

VNR9M

Virudhunagar District

Common Half Yearly Examination - December 2024



Standard 9

MATHEMATICS

Time: 3.00 Hrs.

Marks: 100

PART - A

I. Answer ALL the questions. Choose the correct answer:

14×1=14

- 1) Which of the following is correct?
a) $\phi \subseteq \{a, b\}$ b) $\phi \in \{a, b\}$ c) $\{a\} \in \{a, b\}$ d) $a \subseteq \{a, b\}$
- 2) If $n(A \cup B \cup C) = 100$, $n(A) = 4x$, $n(B) = 6x$, $n(C) = 5x$, $n(A \cap B) = 20$, $n(B \cap C) = 15$, $n(A \cap C) = 25$ and $n(A \cap B \cap C) = 10$ then the value of x is
a) 10 b) 15 c) 25 d) 30
- 3) 0.245 length of period is _____.
a) 2 b) 3 c) 4 d) 5
- 4) $4\sqrt{7} \times 2\sqrt{3} =$ _____.
a) $6\sqrt{10}$ b) $8\sqrt{21}$ c) $8\sqrt{10}$ d) $6\sqrt{21}$
- 5) If $x^{51} + 51$ is divided by $x - 1$, then the remainder is
a) 0 b) 102 c) 51 d) 52
- 6) Zeros of $(2 - 3x)$ is _____.
a) 3 b) 2 c) $\frac{2}{3}$ d) $\frac{3}{2}$
- 7) The GCD of $x^4 - y^4$ and $x^2 - y^2$ is
a) $x^4 - y^4$ b) $x^2 - y^2$ c) $(x + y)^2$ d) $(x + y)^4$
- 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) If one angle of cyclic quadrilateral is 75° , then the opposite angle is
a) 100° b) 105° c) 85° d) 90°
- 10) The point whose ordinate is 4 and which lies on the x axis is _____.
a) (4, 0) b) (0, 4) c) (1, 4) d) (4, 2)
- 11) 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
- 12) The distance between the points (5, -1) and the origin is _____.
a) $\sqrt{24}$ b) $\sqrt{37}$ c) $\sqrt{26}$ d) $\sqrt{17}$
- 13) 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) $\cos 90^\circ$
- 14) The value of $\frac{\tan 35^\circ}{\cot 55^\circ} - \frac{\sec 18^\circ}{\operatorname{cosec} 72^\circ}$ is
a) 2 b) 1 c) 0 d) -1

PART - B

II. Answer any 10 questions: [Q.No. 28 is compulsory]

10×2=20

- 15) If $A = \{6, 7, 8, 9\}$ and $\{8, 10, 12\}$, find $A \Delta B$.
- 16) Draw Venn diagram: $(A \cup B)'$

17) Find the value of $\left(\frac{64}{125}\right)^{-2/3}$.

18) Simplify: $(7\sqrt{a} - 5\sqrt{b})(7\sqrt{a} + 5\sqrt{b})$

19) Write in scientific notation: $(0.00000005)^3$

20) By using identity evaluate: $7^3 - 10^3 + 3^3$

21) The area of rectangle is $x^2 + 7x + 12$. If its breadth is $(x + 3)$, then find its length.

22) In a quadrilateral ABCD, $\angle A = 72^\circ$ and $\angle C$ is the supplementary of $\angle A$. The other two angles are $(2x - 10)^\circ$ and $(x + 4)^\circ$. Find the value of x and the measure of all the angles.

23) A chord is 12 cm away from the centre of the circle of radius 15 cm. Find the length of the chord.

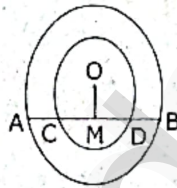
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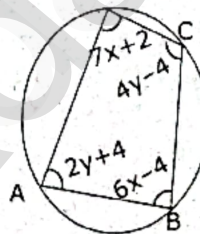
- 24) Find the coordinates of the point which divides the line segment joining the points A(4, -3) and B(9, 7) in the ratio 3:2.
- 25) Find the centroid of the triangle whose vertices are A(2, -4), B(-3, -7) and C(7, 2).
- 26) Find the value of $8 \sin 2x \cos 4x \sin 6x$, when $x = 15^\circ$.
- 27) Evaluate: $\frac{\tan 45^\circ}{\tan 30^\circ + \tan 60^\circ}$
- 28) If $P = \{1, 2, 5, 7, 9\}$, $Q = \{2, 3, 5, 9, 11\}$ then verify the commutative property of intersection of set.

PART - C**III. Answer any 10 questions: [Q.No. 42 is compulsory]****10×5=50**

- 29) If $A = \{0, 2, 4, 6, 8\}$, $B = \{x : x \text{ is a prime number, } x < 11\}$ and $C = \{x : x \in \mathbb{N} \text{ and } 5 \leq x < 9\}$ then verify $A \cup (B \cap C) = (A \cup B) \cap (A \cup C)$.
- 30) In a class of 50 students, each are come to school by bus or bicycle or on foot. 25 by bus, 20 by bicycle, 30 on foot and 10 students by all the three. Now how many students come to school exactly by two modes of transport?
- 31) Represent $\sqrt{6.5}$ on a number line.
- 32) Given $\sqrt{3} = 1.732$, find the value of $\frac{9 - 5\sqrt{3}}{7 - 4\sqrt{3}}$. (upto 3 places of decimals)
- 33) If two polynomials $2x^3 + ax^2 + 4x - 12$ and $x^3 + x^2 - 2x + a$ leave the same remainder when divided by $(x-3)$, find the value of a and also find the remainder.
- 34) Factorise: $x^3 + 13x^2 + 32x + 20$
- 35) Solve by the method of elimination: $13x + 11y = 70$; $11x + 13y = 74$
- 36) In the concentric circle, chord AB of the outer circle cuts the inner circle at C and D as shown in the diagram. Prove that $AB - CD = 2AC$.



- 37) Find all the angles of the given cyclic quadrilateral ABCD.



- 38) The vertices of a triangle are $(1, 2)$, $(h, -3)$ and $(-4, k)$. If the centroid of the triangle is at the points $(5, -1)$, then find the value of $\sqrt{(h+k)^2 + (h+3k)^2}$.
- 39) $A(-3, 2)$, $B(3, 2)$ and $C(-3, -2)$ are the vertices of the right angle triangle, right angled at A. Show that mid-point of the hypotenuse is equidistant from the vertices.
- 40) If $\sec \theta = \frac{13}{5}$, then show that $\frac{2 \sin \theta - 3 \cos \theta}{4 \sin \theta - 9 \cos \theta} = 3$.
- 41) Find the area of a right triangle whose hypotenuse is 10 cm and one of the acute angle is $24^\circ 24'$.
- 42) Show that the points are collinear $A(7, -5)$, $B(9, -3)$ and $C(13, 1)$.

PART - D**IV. Answer any 2 questions:****2×8=16**

- 43) Construct ΔPQR whose sides are $PQ = 6$ cm, $\angle Q = 60^\circ$ and $QR = 7$ cm and locate its Orthocentre. **(OR)**
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) Draw the graph: $y = 4x - 1$ **(OR)**
Use graphical method to solve the following system of equations:
 $3x + 2y = 6$; $6x + 4y = 8$