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Subject – Geometry

Std. – 10th EM/Semi

Set – I

Time: 2 Hrs

Marks: 40

Q.1.A Choose the correct alternative. **[4]**

1) If $\sin\theta = \frac{7}{25}$, find the value of $\cos\theta$.

A) $\frac{24}{25}$ B) $\frac{25}{24}$ C) $\frac{7}{24}$ D) $\frac{25}{7}$

2) Out of the dates given below which date constitutes a Pythagorean triplet?

A) 15/08/17 B) 16/08/16 C) 3/5/17 D) 4/9/15

3) In the adjoining figure, seg XY ∥ seg BC, then which of the following statements is true?

A) $\frac{AB}{AC} = \frac{AX}{AY}$ B) $\frac{AX}{XB} = \frac{AY}{AC}$ C) $\frac{AX}{YC} = \frac{AY}{XB}$ D) $\frac{AB}{YC} = \frac{AC}{XB}$

4) Q is a point on a circle with centre P, then we can draw _____ to the circle at point Q.

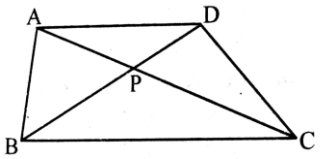
A) at least one tangent B) Only one tangent

C) more than one tangent D) maximum two tangents.

Q.1.B Solve any TWO of the following: **[4]**

1) Construct a tangent to a circle with centre P and radius 3.2 cm at any point M on it.

2) In □ ABCD, seg AD ∥ seg BC. Diagonal AC and diagonal BD intersect each other in point P. Then show that $\frac{AP}{PD} = \frac{PC}{BP}$.



3) Verify if the points A(−1, −1), B(0, 1) and C(1, 3) are collinear or not.

Q.2A Complete the any TWO of the following activities: **[4]**

1) In ΔABC, ray BD bisects ∠ABC. A–D–C, side DE ∥ side BC, A–E–B, then prove that $\frac{AB}{BC} = \frac{AE}{EB}$.

In ΔABC, ray BD bisects ∠B. …….[Given]

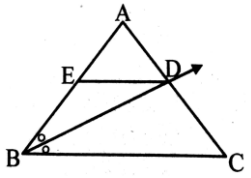
$\therefore \frac{AB}{BC} = \frac{AD}{DC}$ ……..(i) □

In ΔABC, DE ∥ BC …….[Given]

$\therefore \frac{AE}{EB} = \frac{AD}{DC}$ ……..(ii) □

$\therefore \quad \frac{AB}{\square} = \frac{\square}{EB}$

$\therefore$ .....[From (i) and (ii)]



2) If PQ ∥ RS and P(1, −2), Q(5, 2) R(3, k) and S(k, −5). Complete the following activity to find value of k.

$\therefore$ Slope of PQ $= \frac{y_2 - y_1}{x_2 - x_1} = \frac{\square - \square}{\square - \square} = \frac{\square}{\square} = \frac{\square}{\square}$ …(I)

Slope of RS $= \frac{y_2 - y_1}{x_2 - x_1} = \frac{\square - \square}{\square - \square} = \frac{\square}{\square} = \frac{\square}{\square}$ …(II)

But slope of PQ = slope of RS ($\because$ □ *lines have* □ *slopes*)

$\therefore \frac{\square}{\square} = \frac{\square}{\square}$ *…(substituting values from (1) & (2) solve this to find value of k)*

3) Theorem: If secants containing chords AB and CD of a circle intersect outside the circle in

point E, then AE × EB = CE × ED.

Given: Chords AB and CD of a circle intersect outside the circle in point E.

To prove: AE × EB = CE × ED

Construction: Draw seg AD and seg BC.

Proof: In ΔADE and ΔCBE,

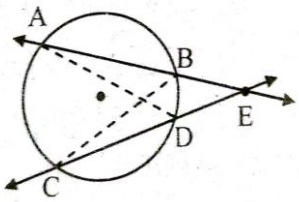
∠AED ≅ ☐

∠DAE ≅ ∠BCE ……..☐

∴ ΔADE ~ ☐ ……..☐

∴ $\frac{AE}{\square} = \frac{\square}{\square}$ ... [Corresponding sides of similar triangles]

∴ ☐ = CE × ED

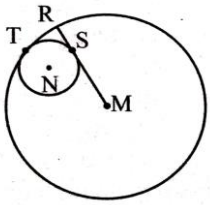


Q.2.B Solve any TWO of the following: **[4]**

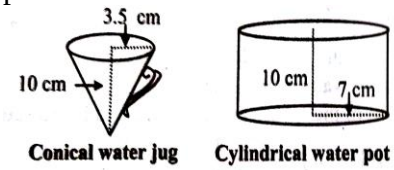
1) Find the diagonal of a rectangle whose length is 16 cm and area is 192 sq. cm.
2) Draw a circle of radius 3.6 cm. Draw a tangent to the circle at any point on it without using the centre.
3) The area of a sector of a circle of 6 cm radius is 15π sq.cm. Find the measure of the arc and length of the arc corresponding to the sector.

Q.3 Solve any THREE of the following: **[9]**

1) In the adjoining figure, circle with centre M touches the circle with centre N at point T. Radius RM touches the smaller circle at S. Radii of circles are 9 cm and 2.5 cm. Find the answers to the following questions, hence find the ratio MS : SR.
   i) Find the length of segment MT.
   ii) Find the length of seg MN.
   iii) Find the measure of ∠NSM.



2) Observe the measures of pots in the given figures. How many jugs of water can the cylindrical pot hold?

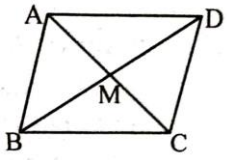


Conical water jug Cylindrical water pot

3) Find the ratio in which point P (k, 7) divides the segment joining A(8, 9) and B(1, 2). Also find k.
4) Prove that the sum of the squares of the diagonals of a parallelogram is equal to the sum of the squares of its sides.

Given: □ABCD is a parallelogram, diagonals AC and BD intersect at point M.

To prove: $AC^2 + BD^2 = AB^2 + BC^2 + CD^2 + AD^2$

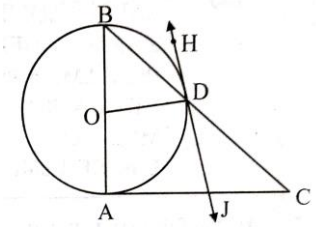


Q.4 Solve any ONE of the following **[4]**

1) Prove that $\frac{1+\sin x-\cos x}{1+\sin x+\cos x} + \frac{1+\sin x+\cos x}{1+\sin x-\cos x} = 2 \operatorname{cosec} x$.

2) In the adjoining figure, AB is the diameter of circle with centre O, AC is tangent at point A and BC intersects the circle at point D. Line JH touches the circle at point D and intersects AC in point J.

Prove that seg AJ ≅ seg CJ.



Q.5 Solve any ONE of the following **[3]**

1) Distance between the places A and B is 225 km. In a map this distance is denoted by a segment of length 2.5 cm. In the same map if the distance of a place C from A is 4.2 cm. then what is the actual distance between A and C.

2) In an isosceles triangle, length of the congruent sides is 13 cm and its base is 10 cm. Find the distance between the vertex opposite to the base and the centroid-.

*This question paper is for practice purpose only.