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Class: EM - CLASS 10 **Subject:** Mathematics - Part 2 (Geometry) **Time:**2 hrs
Date: 07-03-2025 **Paper:** March 2024 **Marks:**40

Q1(A) Four alternative answer are given for every subquestion. Select the correct alternative and write the alphabet of that answer : **(4)**

(1) Out of the dates given below which date constitutes a Pythagorean triplet?
a) 15/08/17
b) 3/05/17
c) 16/08/16
d) 4/09/15

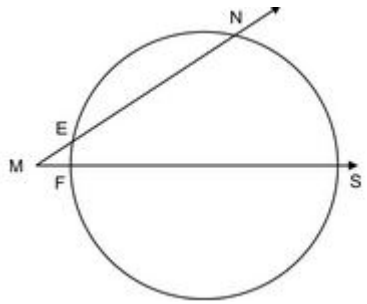
(2) A circle having radius 3 cm, then the length of its largest chord is ..... .
a) 1.5 m
b) 6 cm
c) 3 cm
d) 9 cm

(3) sin 0 x cosec 0 = ?
a) 1
b) $\frac{1}{2}$
c) 0
d) $\sqrt{-2}$

(4) Slope of X-axis is .....
a) 1
b) 0
c) -1
d) 10

(B) Solve the following subquestions : **(4)**

(1) In the adjoining figure, m(arc NS) = 125° , m(arc EF) = 37°, find the measure of ∠NMS.



(2) Two circles of radii 5 cm and 3 cm touch each other externally. Find the distance between their centres.

(3) Find the side of a square whose diagonal is $10\sqrt{2}$ cm.

(4) Angle made by the line with the positive direction of X-axis is 45°. Find the slope of that line.

Q2(A) Complete the following activities and rewrite it (any two) : **(4)**

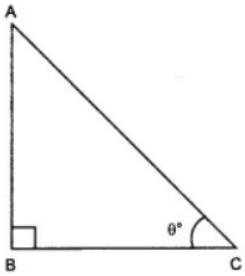
(1) In the figure given above, ABCD is a square and a circle is inscribed in it. All sides of a square touch the circle. If AB = 14 cm, find the area of shaded region.

(2) In the above figure, ∠ABC is inscribed in arc ABC.
If ∠ABC = 60°, find m∠AOC = ?
Solution:
∠ABC = $\frac{1}{2}$ m(arc AXC)

$60° = \frac{1}{2}$ m(arc AXC)

..... = m(arc AXC)
But m AOC = m(arc.....)
m(AOC) = ...

(3) Find the value of $\sin^2\theta + \cos^2\theta$.



Solution : In ΔABC, $\angle ABC = 90°, \angle C = \theta°$

$AB^2 + BC^2 =$ ☐ **...(Pythagoras theorem)**

Divide both sides by AC^2

$$\frac{AB^2}{AC^2} + \frac{BC^2}{AC^2} = \frac{AC^2}{AC^2}$$

$$\therefore \left(\frac{AB}{AC}\right)^2 + \left(\frac{BC}{AC}\right)^2 = 1$$

But $\frac{AB}{AC} =$ ☐ **and** $\frac{BC}{AC} =$ ☐

$\therefore \sin^2\theta + \cos^2\theta =$ ☐

(B) Solve the following subquestions (any four) : **(8)**

(1) Find the slope of the line passing through the points A(2,3), B(4, 7).

(2) Find the length of the hypotenuse of a right-angled triangle if remaining sides are 9 cm and 12 cm.

(3) Radius of a sector of a circle is 3.5 cm and length of its arc is 2.2 cm. Find the area of the sector.

Q3(A) Complete the following activity and rewrite it (any one) : **(3)**

(1) In ΔABC, ray BD bisects ∠ABC, A – D – C, seg DE || side BC, A – E – B, then for showing AB/BC = AE/EB, complete the following activity:
In ΔABC, ray BD bisects ∠B.

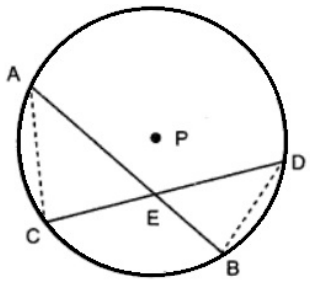
$\therefore \frac{.....}{BC} = \frac{AD}{DC}$ ...(1)(.....)

AABC, DE || BC

$\therefore \frac{.....}{EB} = \frac{AD}{DC}$ ...(2)(.....)

$\therefore \frac{AB}{.....} = \frac{.....}{EB}$ ...[from (1) and (2)]

(2)



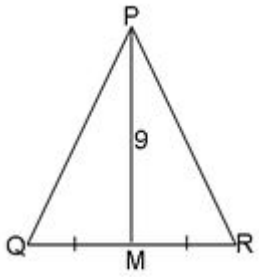
Given:
Chords AB and CD of a circle with centre P intersect at point E.
To prove:
AE x EB = CE x ED
Construction:
Draw seg AC and seg BD.
Fill in the blanks and complete the proof.
Proof:
In Δ CAE and Δ BDE,
∠AEC ≅ ∠DEB .....(.....)
..... ≅ ∠BDE .....(angles inscribed in the same arc)
Δ CAE ~ Δ BDE .....(.....)

$\frac{\text{.....}}{DE} = \frac{CE}{\text{.....}}$ .....(.....)

∴ AE x EB = CE x ED.

(B) Solve the following subquestions (any two) : **(6)**

(1)



In the figure, seg PM is a median of △ PQR. PM = 9 and $PQ^2 + PR^2 = 290$, then find QR.

(2) Prove that, 'If a line parallel to a side of a triangle intersects the remaining sides in two distinct points, then the line divides the side in the same proportion.

Q4) Solve the following subquestions (any two) : **(8)**

(1) Determine whether the points are collinear.
A (1, – 3), B (2, – 5), C (– 4, 7)

(2) A cylinder of radius 12 cm contains water up to the height 20 cm. A spherical iron ball is dropped into the cylinder and thus water level raised by 6.75 cm. What is the radius of iron ball ?

(3) $\frac{1}{\sin^2\theta} - \frac{1}{\cos^2\theta} - \frac{1}{\tan^2\theta} - \frac{1}{\cot^2\theta} - \frac{1}{\sec^2\theta} - \frac{1}{\text{cosec}^2\theta} = -3$, then find the value of θ.

Q5) Solve the following subquestions (any one) : **(3)**

(1) B is a chord of a circle with centre O. AOC is diameter of circle, AT is a tangent at A. Write answers of the following questions :

(a) Draw the figure using given information.

(b) Find the measures of ∠CAT and ∠ABC with reasons.

(c) Whether ∠CAT and ∠ABC are congruent ? Justify your answer.

(2) OABCD is trapezium, AB || CD diagonals of trapezium intersects in point P. Write the answers of the following questions:

(a) Draw the figure using given information.

(b) Write any one pair of alternate angles and opposite angles.

(c) Write the names of similar triangles with test of similarity.

All the Best