

**COMMON HALF YEARLY EXAMINATION - 2023****Std - IX****Time : 3.00 Hours****MATHS****Marks: 100****I. Answer all questions. Choose the best answer:****14 x 1 = 14**

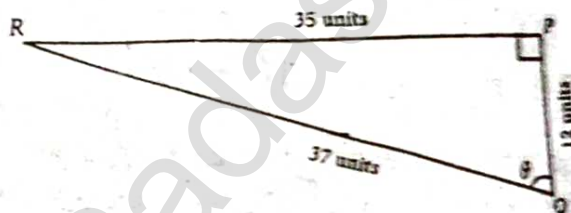
1. If  $A = (x, y, z)$  then the number of non-empty subsets of  $A$  is  
a) 8                      b) 5                      c) 6                      d) 7
2. If  $A \cup B = A \cap B$ , then  
a)  $A \neq B$                       b)  $A = B$                       c)  $A \subset B$                       d)  $B \subset A$
3. The smallest rational number by which  $1/3$  should be multiplied so that its decimal expansion terminates with one place of decimal is  
a)  $\frac{1}{10}$                       b)  $\frac{3}{10}$                       c) 3                      d) 30
4. When written with a rational denominator, the expression  $\frac{2\sqrt{3}}{3\sqrt{2}}$  can be simplified as  
a)  $\frac{\sqrt{2}}{3}$                       b)  $\frac{\sqrt{3}}{2}$                       c)  $\frac{\sqrt{6}}{3}$                       d)  $\frac{2}{3}$
5. Degree of the polynomial  $(y^3 - 2)(y^3 + 1)$  is  
a) 9                      b) 2                      c) 3                      d) 6
6. The root of the polynomial equation  $2x + 3 = 0$  is  
a)  $\frac{1}{3}$                       b)  $-\frac{1}{3}$                       c)  $-\frac{3}{2}$                       d)  $-\frac{2}{3}$
7. GCD of any two prime numbers is .....  
a) -1                      b) 0                      c) 1                      d) 2
8. The angles of the triangle are  $3x - 40$ ,  $x + 20$  and  $2x - 10$  then the value of  $x$  is  
a)  $40^\circ$                       b)  $35^\circ$                       c)  $50^\circ$                       d)  $45^\circ$
9. A chord is at a distance of 15cm from the centre of the circle of radius 25cm. The length of the chord is  
a) 25cm                      b) 20cm                      c) 40cm                      d) 18cm
10. In what ratio does the point  $Q(1, 6)$  divide the line segment joining the points  $P(2, 7)$  and  $R(-2, 3)$   
a) 1:2                      b) 2:1                      c) 1:3                      d) 3:1
11. The interior angle made by the side in a parallelogram is  $90^\circ$  then the parallelogram is  
a) rhombus                      b) rectangle                      c) trapezium                      d) kite
12. If  $\sin 30^\circ = x$  and  $\cos 60^\circ = y$ , then  $x^2 + y^2$  is  
a)  $1/2$                       b) 0                      c)  $\sin 90^\circ$                       d)  $\cos 90^\circ$
13. The point  $(-5, 2)$  and  $(2, -5)$  lie in the .....  
a) same quadrant                      b) II and III quadrant respectively  
c) II and IV quadrant respectively                      d) IV and II quadrant respectively

- a) 0                      b) 1                      c) 2                      d)  $\frac{\sqrt{3}}{2}$

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

10 x 2 = 20

15. Write the set of letters of the following words in Roster form  
i) ASSESSEMENT ii) PRINCIPAL
16. Represent  $A \Delta B$  through venn diagram.
17. Verify that  $1 = 0.\bar{9}$
18. The mass of the Earth is  $5.97 \times 10^{24}$  kg and that of the Moon is  $0.073 \times 10^{24}$  kg. What is their total mass.
19. If  $p(x) = 4x^2 - 3x + 2x^3 + 5$  and  $q(x) = x^2 + 2x + 4$ , then find  $p(x) + q(x)$
20. Evaluate :  $10^3 - 15^3 + 5^3$
21. Check whether -3 and 3 are zeros of the polynomial  $x^2 - 9$ .
22. Solve by the method of elimination  $2x - y = 3$ ,  $3x + y = 7$
23. Two circles of radii 5 cm and 3 cm intersect at two points and the distance between their centres is 4cm, find the length of the common chord.
24. The angle of a triangle are in the ratio 1:2:3, find the measure of each angle of the triangle.
25. Find the distance between the points (-4, 3), (2, -3)
26. In what ratio does the point P(2,-5) divided the line segment joining A(-3, 5) and B (4, -9)
27. For the measures in the figure, compute sine, cosine and tangent ratios of the angle.



28. Evaluate:  $\frac{\tan 45^\circ}{\tan 30^\circ + \tan 60^\circ}$

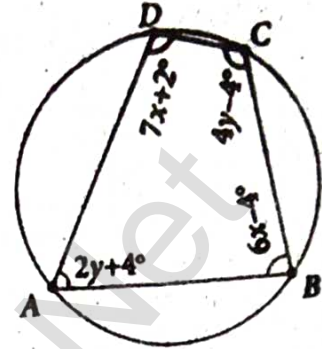
**III. Answer any 10 questions. (Q.No. 42 compulsory)**

10 x 5 = 50

29. In a college, 240 students play cricket, 180 students play football, 164 students play hockey, 42 play both cricket and football, 38 play both football and hockey, 40 play both cricket and hockey and 16 play all the three games. If each student participate in atleast one game, then find (i) the number of students in the college (ii) the number of students who play only one game.
30. Represent the following sets in Roster form
  - i) A = The set of all even natural numbers less than 20
  - ii)  $D = \{x : x \in \mathbb{Z}, -5 < x \leq 2\}$
  - iii) E = The set of odd Whole numbers less than 9
  - iv)  $P = \{x : x \in \mathbb{N}, 1 < x < 2\}$
  - v)  $B = \{x : x \in \mathbb{Z} \text{ and } x < 5\}$
31. Arrange in ascending order :  $\sqrt[3]{2}$ ,  $\sqrt[2]{4}$ ,  $\sqrt[4]{3}$
32. Represent  $\sqrt{9.3}$  on a number line.

33. If  $\sqrt{2} = 1.414$ ,  $\sqrt{3} = 1.732$ ,  $\sqrt{5} = 2.236$ ,  $\sqrt{10} = 3.162$ , then find the values of the following correct to 3 places of decimals,  $\sqrt{40} - \sqrt{20}$
34. Factorise :  $x^3 - 5x^2 - 2x + 24$
35. Solve by cross-multiplication method :  $8x - 3y = 12$ ;  $5x = 2y + 7$ .
36. Find quotient and the remainder when  $f(x)$  is divided by  $g(x)$ ,  $f(x) = (8x^3 - 6x^2 + 15x - 7)$ ,  $g(x) = 2x + 1$ .

37. Find all the angles of the given cyclic quadrilateral ABCD in the figure.



38. In a parallelogram ABCD, the bisectors of the consecutive angles  $\angle A$  and  $\angle B$  intersect at P. Show that  $\angle APB = 90^\circ$ .
39. Using section formula, show that the points A(7, -5), B(9, -3) and C(13, 1) are collinear.
40. The mid-points of the sides of a triangle are (5, 1) (3, -5) and (-5, -1). Find the coordinates of the vertices of the triangle.
41. Find the values of  $\frac{\cos 35^\circ}{\sin 55^\circ} + \frac{\sin 12^\circ}{\cos 78^\circ} - \frac{\cos 18^\circ}{\sin 72^\circ}$

42. Verify the following equalities:

i)  $\sin^2 60^\circ + \cos^2 60^\circ = 1$     ii)  $\sin 30^\circ \cos 60^\circ + \cos 30^\circ \sin 60^\circ = \sin 90^\circ$

IV. Answer both questions. Each questions carries 8 marks: 2 x 8 = 16

43. a) Draw a triangle PQR, where PQ = 8cm, QR = 6cm and  $\angle Q = 70^\circ$  and locate its circumcentre and draw the circumcircle. (OR)
- b) Draw  $\triangle ABC$  given AB = 9cm,  $\angle CAB = 115^\circ$  and  $\angle ABC = 40^\circ$ . Locate its incentre and also draw the incircle.
44. a) Solve graphically :  $x + y = 5$ ;  $x - y = 1$  (OR)
- b) Use graphical method to solve the following system of equations:  
 $3x + 2y = 6$ ;  $6x + 4y = 8$