

MT

2018 ____ 1100

Seat No.

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MT - GEOMETRY - SEMI PRELIM - I : PAPER - 4

Time : 2 Hours

(Pages 5)

Max. Marks : 40

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

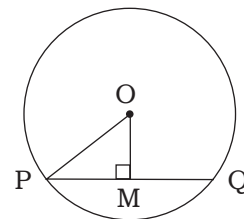
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1. If adjacent sides of a parallelogram are 3 cm and 4 cm, then find the perimeter of the parallelogram.
2. Radius of a circle is 8 cm. Find the length of the longest chord of the circle.
3. Side of a square is 5 cm. What is the length of its diagonal.
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)

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1. In a parallelogram ABCD, if $\angle A = (3x + 12)^\circ$, $\angle B = (2x - 32)^\circ$, then find the value of x and then find the measures of $\angle C$ and $\angle D$.
2. Radius of a circle with centre O is 41 units. Length of a chord PQ is 80 units. Find the distance of the chord from the centre of the circle.



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

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

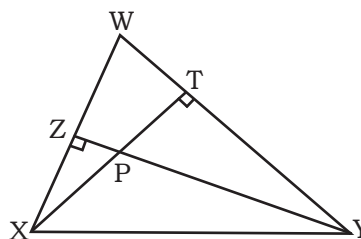
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- Find perimeter of a square, if its diagonal is $10\sqrt{2}$ cm.
(A) 10 cm (B) $40\sqrt{2}$ cm (C) 20 cm (D) 40 cm
- In a cyclic o ABCD, twice the measure of $\angle A$ is thrice the measure of $\angle C$. Find the measure of $\angle C$?
(A) 36 (B) 72 (C) 90 (D) 108
- Seg AB is parallel to Y-axis and coordinates of point A are (1, 3) then co-ordinates of point B can be _____.
(A) (3, 1) (B) (5, 3) (C) (3, 0) (D) (1, -3)
- Altitude on the hypotenuse of a right angle triangle divides it in two parts of lengths 4 cm and 9 cm. Find the length of the altitude.
(A) 9 cm (B) 4 cm (C) 6 cm (D) 18 cm

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

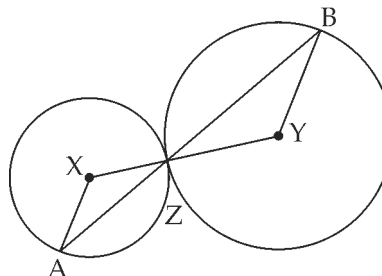
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- $\triangle ABC$, seg $AD \perp$ seg BC , $\angle C = 45^\circ$, $BD = 5$ and $AC = 8\sqrt{2}$ then find AD and BC.
- In the adjoining figure, altitudes YZ and XT of $\triangle WXY$, intersect at P. Prove that,
(i) $\square WZPT$ is cyclic
(ii) Points X, Z, T, Y are concyclic.
- Find the slope of the line passing through the points C(5, -2) and D(7, 3).

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

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- 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 $XA \parallel$ 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

$$\angle XZA \cong \text{} \quad \dots(\text{Vertically Opposite angles})$$

$$\text{Let } \angle XZA = \angle BZY = a \quad \dots(\text{i})$$

$$\text{seg } XA \cong \text{seg } XZ \quad \text{$$

$$\therefore \angle XAZ = \text{} = a \quad \dots(\text{ii}) (\text{Isosceles triangle theorem})$$

$$\text{seg } YB \cong \text{} \quad \text{$$

$$\therefore \angle BZY = \text{} = a \quad \dots(\text{iii}) (\text{Isosceles triangle theorem})$$

$$m\angle XAZ = m\angle YBZ = a \quad \dots[\text{From (i), (ii) and (iii)}]$$

$$\therefore \text{Radius } XA \parallel \text{radius } YB \quad \text{$$

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 $\triangle ABC$, $\angle ABC = 90^\circ$

(2) $\text{seg } BD \perp \text{hypotenuse } AC$, A - D - C

To Prove :

$$\triangle ABC \sim \triangle ADB \sim \triangle BDC$$

Proof :

In $\triangle ABC$ and $\triangle ADB$,

$$\angle ABC \cong \angle ADB \quad \text{$$

$$\angle A \cong \angle A \quad \text{$$

$$\therefore \text{} \sim \text{} \quad \dots(\text{i}) (\text{By AA Test of similarity})$$

In $\triangle ABC$ and $\triangle BDC$,

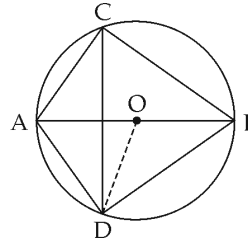
$$\text{} \cong \text{} \quad \dots(\text{Each is a right angle})$$

$$\text{} \cong \text{} \quad \dots(\text{Common angle})$$

$$\therefore \triangle ABC \sim \triangle BDC \quad \dots(\text{ii}) \text{$$

$$\therefore \triangle ABC \sim \text{} \sim \text{} \quad \dots[\text{From (i) and (ii)}]$$

3. In the adjoining figure, seg AB is a diameter of a circle with centre O. Bisector of inscribed $\angle ACB$ intersects circle at point D. Prove that: $\text{seg AD} \cong \text{seg BD}$
 Proof : Draw seg OD.

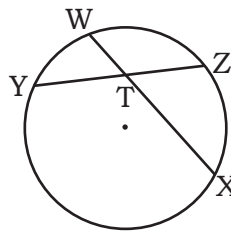


$\angle ACB = \square$ (\because Angle inscribed in a semicircle)
 $\angle DCB = \square$ (\because CD bisects $\angle ACB$)
 $m(\text{arc DB}) = \square$...(Inscribed angle theorem)
 $\angle DOB = \square$... (i) (Definition of measure of an arc)
 $\text{seg OA} \cong \text{seg OB}$... (ii)
 seg OD is of seg AB [From (i) and (ii)]
 $\therefore \text{seg AD} \cong \text{seg BD}$

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

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1. Point P is the centre of the circle and AB is a diameter. Find the coordinates of point B if coordinates of point A and P are (2, -3) and (-2, 0) respectively.
2. In ΔPQR , point S is the midpoint of side QR. If $PQ = 11$, $PR = 17$, $PS = 13$, find QR.
3. In the adjoining figure, If $WX = 25$, $YT = 8$, $YZ = 26$, then find WT.

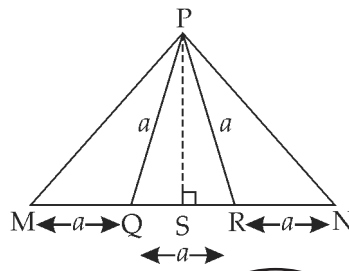


Q.4. Solve the following : (Any 3)

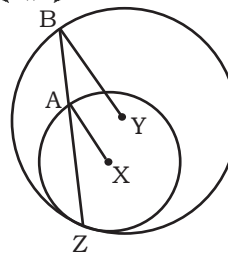
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1. Determine whether $P(2, -5)$, $Q(1, -3)$ and $R(-2, 3)$ are collinear.
2. Find k , if $PQ \parallel RS$ and $P(2, 4)$, $Q(3, 6)$, $R(3, 1)$ $S(5, k)$.

3. From the information given in the figure, Prove that :
 $PM = PN = \sqrt{3} \times a$



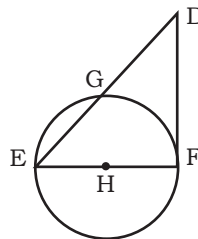
4. In the adjoining fig., circles with centres X and Y touch internally at point Z. Seg BZ is a chord of bigger circle and it intersects smaller circle at point A. Prove that, seg AX || seg BY.



Q.5 Solve the following : (Any 1)

4

1. In the adjoining figure, seg EF is a diameter and seg DF is a tangent segment. The radius of the circle is r, prove that $DE \times GE = 4r^2$



2. Prove that the sum of the squares of the diagonals of a parallelogram is equal to the sum of the squares of its sides.

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. Pranali and Prasad started walking to the East and to the North respectively, from the same point and at the same speed. After 2 hours distance between them was $15\sqrt{2}$ km. Find their speed per hour.

Best Of Luck 🍀