HSS

HALF YEARLY EXAMINATION - 2024

9 - Std

MATHS

Time : 3.00 hrs. Marks : 100

I . Answer all the questions. 14 X 1 = 14

Choose the appropriate answer from the given four alternatives.

1. In a class of 50 boys, 35 boys play carrom and 20 boys play chess then the number of boys play both games is

   a) 5 b) 30 c) 15 d) 10

2. For any three sets A,B and C, $(A-B)\cap(B-C)$ is equal to

   a) A only b) B only c) C only d) ϕ

3. An irrational number between 2 and 2.5 is

   a) $\sqrt{11}$ b) $\sqrt{5}$ c) $\sqrt{2.5}$ d) $\sqrt{8}$

4. The length and breadth of a rectangular plot are 5×10^5 and 4×10^4 metres respectively. Its area is ..... .

   a) 9×10^1 m^2 b) 9×10^9 m^2

   c) 2×10^{10} m^2 d) 20×10^{20} m^2

5. The zero of the polynomial 2x + 5 is

   a) $\frac{5}{2}$ b) $-\frac{5}{2}$ c) $\frac{2}{5}$ d) $-\frac{2}{5}$

6. Which of the following is a linear equation?

   a) $x + \frac{1}{x} = 2$ b) x (x - 1) = 2 c) $3x + 5 = \frac{2}{3}$ d) $x^3 - x = 5$

7. GCD of any two prime number is ..... .

   a) -1 b) 0 c) 1 d) 2

8. Longest chord of the circle is ..... .

   a) radius b) arc c) diameter d) none

9. The exterior angle of a triangle is equal to the sum of two

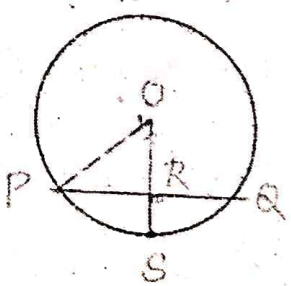
   a) exterior angle b) interior opposite angles

   c) alternate angle d) interior angles

10. In the given figure if OP = 17cm, PQ = 30cm and OS is perpendicular to PQ, then RS is

    a) 10cm b) 6cm

    c) 7cm d) 9cm



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11. The point whose ordinate is 4 and which lies on the y - axis is ..... .

a) (4, 0) b) (0, 4) c) (1, 4) d) (4, 2)

12. If the coordinates of one end of a diameter of a circle is (3,4) and the coordinates of its centre is (-3, 2), then the coordinate of the other end of the diameter is

a) (0, -3) b) (0, 9) c) (3,0) d) (-9, 0)

13. If (1, -2), (3,6), (x, 10) and (3,2) are the vertices of the parallelogram taken in order, then the value of x is

a) 6 b) 5 c) 4 d) 3

14. If $\sin 30^\circ = x$ and $\cos 60^\circ = y$ then $x^2 + y^2$ is

a) $\frac{1}{2}$ b) 0 c) $\sin 90^\circ$ d) $\cos 90^\circ$

II Answer any 10 questions. Question no. 28 is compulsory. 10 X 2 = 20

15. Write down the power set of the following set. A = {p, q, r, s}.

16. Find the symmetric difference between the following sets.
R = {l, m, n, o, p} and S = {j, l, n, q}.

17. Express the fallowing in the form 2^n, $\sqrt{8}$.

18. Multiply : $\sqrt[3]{40}$ and $\sqrt[3]{16}$.

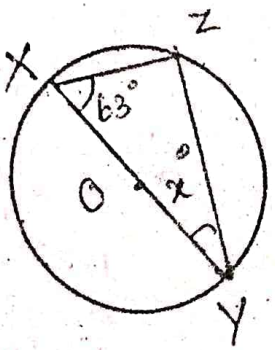
19. By remainder theorem, find the remainder when p(x) is divided by g(x) where
$p(x) = x^3 - 2x^2 - 4x - 1$; $g(x) = x + 1$.

20. Find the GCD for the following : ab^2c^3, a^2b^3c, a^3bc^2.

21. Solve by the method of elimination $2x - y = 3$; $3x + y = 7$.

22. The angle of a triangle are in the ratio 1 : 2 : 3, find the measure of each angle of the triangle.

23. Find the value of x° in the following figure.



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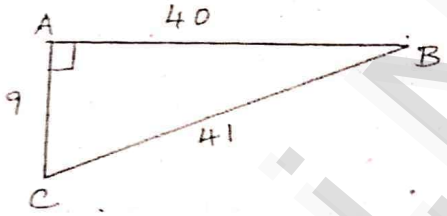
24. The centre of a circle is (-4, 2). If one end of the diameter of the circle is (-3, 7), then find the other end.

25. If (x, 3), (6, y), (8, 2) and (9,4) are the vertices of a parallelogram taken in order, then find the value of x and y.

26. Find the centroid of the triangle whose vertices are A(6,-1), B(8,3) and C(10,-5)

27. From the given figure, find all the trigonometric ratios of angle B.



28. In the parallelogram ABCD, if $\angle A = 65^{o}$ find $\angle B$, $\angle C$, $\angle D$.

III Answer any 10 questions. 10 X 5 = 50

Question number 42 is compulsory.

29. 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 laws for complementation.

30. In a group of 100 student, 85 students speak Tamil, 40 student speak English, 20 students speak French, 32 speak Tamil and English, 13 speak English and French and 10 speak Tamil and French. If each student known atleast any one of these languages, then find the number of students who speak all these three languages.

31. Represent the following number on the number line : 5. 348.

32. Arrange surds in descending order. $\sqrt[3]{5}$, $\sqrt[9]{4}$, $\sqrt[6]{3}$.

33. Find the quotient and remainder for the following using synthetic division $(x^3+2x^2 - x - 4) \div (x + 2)$

34. Solve by cross multiplication method : $3x + 5y = 21$; $-7x - 6y = -49$.

35. The sum of two digit number and the number formed by interchanging the digits is 110. If 10 is subtracted from the first number, the new number is 4 more than 5 times the sums of the digits of the first number. Find the first number.

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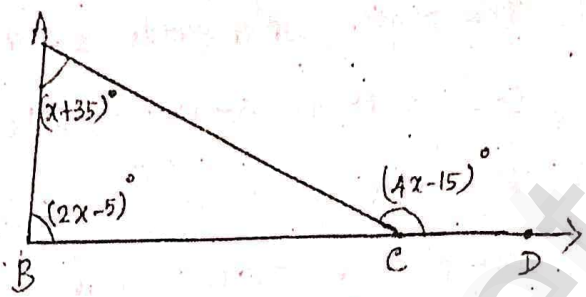
36. Find all the three angles of the ΔABC.



37. Find the length of a chord which is at a distance of $2\sqrt{11}$ cm from the centre of a circle of radius 12cm.

38. Show that the following points A (7,10), B (-2,5), C(3,-4) are the vertices of a right angled triangle.

39. O(0,0) is the centre of a circle whose one chord is AB, where the points A and B are (8,6) and (10,0) respectively. OD is the perpendicular from the centre to the chord AB. Find the coordinates of the mid-point of OD.

40. Using section formula, show that the points A (7, -5), B(9, -3) and C(13, 1) are collinear.

41. If $\cos A = \frac{3}{5}$, then find the value of $\frac{\sin A - \cos A}{2 \tan A}$.

42. If P = {x : x ∈ w and 0 < x < 10}, Q = {x : x = 2n + 1, n∈w and n < 5} and R = {2,3,5,7,11,13}, then verify P-(Q∩R) = (P-Q)∪(P - R).

IV Answer all the questions. 2 X 8 = 16

43. a) Draw ΔPQR with sides PQ= 7cm, QR = 8cm and PR = 5cm and construct its orthocentre. ***(OR)***

b) Construct the circumcentre of the ΔABC with AB = 5 cm, $\angle A = 60^o$ and $\angle B = 80^o$. Also draw the circumcircle and find the circum radius of the ΔABC.

44. a) Draw the graph for the following : $y = \left(\frac{3}{2}\right)x + 3$. ***(OR)***

b) Use graphical method to solve the following system of equations.

x + y = 5; 2x - y = 4.