

VNR9M

Virudhunagar District  
Common Half Yearly Examination - December 2023

### Standard - 9 MATHS PART - I

Maximum Marks:100

Time Allowed:3.00 Hours

**Note:** i) Answer all the questions.  
ii) Choose the most appropriate answer from the given four alternatives and write the option code and the corresponding answer.

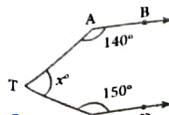
14 × 1 = 14

- If  $B \subseteq A$  then  $n(A \cap B)$ 
  - $n(A-B)$
  - $n(B)$
  - $n(B-A)$
  - $n(A)$
- Which of the following is true?
  - $A-B = A \cap B$
  - $A-B = B-A$
  - $(A \cup B)' = A' \cup B'$
  - $(A \cap B)' = A' \cup B'$
- For any set A,  $A \cup \phi = A$  and  $A \cap U = A$ 
  - Idempotent laws
  - Identify law
  - De Morgan's law
  - Symmetric law
- Which of the following is an irrational number
  - $\sqrt{25}$
  - $\sqrt{\frac{9}{4}}$
  - $\frac{7}{11}$
  - $\pi$
- $\sqrt{27} + \sqrt{12} = \underline{\hspace{2cm}}$ 
  - $\sqrt{39}$
  - $5\sqrt{6}$
  - $5\sqrt{3}$
  - $3\sqrt{5}$
- If  $\sqrt{9^x} = 3\sqrt{9^2}$ , then  $x = \underline{\hspace{2cm}}$ 
  - $\frac{2}{3}$
  - $\frac{4}{3}$
  - $\frac{1}{3}$
  - $\frac{5}{3}$
- If  $x^{51} + 51$  is divided by  $x+1$ , then the remainder is .
  - 0
  - 1
  - 49
  - 50
- Cubic polynomial may have maximum of  $\underline{\hspace{2cm}}$  linear.
  - 1
  - 2
  - 3
  - 4
- GCD of any two prime number is
  - 1
  - 0
  - 1
  - 2
- If the diagonal of a rhombus are equal, then the rhombus is a  $\underline{\hspace{2cm}}$ .
  - Parallelogram but not a rectangle
  - Rectangle but not a square
  - Square
  - Parallelogram but not a square
- If one angle of a cyclic quadrilateral is  $75^\circ$ , then the opposite angle is
  - $100^\circ$
  - $105^\circ$
  - $85^\circ$
  - $90^\circ$
- The distance between the points (5,-1) and the rhombus is a  $\underline{\hspace{2cm}}$ .
  - $\sqrt{24}$
  - $\sqrt{37}$
  - $\sqrt{26}$
  - $\sqrt{17}$
- 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.
  - 6
  - 5
  - 4
  - 3
- The value of  $\tan 1^\circ \tan 2^\circ \tan 3^\circ \dots \tan 89^\circ$  is
  - 0
  - 1
  - 2
  - $\frac{\sqrt{3}}{2}$

### PART - II

**Note:** Answer any Ten questions. Question no. 28 is compulsory. 10 × 2 = 20

- Find the number of subsets and the number of proper subsets of a set  $X = \{a, b, c, x, y, z\}$ .
- If  $n(A) = 300$ ,  $n(A \cup B) = 500$ ,  $n(A \cap B) = 50$  and  $n(B) = 250$ , find  $n(B)$  and  $n(U)$ .
- If  $n[P(A)] = 256$ , find  $n(A)$ .
- $a = 2 + \sqrt{3}$ ,  $b = 2 - \sqrt{3}$ ,  $x = a+b$ ,  $y = a-b$ , find  $x$  and  $y$ .
- Represent the following numbers in the scientific notation: (i) 56943000000 (ii) 2000.57.
- If  $(x-1)$  divides the polynomial  $Kx^3 - 2x^2 + 25x - 26$  without remainder, then find the value of  $k$ .
- Factorise :  $y^2 - 16y - 80$ .
- In the figure AB is parallel to CD, find  $x$ .



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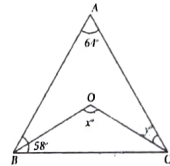
23. Find the GCD of the following:  $a^{m+1}$ ,  $a^{m+2}$ ,  $a^{m+3}$ .
24. A chord is 12cm away from the centre of the circle of radius 15cm. Find the length of the chord.
25. The points (3,-4) is the centre of a circle. If AB, a diameter of the circle and B is (5,-6). Find the co-ordinates of A.
26. Evaluate:  $\sin^2 45^\circ + \cos^2 45^\circ$ .
27. Find the value of the following:  

$$\frac{\cos 70^\circ}{\sin 20^\circ} + \frac{\cos 59^\circ}{\sin 31^\circ} + \frac{\cos \theta}{\sin (90 - \theta)} - 8 \cos^2 60^\circ$$
28. If the centroid of a triangles is at (4,-2) and two of its vertices are (3,-2) and (5,2), then find the third vertex of the triangles.

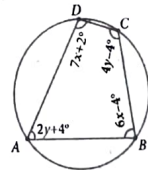
**PART - III****Note: i) Answer any Ten questions.****ii) Question no. 42 is compulsory.****10x5=50**

29. Verify:  $A - (B \cup C) = (A - B) \cap (A - C)$  using Venn diagrams.
30. In a group of 100 students, 85 students speak Tamil, 40 students speak English, 20 students French, 32 speak Tamil and English, 13 speak English and French and 10 speak Tamil and French. If each students knows atleast any one of these languages, then find the number of students who speak all these three languages.
31. Represents  $\sqrt{9.3}$  on a number line.
32. Find the value of a and b if  $\frac{\sqrt{7}-2}{\sqrt{7}+2} = a\sqrt{7}+b$ .
33. Arrange surds in ascending order:  $\sqrt[3]{5}, \sqrt[3]{47}, \sqrt{3}$
34. 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)  $\frac{a}{bc} + \frac{b}{ac} + \frac{c}{ab}$
35. Factorise:  $x^3 - 3x^2 - 10x + 24$ .
36. Given  $4a + 3b = 65$  and  $a + 2b = 35$ , Solve by elimination method.

37. In the given fig. If  $\angle A = 64^\circ$ ,  $\angle ABC = 58^\circ$ . If BO and CO are the bisectors of ABC and  $\angle ACB$  respectively of  $\triangle ABC$ , find x and y.



38. Find all the angles of the given cyclic quadrilateral ABCD.



39. The vertices of a triangle are (1,2), (h,-3) and (-4, k). If the centroid of the triangle is at the point (5,-1) then find the value of  $\sqrt{(h+K)^2 + (h+3K)^2}$ .
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. Show that (4,3) is the centre of the circle passing through the points (9,3), (7,-1), (-1,3). Also find its radius.
42. If  $U = \{4,7,8,10,11,12,15,16\}$ ,  $A = \{7,8,11,12\}$  and  $B = \{4,8,12,15\}$  then show that  $(A \cap B)' = A' \cup B'$ .

**PART - IV****Note: Answer the following questions.****2x8=16**

43. a) Draw and locate the orthocentre of right triangle PQR where  $PQ = 4.5\text{cm}$ ,  $QR = 6\text{cm}$  and  $PR = 7.5\text{cm}$ . **(OR)**  
 b) Construct the circumcentre of  $\triangle ABC$  with  $AB = 5\text{cm}$ ,  $\angle A = 60^\circ$  and  $\angle B = 80^\circ$ . Also draw the circumcircle and find the circumradius of the  $\triangle ABC$ .
44. a) Draw the graph:  $y = \left(\frac{2}{3}\right)x + 3$ . **(OR)**  
 b) Solve graphically:  $x + y = 7$ ,  $x - y = 3$ .