

CLASS : 9**HALF YEARLY EXAMINATION-2023-24**Register
Number**MATHEMATICS**

Time Allowed : 3.00 Hours]

[Max. Marks : 100

PART - A**I Choose the correct Answer.**

14x1=14

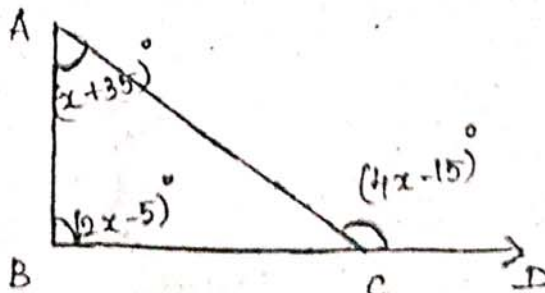
- The set $P = \{x|x \in \mathbb{Z}, -1 < x < 1\}$ is a
 - Singleton set
 - Power set
 - Null set
 - Subset
- If $A \cup B = A \cap B$, then
 - $A \neq B$
 - $A = B$
 - $A \subset B$
 - $B \subset A$
- Let $A = \{\phi\}$ and $B = P(A)$, then $A \cap B$ is
 - $\{\phi, \{\phi\}\}$
 - $\{\phi\}$
 - ϕ
 - $\{0\}$
- An irrational number between 2 and 2.5 is
 - $\sqrt{11}$
 - $\sqrt{5}$
 - $\sqrt{2.5}$
 - $\sqrt{8}$
- When $(2\sqrt{5} - \sqrt{2})^2$ is simplified, we get
 - $4\sqrt{5} + 2\sqrt{2}$
 - $22 - 4\sqrt{10}$
 - $8 - 4\sqrt{10}$
 - $2\sqrt{10} - 2$
- If $x^{51} + 51$ is divided by $x+1$, then the remainder is
 - 0
 - 1
 - 49
 - 50
- Cubic polynomial may have maximum of ----- linear factors.
 - 1
 - 2
 - 3
 - 4
- If (2,3) is a solution of linear equation $2x+3y=k$, then the value of k is
 - 12
 - 6
 - 0
 - 13
- The exterior angle of a triangle is equal to the sum of two
 - Exterior angles
 - Interior opposite angles
 - Alternate angles
 - Interior angles
- In a cyclic quadrilaterals ABCD, $\angle A = 4x$, $\angle C = 2x$ then the value of x is
 - 30°
 - 20°
 - 15°
 - 25°
- If the points A(2,0), B(-6, 0), C(3, a-3) lie on the x-axis then the value of a is -----
 - 0
 - 2
 - 3
 - 6
- The ratio in which the x-axis divides the line segment joining the points (6, 4) and (1, -7) is
 - 2 : 3
 - 3 : 4
 - 4 : 7
 - 4 : 3
- The value of $\tan 72^\circ \tan 18^\circ$ is
 - 0
 - 1
 - 18°
 - 72°
- Given that $\sin \alpha = 1/2$ and $\cos \beta = 1/2$, then the value of $\alpha + \beta$ is
 - 0°
 - 90°
 - 30°
 - 60°

PART - B

Answer any 10 questions. Question No. 28 is compulsory.

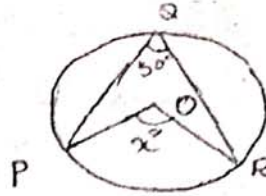
10x2=20

- Find the number of subsets and the number of proper subsets of a set $X = \{a, b, c, x, y, z\}$
- Write the set of letters of the following words in Roster form.
 - INDIA
 - PARALLELOGRAM
- If $n(A) = 25$, $n(B) = 40$, $n(A \cup B) = 50$ and $n(B^c) = 25$, find $n(A \cap B)$ and $n(U)$.
- Verify that $1 = 0.\bar{9}$
- Simplify: $3\sqrt{75} + 5\sqrt{48} - \sqrt{243}$
- If $P(x) = x^2 - 2\sqrt{2}x + 1$, find $P(2\sqrt{2})$
- Find the GCD of $25ab^3c$, $100a^2bc$, $125ab$.
- Find all the three angles of the $\triangle ABC$.



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23. Find the value of x in the given figure.

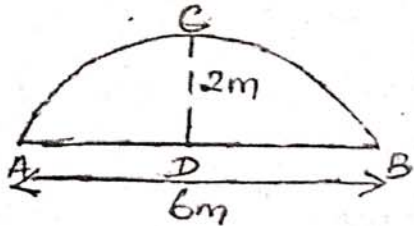


24. Find the distance between the pairs of points $(3, -9)$ and $(-2, 3)$.
 25. The centre of a circle is $(-4, 2)$. If one end of the diameter of the circle's is $(-3, 7)$ then find the other end.
 26. Find the centroid of the triangle whose vertices are $A(6, -1)$, $B(8, 3)$ and $C(10, -5)$.
 27. Verify the following equalities: $1 + \tan^2 30^\circ = \sec^2 30^\circ$.
 28. Find the value of $\tan 15^\circ \tan 30^\circ \tan 45^\circ \tan 60^\circ \tan 75^\circ$.

PART - C

Answer the following any 10 questions. Q.No.42 is compulsory.

10x5=50

29. Verify $A \cap (B \cup C) = (A \cap B) \cup (A \cap C)$ using venn diagram.
 30. In a school, all students play either Hockey or cricket or both. 300 play Hockey, 250 play Cricket and 110 play both games. Find
 i) the number of students who play only Hockey
 ii) the number of students who play only Cricket
 iii) the total number of students in the school
 31. If $U = \{4, 7, 8, 10, 11, 12, 15, 16\}$, $A = \{7, 8, 11, 12\}$ and $B = \{4, 8, 12, 15\}$ then verify De Morgan's law for complementation.
 32. Represent the number $4.\overline{73}$ upto 4 decimal places on the number line.
 33. Find the value of a and b if $\frac{\sqrt{7}-2}{\sqrt{7}+2} = a\sqrt{7} + b$
 34. Determine the value of m , if $(x+3)$ is a factor of $x^3 - 3x^2 - mx + 24$.
 35. If $(x+a)(x+b)(x+c) = x^3 + 14x^2 + 59x + 70$, find the value of
 i) $a+b+c$ ii) $\frac{1}{a} + \frac{1}{b} + \frac{1}{c}$ iii) $a^2 + b^2 + c^2$ iv) $\frac{a}{bc} + \frac{b}{ac} + \frac{c}{ab}$
 36. Solve $3x-4y=10$ and $4x+3y=5$ by the method of cross multiplication.
 37. Find the length of the chord which is at a distance of $2\sqrt{11}$ cm from the centre of a circle of radius 12 cm.
 38. Show that the following points taken in order form the vertices of a parallelogram.
 $A(-7, -3)$, $B(5, 10)$, $C(15, 8)$, $D(3, -5)$
 39. The arch of a bridge has dimensions as shown, where the arch measure 2m at its highest point and its width is 6m. What is the radius of the circle that contains the arch?

 40. If $3 \cot A = 2$, then find the value of $\frac{4 \sin A - 3 \cos A}{2 \sin A + 3 \cos A}$
 41. Find the value of $\frac{\cot \theta}{\tan(90^\circ - \theta)} + \frac{\cos(90^\circ - \theta) \tan \theta \sec(90^\circ - \theta)}{\sin(90^\circ - \theta) \cot(90^\circ - \theta) \operatorname{cosec}(90^\circ - \theta)}$
 42. Orthocentre and centroid of a triangle are $A(-3, 5)$ and $B(3, 3)$ respectively. If C is the circumcentre and AC is the diameter of this circle, then find the radius of the circle.

PART - D

Answer all the questions.

2x8=16

43. a) Draw a $\triangle ABC$, where $AB = 6$ cm, $\angle B = 110^\circ$ and $AC = 9$ cm and construct the centroid.
 (OR)
 b) Draw a triangle ABC , where $AB = 8$ cm, $BC = 6$ cm and $\angle B = 70^\circ$ and locate its circumcentre and draw the circumcircle.
 44. a) Draw the graph for $y = 4x - 1$.
 (OR)
 b) Solve graphically: $x+y=7$; $x-y=3$.

CH/9/Mat/2