



# GRADE 10

# MATHEMATICS

## School Level Examination (SLE) 2025

SUBJECT CODE 

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| 2 | 0 | 1 |
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**Total Questions:** 50

**Total Marks:** 50

**Time:** 1 Hour

**DO NOT OPEN THIS BOOKLET UNTIL INSTRUCTED TO DO SO**

- Carefully fill in your **Name, Class, Roll Number**, and other required details on the **OMR Answer Sheet**.
- Use **only an HB pencil** to fill the OMR Answer Sheet.
- All questions are **compulsory** and carry **one mark** each.
- Only **OMR Answer Sheets** will be evaluated.
- There is **no negative marking** for incorrect answers.
- You may use the **last page** of the question paper for **rough work**.
- **Digital devices** like calculators, smart watches, or mobile phones are **not allowed**.
- After the exam, **submit** both the **OMR Answer Sheet** and the **Question Paper** to the invigilator.

**This question paper contains a total of 50 questions, divided into three sections: A, B, and C.**

## Section A (Logical Reasoning)

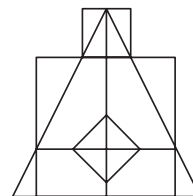
1. Find the missing term in the series:

55296, ?, 288, 36, 9

- (A) 3456 (B) 3436 (C) 4638 (D) 3638

2. How many rectangles and triangles are there in the given figure, respectively?

- (A) 8, 18  
 (B) 12, 23  
 (C) 8, 19  
 (D) 9, 20



3. An old man sold some goats. For each goat, he got as many rupees as number of goats. Now he divided the entire amount he got in the following manner: 1st he gave ₹10 to his 1st son and then gave ₹10 to his 2nd son. Again ₹10 to 1st son and ₹10 to 2nd son. At the end, when the 2nd son's turn was there he was left with less than ₹10, but he gave it to the 2nd son. He asked his 1st son to give some amount to the 2nd son so that both of them are having same amount. Find the amount given by the 1st son to the 2nd son.

- (A) ₹2 (B) ₹4 (C) ₹5 (D) ₹6

4. Six friends A, B, C, D, E, and F are sitting in a circle facing the centre.

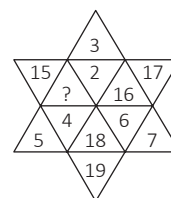
- A is second to the left of D
- C is between E and F
- D is opposite to F
- B is not an immediate neighbour of C

Who is sitting to the immediate right of B?

- (A) E (B) A (C) D (D) F

5. Identify the pattern and find the missing character.

- (A) 13  
 (B) 14  
 (C) 20  
 (D) 21



6. 10 women can complete a work in 7 days and 10 children take 14 days to complete the work. How many days will 5 women and 10 children take to complete the work?

- (A) 7 days (B) 5 days (C) 6 days (D) 4 days

7. The value of G in the given multiplication is

**Note:** Each alphabet represents a distinct digit, and the leftmost digit in each number cannot be zero.

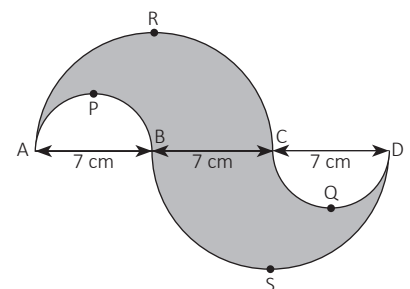
- (A) 3 (B) 5  
 (C) 7 (D) 9

|   |   |   |   |   |
|---|---|---|---|---|
|   | G | E | T |   |
| × |   | B | Y |   |
|   |   |   |   |   |
| B | A | B | E |   |
| G | E | T |   |   |
|   |   |   |   |   |
| B | E | A | R | E |

8. There are 21 identical coins but one of them is defective; it weights differently. It is not known, if the defective coin is heavier or lighter than the right coins. Minimum how many times one has to use physical balance (Tarazu) to find the defective coin?  
 (A) 3 (B) 4 (C) 5 (D) 6
9. In a class of 156 students, each student likes at least one of the 3 sports. If 105 students like Hockey, 76 like Chess, 95 like Carrom and 60 like all the three sports, then find the number of students who like only one.  
 (A) 88 (B) 96 (C) 102 (D) 114
10. A person walks 10 m North, then turns right and walks 20 m. He then turns right again and walks 10 m. Finally, he turns left and walks 10 m. How far is he from the starting point?  
 (A) 30 m (B) 20 m (C) 10 m (D) 40 m

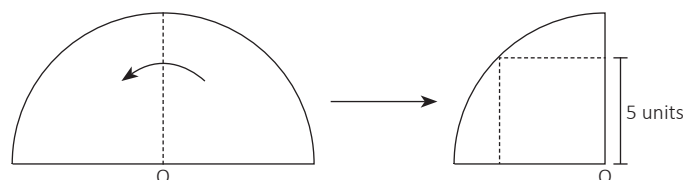
### Section B (Subject Specific)

11.  $a$  and  $b$  are integers such that  $0 \leq a, b \leq 9$ . If the number  $54a29b$  is divisible by 72, then  $2a^2 + b^2 =$  \_\_\_\_\_.  
 (A) 38 (B) 53 (C) 483 (D) 23
12. Dividing  $x^2 - 5x + p$  by  $(x - 3)$  leaves the remainder zero. The quotient is \_\_\_\_\_.  
 (A)  $x + 2$  (B)  $-x - 2$  (C)  $x + p$  (D)  $x - 2$
13. For what value of  $p$  in  $3px + 6y = \sqrt{50}$  and  $\sqrt{18}x + \sqrt{24}y = \sqrt{75}$  will the equations be inconsistent?  
 (A)  $-\sqrt{3}$  (B)  $\sqrt{3}$  (C)  $\sqrt{2}$  (D)  $\sqrt{6}$
14. A number is selected at random from the first 50 natural numbers, then the probability of getting a perfect square is \_\_\_\_\_.  
 (A)  $\frac{7}{50}$  (B)  $\frac{1}{50}$  (C)  $\frac{9}{50}$  (D)  $\frac{11}{50}$
15. If  $\alpha, \beta$  are the roots of  $ax^2 + bx + c = 0$ , then  $\alpha\beta^2 + \alpha^2\beta + \alpha\beta =$   
 (A)  $\frac{c(a-b)}{a^2}$  (B)  $\frac{-bc}{a^2}$   
 (C) 0 (D)  $\frac{-bc}{a}$
16. In the given figure, APB and CQD are semicircles of diameter 7 cm each, while ARC and BSD are semicircles of diameter 14 cm each. Find the perimeter of the figure.  
 (A) 63 cm (B) 64 cm  
 (C) 65 cm (D) 66 cm
17. The value of 'y' which satisfies the given equation  $1 + \frac{y^2}{13} = \sqrt{\frac{27}{169}} + 1$  is \_\_\_\_\_.  
 (A)  $\pm 2$  (B)  $\pm 3$  (C)  $\pm 4$  (D)  $\pm 1$



18. The height of a right circular cylinder is 10.5 m. If three times the sum of the areas of its two circular faces is twice the area of the curved surface, then find the volume of cylinder.  
 (A)  $1337 \text{ m}^3$  (B)  $1417 \text{ m}^3$  (C)  $1537 \text{ m}^3$  (D)  $1617 \text{ m}^3$
19. If one root of  $(a^2 - 5a + 3)x^2 + (3a - 1)x + 2 = 0$  is twice the other, then what is the value of  $a$ ?  
 (A)  $\frac{2}{3}$  (B)  $\frac{-2}{3}$  (C)  $\frac{1}{3}$  (D)  $\frac{-1}{3}$
20. A bag contains 6 black balls and some white balls. If the probability of drawing a white ball from the bag is double that of a black ball, find the number of white balls in the bag.  
 (A) 9 (B) 10 (C) 11 (D) 12

21. A semicircular sheet of paper with centre O is folded in half as shown alongside. Then a square of length 5 units is cut from it.



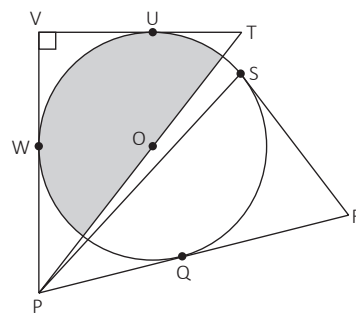
What is the area of the remaining paper?

- (A)  $25(\pi - 2)$  sq. units  
 (B)  $25(\pi - 1)$  sq. units  
 (C)  $25(2\pi - 2)$  sq. units  
 (D)  $25\left(\frac{1}{2} - 1\right)$  sq. units

22. There is a circle with centre O.  $VP = 34 \text{ cm}$ ,  $PR = 36 \text{ cm}$  and  $RS = 17 \text{ cm}$ . U, W, Q and S are the points of tangency.

Find the area of the shaded region in terms of  $\pi$ .

- (A)  $115.5\pi \text{ cm}^2$   
 (B)  $114.5\pi \text{ cm}^2$   
 (C)  $113.5\pi \text{ cm}^2$   
 (D)  $112.5\pi \text{ cm}^2$



23. If the roots of the equation  $3x^2 + 9x + 2 = 0$  are in the ratio  $m : n$ , then find  $\sqrt{\frac{m}{n}} + \sqrt{\frac{n}{m}}$

- (A)  $\frac{-3\sqrt{3}}{\sqrt{2}}$  (B)  $\frac{3\sqrt{2}}{2}$  (C)  $\frac{3\sqrt{3}}{2}$  (D)  $\frac{-3\sqrt{3}}{2}$

24. If  $x = 6 \sin \theta$  and  $y = 7 \cos \theta$ , find the value of  $\sqrt{49x^2 + 36y^2}$ .

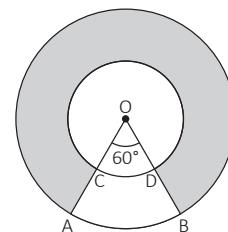
- (A) 41 (B) 42 (C) 43 (D) 44

25. A passenger while boarding a plane hurt herself and the captain called for immediate medical attention. Thus, the plane left 30 minutes behind schedule. In order to reach its destination 1500 km away on time, the speed was increased by 100 km/h from its usual speed. Find the usual speed.

- (A) 400 km/h (B) 450 km/h (C) 500 km/h (D) 550 km/h

26. In the given figure, two concentric circles with centre O have radii of 21 cm and 42 cm. If  $\angle AOB = 60^\circ$ , find the area of the shaded region.

- (A)  $3465 \text{ cm}^2$  (B)  $4365 \text{ cm}^2$   
 (C)  $2465 \text{ cm}^2$  (D)  $4265 \text{ cm}^2$



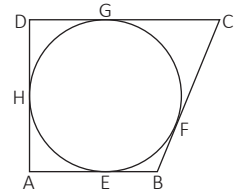
27. If  $0.737373\ldots = \frac{p}{q}$ , where  $p$  and  $q$  are co-prime, then prime factorisation of  $q$  is given as

(A)  $2^2 \times 5^2$  (B)  $2^2 \times 11 \times 5^0$  (C)  $3^2 \times 5 \times 2$  (D)  $3^2 \times 11$

28. A village panchayat constructed a circular tank to serve as a bird bath. A fence was made in the shape of a quadrilateral. The sides of the quadrilateral touched the circle as shown in the figure.

If  $AB = 5$  m,  $CD = 6$  m,  $BC = 7$  m, then find  $AD$ .

(A) 4 m (B) 5 m  
(C) 6 m (D) 7 m

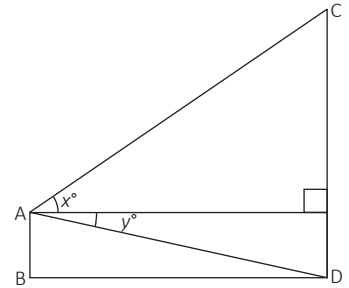


29. If  $\frac{x}{a} \cos \theta + \frac{y}{b} \sin \theta = 1$  and  $\frac{x}{a} \sin \theta - \frac{y}{b} \cos \theta = 1$ , then the value of  $\frac{x^2}{a^2} + \frac{y^2}{b^2}$  is

(A) 0 (B) 1 (C) 2 (D) 3

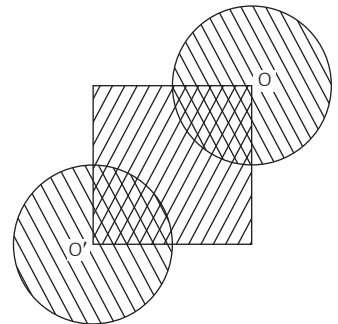
30. From a window A, 10 m above ground, the angle of elevation of the top C of a tower is  $x^\circ$ , where  $\tan x^\circ = \frac{5}{2}$  and the angle of depression of the foot D of the tower is  $y^\circ$ , where  $\tan y^\circ = \frac{1}{4}$ . Calculate the height CD of the tower in metres.

(A) 109 m (B) 110 m  
(C) 111 m (D) 112 m



31. In the given figure, the side of a square is 28 cm and the radius of each circle is half the length of the side of the square, where O and O' are centres of the circles. Find the area of the shaded region.

(A)  $1408 \text{ cm}^2$   
(B)  $1508 \text{ cm}^2$   
(C)  $1608 \text{ cm}^2$   
(D)  $1708 \text{ cm}^2$



32. The sum of three terms in an AP is 15 and the sum of their squares is 93. The common difference of the given series are \_\_\_\_\_.

(A) 5 (B)  $\pm 3$  (C)  $\pm 2$  (D)  $-4$

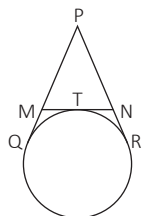
33. If  $(x + y)^{-1} \cdot (x^{-1} + y^{-1}) = x^p \cdot y^q$ , then the value of  $p + q + 2$  is equal to

(A) 0 (B) 1 (C) 2 (D) 3

34. Shipra prepared a project for rainwater harvesting. A diagrammatic representation of the project is given in the figure.

PQ and PR are the pipes touching the circular pit. The length of these pipes is 5 m each. What is the perimeter of  $\triangle PMN$ ?

(A) 9 m (B) 10 m (C) 11 m (D) 12 m



35. The angles of elevation of a cliff from a point A on the ground and from point B, 50 m vertically above point A, are  $\alpha$  and  $\beta$  respectively. The height of the cliff in metres is \_\_\_\_\_.

(A)  $\frac{50 \cot \beta}{\cot \beta - \cot \alpha}$  (B)  $\frac{50 \cot \alpha}{\cot \alpha + \cot \beta}$  (C)  $\frac{50 \cot \alpha}{\cot \beta - \cot \alpha}$  (D)  $\frac{50 \cot \beta}{\cot \alpha + \cot \beta}$

**Instruction: Q. 36 to 40 are two-key based questions having four options A, B, C and D out of which TWO are correct.**

36. If the pair of linear equations  $2x + 3y = 11$  and  $(m + n)x + (2m - n)y - 33 = 0$  has infinitely many solutions, then the values of  $m$  and  $n$  are

(A) 7 (B) 5 (C) 3 (D) 1

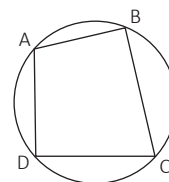
37. If the points  $P(-3, 9)$ ,  $Q(a, b)$  and  $R(4, -5)$  are collinear and  $a + b = 1$ , then the values of  $a$  and  $b$  are

(A) -1 (B) 1 (C) 2 (D) 3

38. In figure, ABCD is a cyclic quadrilateral, the angles of the quadrilateral are given as:  $\angle A = (6x + 10)^\circ$ ,  $\angle B = (5x)^\circ$ ,  $\angle C = (x + y)^\circ$ ,  $\angle D = (3y - 10)^\circ$ .

Find the values of  $x$  and  $y$ .

(A)  $10^\circ$  (B)  $20^\circ$  (C)  $30^\circ$  (D)  $40^\circ$



39. In a society, there is a big swimming pool. It has three pipes with uniform flow to fill the swimming pool. If the first two pipes operate simultaneously, then they fill the pool in same time during which the pool is filled by the third pipe alone. If the second pipe is operated alone, it fills the pool five hours faster than the first pipe and four hours slower than the third pipe. Pool is closed for monthly maintenance. Find the time required to fill the pool by the first and the third pipe.

(A) 15 hours (B) 10 hours (C) 9 hours (D) 6 hours

40. Two years ago, a man's age was three times the square of his son's age. In three years' time, his age will be four times his son's age. Find their present ages.

(A) 3 years (B) 5 years (C) 27 years (D) 29 years

## Section C (Competency Enhancement)

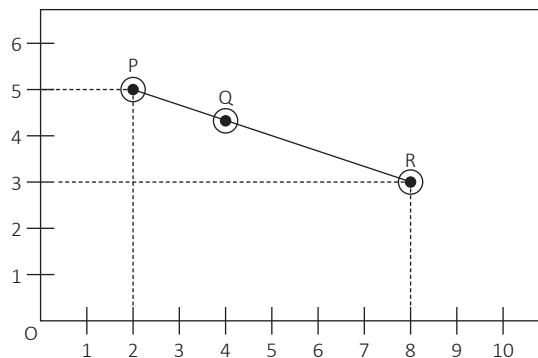
Read the text given below and answer the questions from 41-43.

A group of Class X students goes on a picnic during vacation, There are three different slides, and three friends, Ajay, Ram and Shyam, are sliding on them. The positions of the three friends are shown by P, Q and R in the given figure.

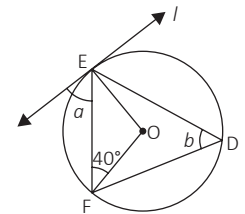
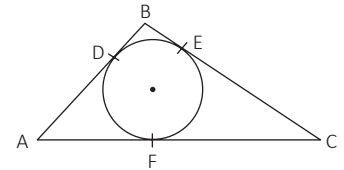
Consider O as origin, answer the questions:

41. The coordinates of the point 'Q' which divides the line segment PR in the ratio 1 : 2 internally are

(A)  $\left(4, \frac{13}{3}\right)$  (B)  $\left(\frac{13}{11}, \frac{11}{3}\right)$   
(C)  $\left(\frac{10}{3}, \frac{13}{3}\right)$  (D)  $\left(\frac{13}{3}, 4\right)$



42. The coordinates of the point on the x-axis, which is at equal distance from P and Q, are:  
 (A)  $\left(\frac{11}{9}, 0\right)$  (B) (3, 0) (C)  $\left(\frac{13}{9}, 0\right)$  (D) (1, 3)
43. If we shift origin 'O' by 2 units rightward and 1 unit upward, then the coordinates of point R is:  
 (A) (2, 6) (B) (6, 2) (C) (-6, 2) (D) (-2, 6)
44. A circle is inscribed in  $\triangle ABC$ , having  $AB = 10$  cm,  $BC = 12$  cm and  $CA = 18$  cm touching sides at D, E and F respectively. Then  $AD + BE + CF$  is equal to  
 (A) 16 cm (B) 20 cm  
 (C) 22 cm (D) 24 cm
45. Line  $l$  is tangent to the circle with centre O at a point E. If  $\angle OFE = 40^\circ$ , then the value of  $a$  is  
 (A)  $40^\circ$  (B)  $50^\circ$   
 (C)  $60^\circ$  (D)  $80^\circ$
46. A right triangle has hypotenuse ' $p$ ' cm and one side ' $q$ ' cm. If  $p - q = 1$ , the length of third side is  
 (A)  $\sqrt{q-2}$  cm (B)  $\sqrt{2q-1}$  cm (C)  $\sqrt{q+2}$  cm (D)  $\sqrt{2q+1}$  cm



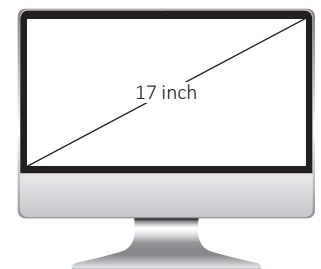
Read the text given below and answer the questions from 47-48.

Riya uses a square cardboard of side 50 cm to design a closed box (with a lid) by removing 4 congruent squares of side  $x$  cm from each corner and folding the flaps.

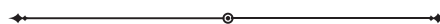
47. Write an expression for the surface area of the closed box (including the lid and base).  
 (A)  $2000 - 40x$  (B)  $200x - 8x^2$  (C)  $5000 - 200x$  (D)  $5000 - 400x$
48. Riya wants the surface area to be between  $2000 \text{ cm}^2$  and  $3000 \text{ cm}^2$ . Find the range of values of  $x$  that satisfies this condition.  
 (A)  $x > 15$  (B)  $15 < x < 20$  (C)  $0 < x < 10$  (D)  $10 < x < 15$

Read the text given below and answer the questions from 49-50.

A screen has a diagonal size of 17 inches. The height of the screen is 1 inch more than half of its width.



49. Form an equation to find the width ( $w$ ) of the screen.  
 (A)  $5w^2 + 4w - 1152 = 0$   
 (B)  $w^2 + 5w - 152 = 0$   
 (C)  $w^2 + w + 1 = 289$   
 (D) None of these
50. What are the height of the screen? (Round your answers to 1 decimal place).  
 (A) 14.8 inches (B) 8.4 inches (C) 7.4 inches (D) 12 inches



## SPACE FOR ROUGH WORK