

**10th ICSE 2025 EXAMINATION
MATHEMATICS**

Time Allowed: 2 hours and 30 minutes

Maximum Marks: 80

General Instructions:

- Answers to this Paper must be written on the paper provided separately.
- You will not be allowed to write during the first 15 minutes.
- This time is to be spent reading the question paper.
- The time given at the head of this Paper is the time allowed for writing the answers.
- **Attempt all questions from Section A and any four questions from Section B.**
- All work, including rough work, must be clearly shown and must be done on the same sheet as the rest of the
- answers.
- Omission of essential work will result in a loss of marks.
- The intended marks for questions or parts of questions are given in brackets []
- Mathematical tables are provided.

Section A

1. **Question 1 Choose the correct answers to the questions from the given options: [15]**

- (a) A retailer purchases a fan for ₹1500 from a wholesaler and sells it to a consumer at 10% profit. If the sales are intra-state and the rate of GST is 12%, the cost of the fan to the consumer inclusive of tax is:
(1) ₹1848 (2) ₹1830 (3) ₹1650 (4) ₹1800
- (b) A factory kept increasing its output by the same percentage every year. Then, the percentage, if it is known that the output is doubled in the last two years, will be
(1) 44.4% (2) 14.4% (3) 41.4% (4) 44.1%
- (c) When $ax^3 + 6x^2 + 4x + 5$ is divided by $(x + 3)$, the remainder is -7 . The value of constant a is
(1) 2 (2) -2 (3) -3 (4) 3
- (d) If $A = \begin{bmatrix} 3 & 1 \\ -1 & 2 \end{bmatrix}$, then the value of matrix A^5 is:
(1) $\begin{bmatrix} 87 & 149 \\ 149 & -62 \end{bmatrix}$ (2) $\begin{bmatrix} 87 & 149 \\ 149 & 62 \end{bmatrix}$
(3) $\begin{bmatrix} 62 & 149 \\ -149 & -87 \end{bmatrix}$ (4) $\begin{bmatrix} -62 & -149 \\ 149 & 87 \end{bmatrix}$
- (e) An AP starts with a positive fraction and every alternate term is an integer. If the sum of the first 11 terms is 33, then the fourth term is
(1) 3 (2) 6 (3) 5 (4) 2

- (f) If $(4, 3)$ and $(-4, -3)$ are opposite two vertices of a rectangle, then other two vertices are:
- (1) $(4, -3)$ and $(-3, 4)$ (2) $(-4, -3)$ and $(-4, -3)$
(3) $(-4, 4)$ and $(-3, 4)$ (4) $(4, -3)$ and $(-3, 4)$
- (g) Through the mid-point M of the side CD of a parallelogram $ABCD$, the line BM is drawn intersecting AC at L and AD produced at E . The values of EL and $\text{ar}(\triangle AEL)$ are respectively:
- (1) $\text{ar}(\triangle CBL)$ and BL (2) $2BL$ and $4 \text{ar}(\triangle CBL)$
(3) $4 \text{ar}(\triangle CBL)$ and $2BL$ (4) BL and $\text{ar}(\triangle CBL)$
- (h) A sphere of radius a units is immersed completely in water contained in a right circular cone of semivertical angle 30° and water is drained off from the cone till its surface touches the sphere. Then, the volume of water remaining in the cone will be:
- (1) $\frac{5}{3}\pi a^2$ (2) $\frac{5\pi}{3}a^3$ (3) $\frac{\pi a^3}{3}$ (4) $5\pi a^3$
- (i) Graph the range of the inequation $-2\frac{2}{3} \leq x + \frac{1}{3} \leq 3\frac{1}{3}, \forall x \in \mathbb{R}$ on the number line. If the solution set is consider as a diagonal of a square on the number line, then the area of obtained figure, is
- (1) 11 sq units (2) 14 sq units (3) 17 sq units (4) 18 sq units
- (j) The probability that the minute hand lies from 5 to 15 min in the wall clock, is
- (1) $\frac{1}{6}$ (2) $\frac{5}{6}$ (3) $\frac{1}{5}$ (4) $\frac{1}{10}$
- (k) If $A = \begin{bmatrix} 3 & 0 \\ 0 & 3 \end{bmatrix}$, then A^n (where, n is a natural number) is equal to:
- (1) $\begin{bmatrix} 3n & 0 \\ 0 & 3n \end{bmatrix}$ (2) $3^n \begin{bmatrix} 1 & 0 \\ 0 & 1 \end{bmatrix}$ (3) $\begin{bmatrix} 3 & 0 \\ 0 & 3 \end{bmatrix}$ (4) $I_{2 \times 2}$
- (l) The sum of the squares of the distances of a moving point (x, y) from two fixed points $(a, 0)$ and $(-a, 0)$ is equal to a constant quantity $2b^2$. The value of $x^2 + y^2 + a^2$ is equal to
- (1) b^2 (2) $-a^2$ (3) ab (4) $-b^2$
- (m) If P, Q, S and R are points on the circumference of a circle of radius r , such that PQR is an equilateral triangle and PS is a diameter of the circle. Then, the perimeter of the quadrilateral $PQSR$ will be:
- (1) $2(\sqrt{3}+1)r$ (2) $2\sqrt{3}+r$ (3) $2r$ (4) $2\sqrt{3}+r$
- (n) Observe the data given in three sets
 $P: 3, 5, 9, 12, x, 7, 2$
 $Q: 8, 2, 1, 5, 7, 9, 3$
 $R: 5, 9, 8, 3, 2, 7, 1$
If the ratio between P 's and Q 's means is $7 : 5$, then the ratio between P 's and R 's means is
- (1) $7 : 5$ (2) $5 : 7$ (3) $6 : 7$ (4) $7 : 6$

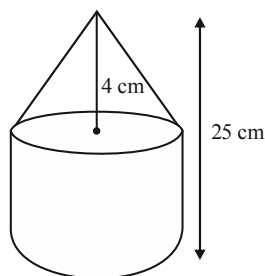
- (o) **Assertion (A):** Sum of first 10 terms of the arithmetic progression $-0.5, -1.0, -1.5, \dots$ is 27.5.
Reason (R): Sum of n terms of an A.P. is given as $S_n = \dots$ where $a =$ first term, $d =$ common difference.
- (1) Both A and R are true and R is the correct explanation of A.
 (2) Both A and R are true but R is not the correct explanation of A.
 (3) A is true but R is false.
 (4) A is false but R is true.

2. **Question 2** [12]

- (a) Mrs. Chopra deposits ₹1600 per month in a Recurring Deposit Account at 9% per annum simple interest. If she gets ₹65592 at the time of maturity, then find the total time for which the account was held.
- (b) Find the mean proportional of $(a^4 - b^4)^2$ and $[(a^2 - b^2)(a - b)]^{-2}$.
- (c) If $\operatorname{cosec} \theta = x + \frac{1}{4x}$, then prove that $\operatorname{cosec} \theta + \cot \theta = 2x$ or $\frac{1}{2x}$.

3. **Question 3** [13]

- (a) The given solid figure is cylinder surmounted by a cone. The diameter of the base of the cylinder is 6 cm. The height of the cone is 4 cm and the total height of the solid is 25 cm. Take $\pi = \frac{22}{7}$.



Find the:

- i. Volume of the solid
- ii. Curved surface area of the solid

Give your answer correct to the nearest whole number.

- (b) The equation of a line is $y = 3x - 5$. Write down the slope of this line and the intercept made by it on the Y-axis. Hence or otherwise, write down the equation of a line, which is parallel to the line and which passes through the point $(0, 5)$.
- (c) Use graph paper for this question (Take 2 cm = 1 unit along both x and y axis). ABCD is a quadrilateral whose vertices are $A(2, 2)$, $B(2, -2)$, $C(0, -1)$ and $D(0, 1)$
- i. Reflect quadrilateral ABCD on the y -axis and name it as $A'B'CD$.
 - ii. Write down the coordinates of A' and B'
 - iii. Name two points which are invariant under the above reflection.
 - iv. Name the polygon $A'B'CD$.

Section B
Attempt any 4 questions

4. Question 4 **[10]**

- (a) The price of a Barbie Doll is ₹3136 inclusive tax (under GST) at the rate of 12% on its listed price. A buyer asks for a discount on the listed price, so that after charging GST, the selling price becomes equal to the listed price. Find the amount of discount which the seller has to allow for the deal.
- (b) Find the values of k , for which the equation $x^2 + 5kx + 16 = 0$ has no real roots.
- (c) The mean of the following distribution is 49. Find the missing frequency a .

Class Interval	0-20	20-40	40-60	60-80	80-100
Frequency	15	20	30	A	10

5. Question 5 **[10]**

- (a) Find the values of x , y , a and b , when $\begin{bmatrix} x+y & a-b \\ a+b & 2x-3y \end{bmatrix} = \begin{bmatrix} 5 & 3 \\ -1 & -5 \end{bmatrix}$.
- (b) Two chords AB and CD of a circle intersect each other at a point E inside the circle. If $AB = 9$ cm, $AE = 4$ cm and $ED = 6$ cm, then find CE.
- (c) Determine, whether the polynomial $g(x) = x - 7$ is a factor of $f(x) = x^3 - 6x^2 - 19x + 84$ or not.

6. Question 6 **[10]**

- (a) Find the points of trisection of the line segment joining the points $(5, -6)$ and $(-7, 5)$.
- (b) Prove the following identities.
i. $\sin^4\theta + \cos^4\theta = 1 - 2 \sin^2\theta \cos^2\theta$
ii. $\frac{1}{\operatorname{cosec} \theta - \cot \theta} - \frac{1}{\sin \theta} = \frac{1}{\sin \theta} - \frac{1}{\operatorname{cosec} \theta + \cot \theta}$
- (c) 150 workers were engaged to finish a job in a certain number of days, 4 workers dropped out on second day, 4 more workers dropped out on third day and so on. It took 8 more days to finish the work. Find the number of days in which the work was completed.

7. Question 7 **[10]**

- (a) A two-digit positive number, such that the product of its digits is 6. If 9 is added to the number, then the digits interchange their places. Find the number.
- (b) The marks obtained by 120 students in a test are given below:

Marks	Number of Students
0 - 10	5
0 - 20	9
20 - 30	16

30 - 40	22
40 - 50	26
50 - 60	18
60 - 70	11
70-80	6
80-90	4
90-100	3

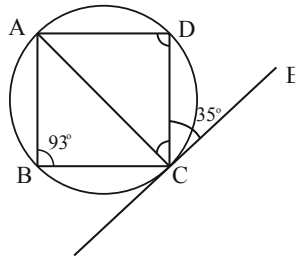
Draw an ogive for the given distribution on a graph sheet. (Use suitable scale for ogive to estimate the following)

- the median.
- the number of students who obtained more than 75% marks in the test.
- the number of students who did not pass the test, if minimum marks required to pass is 40.

8. **Question 8**

[10]

- Two players Niharika and Shreya play a tennis match. It is known that the probability of Niharika winning the match is 0.62. What is the probability of Shreya winning the match?
- A conical military tent is 5 m high and the diameter of the base is 24 m. Find the cost of canvas used in making this tent at the rate of ₹14 per sq. m.
- In the given figure CE is a tangent to the circle at point C. ABCD is a cyclic quadrilateral. If $\angle ABC = 93^\circ$ and $\angle DCE = 35^\circ$



find:

- $\angle ADC$
- $\angle CAD$
- $\angle ACD$

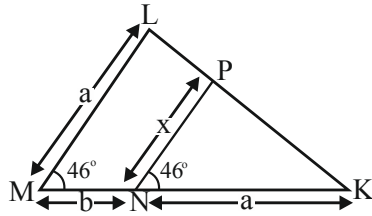
9. **Question 9**

[10]

- Given: $A = \{x : 3 < 2x - 1 < 9, x \in \mathbb{R}\}$, $B = \{x : 11 \leq 3x + 2 \leq 23, x \in \mathbb{R}\}$ where \mathbb{R} is the set of real number.
 - Represents A and B on number lines
 - On the number line also mark $A \cap B$.
- Find the missing frequency for the given frequency distribution table, if the mean, of the distribution is 18.

Class interval	11-13	13-15	15-17	19-21	21-23	23-25
Frequency	3	6	9	f	5	4

- In the given figure, $\angle M = \angle N = 46^\circ$. Express x in terms of a, b and c, where a, b and c are the lengths of LM, MN and NK, respectively.



10. **Question 10**

[10]

- (a) The ages of A and B are in the ratio 7 : 8. Six years ago, their ages were in the ratio 5 : 6. Find their present ages.
- (b) Draw a circle of radius 6 cm. From a point 10 cm away from its centre, construct the pair of tangents to the circle and measure their lengths.
- (d) The angle of elevation from a point P of the top of a tower QR, 50 m high is 60° and that the tower PT from a point Q is 30° . Find the height to the tower PT, correct to the nearest metre.

