

COMMON HALF YEARLY EXAMINATION - 2024

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Standard IX

Reg.No.

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MATHEMATICS

Time : 3.00 hrs

Part - I

Marks : 100

I. Choose the correct answer:

14 x 1 = 14

1. Which of the following is true?

- a) $A - B = A \cap B$ b) $A - B = B - A$ c) $(A \cup B)' = A' \cup B'$ d) $(A \cap B)' = A' \cup B'$

2. The set $A = \{x / x \in \mathbb{Z}, -2 < x < -1\}$ is a

- a) singleton set b) power set c) null set d) subset

3. Simplify : $\sqrt{27} + \sqrt{12} =$

- a) $\sqrt{39}$ b) $5\sqrt{6}$ c) $5\sqrt{3}$ d) $3\sqrt{5}$

4. Which one of the following is an irrational number?

- a) $\sqrt{25}$ b) $\sqrt[3]{\frac{9}{4}}$ c) $\frac{7}{11}$ d) π

5. Zeros of $(2x - 3)$ is _____

- a) $\frac{3}{2}$ b) 3 c) $\frac{2}{3}$ d) $\frac{3}{2}$

6. If $x + 3$ is a factor of $p(x)$, then the remainder is

- a) 3 b) -3 c) $p(3)$ d) $p(-3)$

7. If $(2, 3)$ is a solution of linear equation $3x + 2y = k$, then the value of k is _____

- a) 12 b) 6 c) 0 d) 13

8. The interior angle made by the side in a parallelogram is 90° , then the parallelogram is a _____

- a) rhombus b) rectangle c) trapezium d) kite

9. Angle inscribed in a semicircle is a _____

- a) acute angle b) obtuse angle c) right angle d) straight angle

10. The point whose ordinate is 4 and which lies on the y-axis is _____.
a) (4,0) b) (1,4) c) (4,2) d) (0,4)
11. The distance between the two points $(-\sqrt{2}, 3)$ and origin is
a) 1 b) 5 c) $\sqrt{5}$ d) $\sqrt{6}$
12. If $\tan \theta = \cot 37^\circ$, then the value of θ is
a) 37° b) 53° c) 90° d) 1°
13. The value of $\tan 60^\circ$ is
a) 1 b) $\frac{1}{\sqrt{3}}$ c) $\sqrt{3}$ d) 0
14. If $2\sin \theta = \sqrt{3}$, then the value of θ is
a) 90° b) 30° c) 45° d) 60°

Part - II

II. Answer any 10 questions. (Q.No.28 is compulsory)

10 x 2 = 20

15. If $A = \{6, 7, 8, 9\}$, $B = \{8, 10, 12\}$, find $A-B$ and $B-A$
16. The set $A = \{b, e, f, g\}$ and $B = \{a, c, e, g, h\}$, verify the commutative property for union.
17. Rationalise the denominator: $\frac{5}{1+\sqrt{3}}$
18. Simplify: $\sqrt{63} - \sqrt{175} + \sqrt{28}$
19. If $p(x) = 4x^3 - 6x^2 + 3x - 14$, then find the value of $p(-1)$ and $p(0)$
20. Expand using identity: $(3a - 4b)^3$
21. Factorise: $t^2 + 72 - 17t$
22. A chord is 12 cm away from the centre of the circle of radius 15 cm. Find the length of the chord.
23. The angles of a triangle are in the ratio 1:2:3. Find the measure of each angle of the triangle.

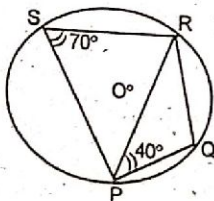
24. Check whether the points $(7, -2)$, $(5, 1)$, $(3, 4)$ are collinear?
25. Find the centroid of the triangle whose vertices are $(-5, -5)$, $(1, -4)$ and $(-4, -2)$
26. Evaluate : $\sin^2 45^\circ + \cos^2 45^\circ$
27. If $\tan A = \frac{2}{3}$, then find the value of $\sin A$
28. Find the quotient and remainder using synthetic division method :
 $(x^3 + x^2 - 7x - 3) \div (x - 3)$

Part - III

III. Answer any 10 questions. (Q.No.42 is compulsory)

10 x 5 = 50

29. Verify using Venn diagram : $A - (B \cap C) = (A - B) \cup (A - C)$
30. In a party of 60 people, 35 had vanilla ice cream, 30 had chocolate ice cream. All the people had atleast one ice cream. Then how many of them had
- Both vanilla and chocolate ice cream
 - Only vanilla ice cream
 - Only chocolate ice cream
31. If $x = \sqrt{5} + 2$, then find the value of $x^2 + \frac{1}{x^2}$.
32. Arrange in ascending order : $\sqrt[3]{2}$, $\sqrt{4}$, $\sqrt[4]{3}$
33. Factorise : $x^3 - 5x^2 - 2x + 24$
34. Determine the value of m , if $x + 3$ is a factor of $x^3 - 3x^2 - mx + 24$
35. Solve: $13x + 11y = 70$, $11x + 13y = 74$
36. If PQRS is a cyclic quadrilateral in which $\angle PSR = 70^\circ$ and $\angle QPR = 40^\circ$, then find $\angle PRQ$.



37. In a quadrilateral ABCD, $\angle A = 72^\circ$ and $\angle C$ is supplementary to $\angle A$. The other two angles are $2x-10$ and $x+4$. Find the value of x and the measures of all the angles.
38. Show that the points $A(-4, -3)$, $B(3, 1)$, $C(3, 6)$ and $D(-4, 2)$ taken in order form the vertices of a parallelogram.
39. Find the length of median through A of a triangle whose vertices are $A(-1, 3)$, $B(1, -1)$ and $C(5, 1)$
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 $\tan 15^\circ \tan 30^\circ \tan 45^\circ \tan 60^\circ \tan 75^\circ$
42. If $A = \{x : x \in \mathbb{Z}, -2 < x \leq 4\}$, $B = \{x : x \in \mathbb{W}, x \leq 5\}$, $C = \{-4, -1, 0, 2, 3, 4, 6\}$ verify $A \cup (B \cap C) = (A \cup B) \cap (A \cup C)$.

Part - IV

 $2 \times 8 = 16$

IV. Answer all the questions.

43. a) Construct a $\triangle ABC$ with $AB = 5$ cm, $\angle B = 100^\circ$ and $BC = 6$ cm. Also locate its circumcenter, draw circumcircle.

(OR)

- b) Draw and locate the centroid of the triangle ABC which is right angled at A, $AB = 4$ cm and $AC = 3$ cm.

44. a) Solve: graphically

$$x + y = 5, 2x - y = 4$$

(OR)

- b) Draw the graph: $y = 4x - 3$
