MT

2018 ___ ___ 1100 **Seat No.** | | | | | | | |

MT - GEOMETRY - SEMI PRELIM - I : PAPER - 2

Time : 2 Hours **(Pages 5)** **Max. Marks : 40**

Q.1. (A) Solve the following : (Any 4) **4**

1. If adjacent sides of a parallelogram are 3 cm and 4 cm, then find the perimeter of the parallelogram.

2. Radius of a circle is 8 cm. Find the length of the longest chord of the circle.

3. Side of a square is 5 cm. What is the length of its diagonal.

4. In a rhombus ABCD, if $\angle DAC = 35^\circ$, then $\angle ABC$ = ?

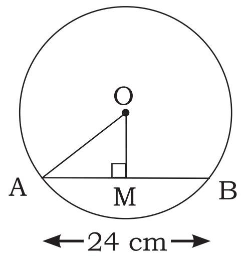
5. Write the equation of x-axis.

6. Write the equation of a line passing through 4 on the x-axis and parallel to y-axis.

Q.1. (B) Solve the following : (Any 2) **4**

1. In a parallelogram ABCD, $\angle A = x^0$, $\angle B = (3x + 20)^0$. Find x and $\angle C$ and $\angle D$.

2. Diameter of a circle is 26 cm and length of the chord of a circle is 24 cm. Find the distance of the chord from the centre.



3. The adjacent of a rectangle are 7 cm and 24 cm. Find the length of its diagonal.

Q.2. (A) Solve the following MCQs : 4

1. Height and base of a right angled triangle are 24 cm and 18 cm, find the length of its hypotenuse.
(A) 24 cm (B) 30 cm (C) 15 cm (D) 18 cm

2. Points A, B, C are on a circle, such that m(are AB) = m(are BC) = 120^0. No point, except point B, is common to the arcs. Which is the type of Δ ABC
(A) Equilateral triangle (B) Scalene triangle
(C) Right angled triangle (D) Isosceles triangle

3. A line makes an angle of 30^0 with the positive direction of – axis. So the slope of the line is _________.
(A) $\frac{1}{2}$ (B) $\frac{\sqrt{3}}{2}$ (C) $\frac{1}{\sqrt{3}}$ (D) $\sqrt{3}$

4. In a right angled triangle, if sum of the squares of the sides making right angle is 169 then what is the length of the hypotenuse?
(A) 15 (B) 13 (C) 5 (D) 12

Q.2. (B) Solve the following : (Any 2) 4

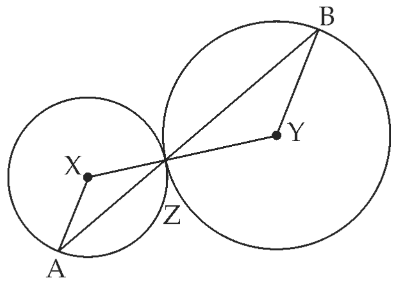
1. In Δ ABC seg AP is a median. If BC = 18, $AB^2 + AC^2 = 260$, then find AP.

2. Prove that, any rectangle is a cyclic quadrilateral.

3. Find k, if R(1, –1), S(–2, k) and slope of line RS is –2,

Q.3. (A) Solve the following activity : (Any 2) 4

1. In the adjoining fig., circles with centres X, Y touch each other at Z. A secant passing through Z meets the circles at A and B respectively. Prove that, Radius XA || radius YB. Fill in the blanks and complete the proof.



Construction :
Draw segments XZ and [ ]
Proof :
By theorem of touching circles, points X, Z, Y are [ ]
∠XZA ≅ [ ] ...(Vertically Opposite angles)
Let ∠XZA = ∠BZY = a ...(i)

	seg XA ≅ seg XZ	□
∴	∠XAZ = □ = a	...(ii) (Isosceles triangle theorem)
	seg YB ≅ □	□
∴	∠BZY = □ = a	...(iii) (Isosceles triangle theorem)
	m∠XAZ = m∠YBZ = a	...[From (i), (ii) and (iii)]
∴	Radius XA ‖ radius YB	□

2. Similarity in Right Angled Triangles :
'In a right angled triangle, if the altitude is drawn from the vertex of the right angle to the hypotenuse, then the two triangles formed are similar to the original triangle and to each other'.

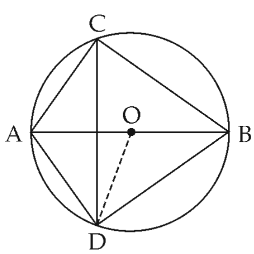
Given :
(1) In ΔABC, ∠ABC = 90°
(2) seg BD ⊥ hypotenuse AC, A - D - C

To Prove :
ΔABC ~ ΔADB ~ ΔBDC

Proof :

	In ΔABC and ΔADB,	
	∠ABC ≅ ∠ADB	□
	∠A ≅ ∠A	□
∴	□ ~ □	...(i) (By AA Test of similarity)
	In ΔABC and ΔBDC,	
	□ ≅ □	...(Each is a right angle)
	□ ≅ □	...(Common angle)
∴	ΔABC ~ ΔBDC	...(ii) □
∴	ΔABC ~ □ ~ □	...[From (i) and (ii)]

3. In the adjoining figure, seg AB is a diameter of a circle with centre O. Bisector of inscribed ∠ACB intersects circle at point D. Prove that: seg AD ≅ seg BD
Proof : Draw seg OD.



∠ACB = □	(∵ Angle inscribed in a semicircle)
∠DCB = □	(∵ CD bisects ∠ACB)

m(arc DB) = ☐ ...(Inscribed angle theorem)

∠DOB = ☐ ...(i) (Definition of measure of an arc)

seg OA ≅ seg OB ... (ii) ☐

seg OD is ☐ of seg AB [From (i) and (ii)]

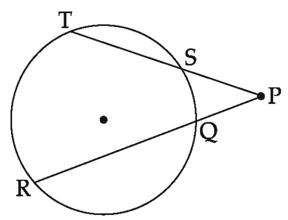
∴ seg AD ≅ seg BD ☐

Q.3. (B) Solve the following : (Any 2) **4**

1. Find the point on the X– axis which is equidistant from A(–3, 4) and B(1, –4).

2. In Δ ABC, ∠B = 90^0, ∠A = 30^0, AC = 14, then find AB and BC

3. In the adjoining figure, if PQ = 6, QR = 10, PS = 8, then find TS.



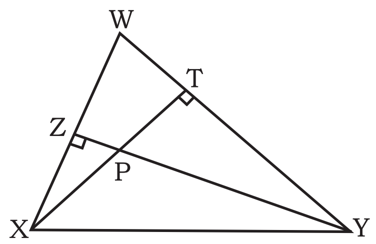
Q.4. Solve the following : (Any 3) **9**

1. If A (6, 1), B (8, 2), C (9, 4) and D (7, 3) are the vertices of ☐ABCD, show that ☐ABCD is a parallelogram.

2. Determine whether A (0, 2), B (1, –0.5) and C (2, –3) are collinear.

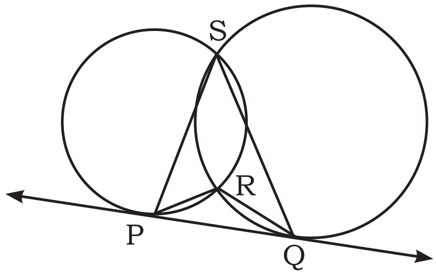
3. Sum of the squares of adjacent sides of a parallelogram is 130 sq. cm and length of one of its diagonals is 14 cm. Find the length of the other diagonal.

4. In figure, altitudes YZ and XT of ΔWXY, which intersect at P. Prove that,
   (1) ☐WZPT is cyclic
   (2) Points X, Z, T, Y are concyclic.

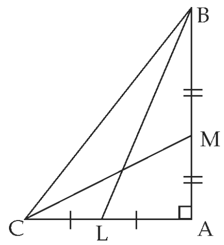


Q.5 Solve the following : (Any 1) **4**

1. In the adjoining figure, two circles intersect each other at points S and R. Their common tangent PQ touching the circle at points P, Q. Prove that: $\angle PRQ + \angle PSQ = 180°$



2. In ΔABC, $\angle BAC = 90°$, seg BL and seg CM are medians of ΔABC. Then prove that: $4(BL^2 + CM^2) = 5\ BC^2$.



Q.6 Solve the following : (Any 1) **3**

1. Find the co-ordinates of the points of trisection of the line segment AB with A(2, 7) and B(–4, –8).

2. Walls of two buildings on either side of a street are parallel to each other. A ladder 5.8 m long is placed on the street such that its top just reaches the window of a building at the height of 4 m. On turning the ladder over to the other side of the street, its top touches the window of the other building at a height of 4.2 m. Find the width of the street.

Best Of Luck