

10th Standard

Maths

Model Public examination -2024-25

Total Marks : 100

Time : 03:00Hrs

Section – A

14 x 1 = 14

- If the range of a function is a singleton set, then it is
(a) a constant function (b) an identity function (c) a bijective function (d) an one-one function
- If the ordered pairs $(a+2, 4)$ and $(5, 2a+b)$ are equal then (a, b) is
(a) $(2, -2)$ (b) $(5, 1)$ (c) $(2, 3)$ (d) $(3, -2)$
- An A.P. consists of 31 terms. If its 16th term is m , then the sum of all the terms of this A.P. is
(a) 16 m (b) 62 m (c) 31 m (d) 31/2 m
- If t_n is the n th term of an A.P., then $t_{2n} - t_n$ is -----
(a) 2d (b) 2nd (c) d (d) nd
- The identity matrix for matrix addition -----
(a) Null matrix (b) Negative matrix (c) Row matrix (d) Column matrix
- Which of the following should be added to make $x^4 + 64$ a perfect square
(a) $4x^2$ (b) $16x^2$ (c) $8x^2$ (d) $-8x^2$
- A Cevian that divides the opposite side into two congruent(equal) lengths is _____.
(a) Median (b) Altitude (c) Incentre (d) Ortho centre
- If $(5, 7)$, $(3, p)$ and $(6, 6)$ are collinear, then the value of p is
(a) 3 (b) 6 (c) 9 (d) 12
- Number of straight lines with slope 1 is/are -----
(a) 1 (b) 2 (c) 3 (d) Infinite Lines
- If $(\sin\alpha + \operatorname{cosec}\alpha)^2 + (\cos\alpha + \sec\alpha)^2 = k + \tan^2\alpha + \cot^2\alpha$, then the value of k is equal to
(a) 9 (b) 7 (c) 5 (d) 3
- Radius and height of a right circular cone and that of a right circular cylinder are respectively equal. If the volume of the cylinder is 120 cm^3 , then the volume of the cone is equal to
(a) 1200 cm^3 (b) 360 cm^3 (c) 40 cm^3 (d) 90 cm^3
- The total surface area of a hemi-sphere is how much times the square of its radius.
(a) π (b) 4π (c) 3π (d) 2π
- If the variance is 0.49 then the standard deviation is _____.
(a) 0.2401 (b) 24.01 (c) 0.98 (d) 0.7
- If A and B are mutually exclusive events then $P(A \cap B) =$ _____.
(a) 0 (b) 1 (c) ∞ (d) -1

Section – B

10 x 2 = 20

II. Answer any 10 questions and question No. 28 is compulsory

- If $A = \{-2, -1, 0, 1, 2\}$ and $f: A \rightarrow B$ is an onto function defined by $f(x) = x^2 + x + 1$ then find B .
- If $13824 = 2^a \times 3^b$ then find a and b .
- Find the number of terms in the A.P. 3, 6, 9, 12, ..., 111
- Find the LCM of the given expression $p^2 - 3p + 2$, $p^2 - 4$
- If $A = \begin{pmatrix} 1 & 3 & -2 \\ 5 & -4 & 6 \\ -3 & 2 & 9 \end{pmatrix}$ and $B = \begin{pmatrix} 1 & 8 \\ 3 & 4 \\ 9 & 6 \end{pmatrix}$, find $A+B$.
- What length of ladder is needed to reach a height of 7 ft along the wall when the base of the ladder is 4 ft from the wall? Round off your answer to the next tenth place.
- The straight lines X axis and Y axis are perpendicular to each other. Is the condition $m_1 m_2 = -1$ true?

22. Find the equation of a line through the given pair of points (2, 3) and (-7, -1)
23. Prove the following identity $\sec^6 \theta = \tan^6 \theta + 3 \tan^2 \theta \sec^2 \theta + 1$
24. A player sitting on the top of a tower of height 20 m observes the angle of depression of a ball lying on the ground as 60° . Find the distance between the foot of the tower and the ball
25. If the circumference of a conical wooden piece is 484 cm then find its volume when its height is 105 cm.
26. If the mean and coefficient of variation of a data are 15 and 48 respectively, then find the value of standard deviation.
27. A die is rolled and a coin is tossed simultaneously. Find the probability that the die shows an odd number and the coin shows a head.
28. Describing domain of a function $f(x) = \frac{1}{x^2 - 5x + 6}$

Part-C**10 x 5 = 50****Answer any 10 questions and Qn No. 42 is compulsory**

29. Let $f: A \rightarrow B$ be a function defined by $f(x) = \frac{x}{2} - 1$ where $A = \{2, 4, 6, 10, 12\}$, $B = \{0, 1, 2, 4, 5, 9\}$.
Represent f by (i) set of ordered pairs (ii) a table (iii) an arrow diagram (iv) a graph
30. If $f(x) = 2x + 3$, $g(x) = 1 - 2x$ and $h(x) = 3x$. Prove that $f \circ (g \circ h) = (f \circ g) \circ h$
31. In an A.P., sum of four consecutive terms is 28 and their sum of their squares is 276. Find the four numbers.
32. Find the values of m and n if the following polynomials are perfect squares
 $36x^4 - 60x^3 + 61x^2 - mx + n$
33. If $A = \begin{bmatrix} a & b \\ c & d \end{bmatrix}$ and $I = \begin{bmatrix} 1 & 0 \\ 0 & 1 \end{bmatrix}$, Show that $A^2 - (a + d)A = (bc - ad)I_2$
34. Find the GCD of the following by division algorithm
 $2x^4 + 13x^3 + 27x^2 + 23x + 7$, $x^3 + 3x^2 + 3x + 1$, $x^2 + 2x + 1$
35. State and prove Pythagoras theorem.
36. If vertices of a quadrilateral are at $A(-5, 7)$, $B(-4, k)$, $C(-1, -6)$ and $D(4, 5)$ and its area is 72 sq. units. Find the value of k .
37. Find the equation of the perpendicular bisector of the line joining the points $A(-4, 2)$ and $B(6, -4)$.
38. From the top of a lighthouse, the angle of depression of two ships on the opposite sides of it are observed to be 30° and 60° . If the height of the lighthouse is h meters and the line joining the ships passes through the foot of the lighthouse, show that the distance between the ships is $\frac{4h}{\sqrt{3}}$ m.
39. An industrial metallic bucket is in the shape of the frustum of a right circular cone whose top and bottom diameters are 10 m and 4 m and whose height is 4 m. Find the curved and total surface area of the bucket.
40. The marks scored by 10 students in a class test are 25, 29, 30, 33, 35, 37, 38, 40, 44, 48. Find the standard deviation.
41. Two dice are rolled once. Find the probability of getting an even number on the first die or a total of face sum 8.
42. A spherical solid material of radius 18 cm is melted and recast into three small solid spherical spheres of different sizes. If the radii of two spheres are 2 cm and 12 cm, find the radius of the third sphere.

Part-D**2 x 8 = 16****Answer all questions**

43. a) A company initially started with 40 workers to complete the work by 150 days. Later, it decided to fasten up the work increasing the number of workers as shown below.

Number of workers (x)	40	50	60	75
Number of days (y)	150	120	100	80

- (i) Graph the above data and identify the type of variation.
 (ii) From the graph, find the number of days required to complete the work if the company decides to opt for 120 workers?
 (iii) If the work has to be completed by 30 days, how many workers are required?

(OR)

- b) Draw the graph of $y = x^2 + 3x + 2$ and use it to solve $x^2 + 2x + 1 = 0$

44. a) Construct a triangle similar to a given triangle PQR with its sides equal to $\frac{7}{4}$ of the corresponding sides of the triangle PQR (scale factor $\frac{7}{4} > 1$)

(OR)

- b) Draw a tangent to the circle from the point P having radius 3.6 cm, and centre at O . Point P is at a distance 7.2 cm from the centre.

By Soosainayakam
 6385742207, 944368210