



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

(3)

1) From the top of a lighthouse, an observer looking at a ship makes an angle of depression of 60° . If the height of the lighthouse is 90 m then find how far is the ship from the lighthouse. ($\sqrt{3} = 1.73$)



Let AB be the lighthouse.

The ship is at C and observer is at A.

$\angle MAC$ is the angle of depression.

$\angle MAC = \angle ACB = \underline{\hspace{2cm}}$

..... Alternate angle

$AB = \underline{\hspace{2cm}}$.

From the figure, $\tan 60^\circ = \underline{\hspace{2cm}}$

$\sqrt{3} = \frac{90}{BC}$

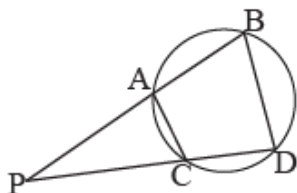
$BC = \frac{90}{\sqrt{3}} = \underline{\hspace{2cm}} = \frac{90\sqrt{3}}{3} = \underline{\hspace{2cm}}$

$\therefore BC = 30 \times 1.73$

\therefore The ship is at a distance of $\underline{\hspace{2cm}}$ from the light house.



2) In the given figure, two chords AB and CD of a circle intersect each other at point P outside the circle. Complete the following activity to prove that $PA \times PB = PC \times PD$

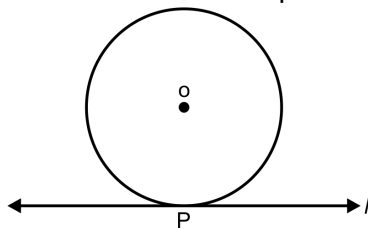


In $\triangle PAC$ and $\triangle PDB$,

$$\begin{aligned} \angle P &= \angle P && \dots \text{_____} \\ \angle PAC &= \text{_____} && \dots \text{(exterior angle of cyclic } \square \text{)} \\ \therefore \Delta PAC &\sim \text{_____} && \dots \text{_____} \\ \therefore \frac{PA}{PD} &= \frac{PC}{\text{_____}} && \dots \text{(c.s.s.t)} \\ \therefore PA \times PB &= \text{_____} \end{aligned}$$

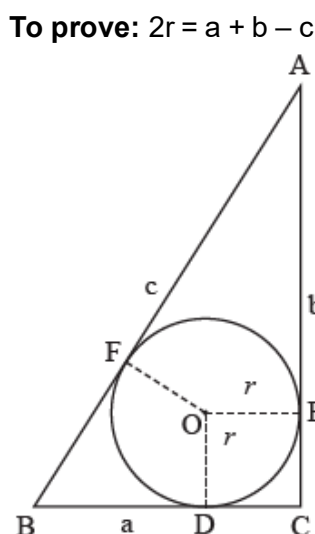
B) Solve the following questions. (Any two) (6)

- 1) Draw a circle with radius 4.1 cm. Construct tangents to the circle from a point at a distance 7.3 cm from the centre.
- 2) A triangle ABC with sides AB = 6 cm, BC = 12 cm and AC = 8 cm is enlarged to ΔPQR such that its largest side is 18 cm. Find the ratio and hence find the lengths of the remaining sides of ΔPQR .
- 3) Prove that $(1 - \cos^2 A) \sec^2 B + \tan^2 B (1 - \sin^2 A) = \sin^2 A + \tan^2 B$.
- 4) 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 ?



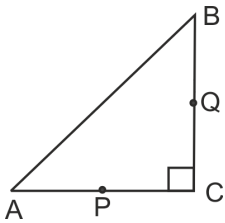
Q.4 Solve the following questions. (Any two) (8)

- 1) Given : A circle inscribed in a right angled ΔABC . If $\angle ACB = 90^\circ$ and the radius of the circle is r .



- 2) A tent of a circus is such that its lower part is cylindrical and upper part is conical. The diameter of the base of the tent is 48 m and the height of the cylindrical part is 15 m. Total height of the tent is 33 m. Find area of canvas required to make the tent. Also find volume of air in the tent.

3)



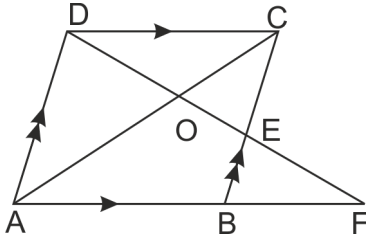
In a right-angled triangle ABC, right angled at C, P and Q are the points on the sides CA and CB respectively which divide these sides in the ratio 2 : 1. Prove that.

- I. $9AQ^2 = 9AC^2 + 4BC^2$
- II. $9BP^2 = 9BC^2 + 4AC^2$
- III. $9(AQ^2 + BP^2) = 13AB^2$

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

(3)

1)



In the adjoining figure, ABCD is a parallelogram. E is mid-point of BC. DE meets the AB (produced) at F. Prove that.

- i. $DO : OE = 2 : 1$
- ii. area of $\triangle OEC$: area of $\triangle OAD = 1 : 4$

2) Find the value of k, if P (k, 3), Q (2, - 4) and R (- k + 1, - 2) are collinear.