2024-25ರ ಎಸ್.ಎಸ್.ಎಲ್.ಸಿ. ಮಾದರಿ ಪ್ರಶ್ನೆಪತ್ರಿಕೆ-2
S.S.L.C. MODEL QUESTION PAPER-2 – 2024-25

ವಿಷಯ : ಗಣಿತ

Subject : MATHEMATICS

(ಆಂಗ್ಲ ಮಾಧ್ಯಮ / English Medium)

ವಿಷಯ ಸಂಕೇತ : **81-E**   **Subject Code : 81-E**

ಸಮಯ : 3 ಗಂಟೆ 15 ನಿಮಿಷಗಳು]   [Time : 3 Hours 15 Minutes

ಗರಿಷ್ಠ ಅಂಕಗಳು : **80**]   [Max. Marks : **80**

General Instructions to the Candidate :

1. This question paper consists of 38 questions.

2. Follow the instructions given against the questions.

3. Figures in the right hand margin indicate maximum marks for the questions.

4. The maximum time to answer the paper is given at the top of the question paper. It includes 15 minutes for reading the question paper.

[Turn over

I. *Four* **alternatives are given for each of the following questions / incomplete statements. Choose the correct alternative and write the complete answer along with its letter of alphabet.**   **8 × 1 = 8**

1. The number of tangents that can be drawn to a circle at the point on its circumference is

    (A) many   (B) 3

    (C) 2   (D) 1

2. If *'a'* and *'b'* are two positive integers then the correct relation between HCF (a, b) and LCM (a, b) is

    (A) HCF (a, b) × LCM (a, b) = $a - b$

    (B) HCF (a, b) × LCM (a, b) = $a \times b$

    (C) HCF (a, b) + LCM (a, b) = $a + b$

    (D) HCF (a, b) − LCM (a, b) = $a \times b$

3. The number of solutions for a pair of linear equations $a_1 x + b_1 y + c_1 = 0$ and $a_2 x + b_2 y + c_2 = 0$ when $\dfrac{a_1}{a_2} \neq \dfrac{b_1}{b_2}$ is

    (A) 0   (B) 1

    (C) 2   (D) infinite

4. The nth term of an arithmetic progression is $3n - 1$. Its 8th term is

    (A) 25   (B) 10

    (C) 23   (D) 12

5. The maximum number of zeroes of a polynomial $P(x) = x^3 - 1$ is

   (A) 3

   (B) 0

   (C) 1

   (D) 2

6. The volume of a right circular based cylinder is 1540 cm^3 and its height is 10 cm. The area of its base is

   (A) 15·4 cm

   (B) 15·4 cm^2

   (C) 154 cm^2

   (D) 154 cm^3

7. The formula to find the mean for the grouped data by direct method is, $\bar{x}$ =

   (A) $\dfrac{\Sigma f_i x_i}{\Sigma f_i}$

   (B) $\dfrac{\Sigma f_i + x_i}{\Sigma f_i}$

   (C) $\dfrac{\Sigma f_i}{\Sigma f_i x_i}$

   (D $\dfrac{\Sigma f_i - x_i}{\Sigma f_i}$

8. $\dfrac{1 - \tan^2 45°}{1 + \tan^2 45°}$ is equal to

   (A) tan 90°

   (B) sin 45°

   (C) cos 0°

   (D) sin 0°

[Turn over

II. **Answer the following questions :** $8 \times 1 = 8$

9. Write the formula to find the sum of first n terms of an arithmetic progression whose first term is a and the last term is a_n.

10. Write the coordinates of the midpoint of the line segment joining the points $A(x_1, y_1)$ and $B(x_2, y_2)$.

11. The pair of linear equations $x + y - 4 = 0$ and $2x + by - 3 = 0$ have no solution. Find the value of 'b'.

12. Find the maximum length of the rod to completely measure the rods of lengths 24 m and 36 m.

13. Write the formula to find the surface area of a sphere.

14. If one of the zeroes of the polynomial $P(x) = x^2 + 7x + k$ is 2, then find the value of 'k'.

15. Find the value of the discriminant of the quadratic equation $x^2 + 4x + 4 = 0$.

16. In the figure, *'O'* is the centre of the circle and *CA* and *CB* are the tangents

    to the circle. If *AB = AC*, then find the measure of $\underline{|\ OAB}$.
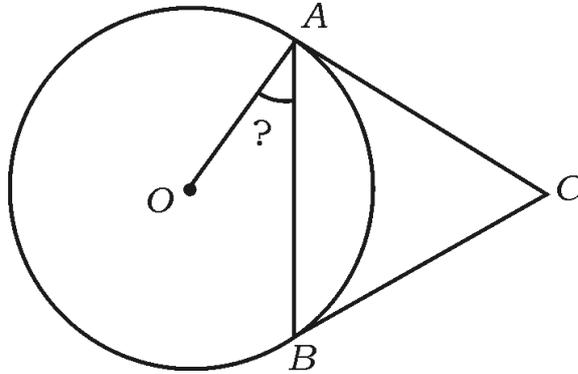
III. **Answer the following questions :**   **8 × 2 = 16**

17. Find the sum of first 20 terms of the arithmetic progression 4, 7, 10, ...

    using formula.

18. Solve the given pair of linear equations by elimination method :

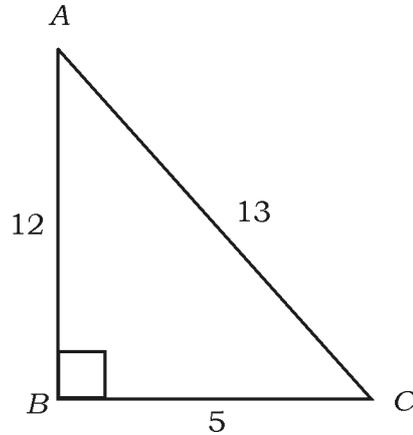 $2x + y = 8$

    $x - y = 1$

OR

    The difference between two positive numbers is 26 and if one number is

    three times the other then find the numbers.

[Turn over

19. In the figure, write the values of sin *C* and cos *A*.



20. Write the probability of

    (i)   a sure event

    (ii)   an impossible event.

21. Find the distance between the points (5, 6) and (1, 3) using distance formula.

22. A fair coin is tossed twice. Find the probability of getting at least one head.

23. Solve the quadratic equation $x^2 + 3x + 2 = 0$ by the method of factorization.

<div align="center">**OR**</div>

Find the value of '*k*' for which the quadratic equation $2x^2 + kx + 3 = 0$ has real equal roots.

24. In triangle ABC, $DE \parallel BC$. $AD = x$, $BD = x - 2$, $AE = x + 2$ and $CE = x - 1$.

Find the value of x and hence find $AD : DB$.
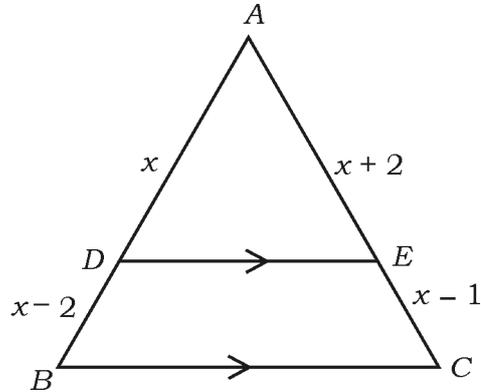
IV. **Answer the following questions :**   **9 × 3 = 27**

25. Prove that $\sqrt{3}$ is an irrational number.

26. Find the zeroes of the quadratic polynomial $P(x) = x^2 + 7x + 10$ and verify the relationship between the zeroes and the coefficients.

27. Calculate the mode for the following data :

Class interval	0-4	4-8	8-12	12-16	16-20	20-24
Frequency	7	3	7	10	1	2

OR

Calculate the median for the following grouped data :

Class interval	0 – 10	10 – 20	20 – 30	30 – 40	40 – 50
Frequency	2	4	8	5	1

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28. Prove that $\sqrt{\dfrac{1-\cos A}{1+\cos A}} + \sqrt{\dfrac{1+\cos A}{1-\cos A}} = 2 \operatorname{cosec} A.$
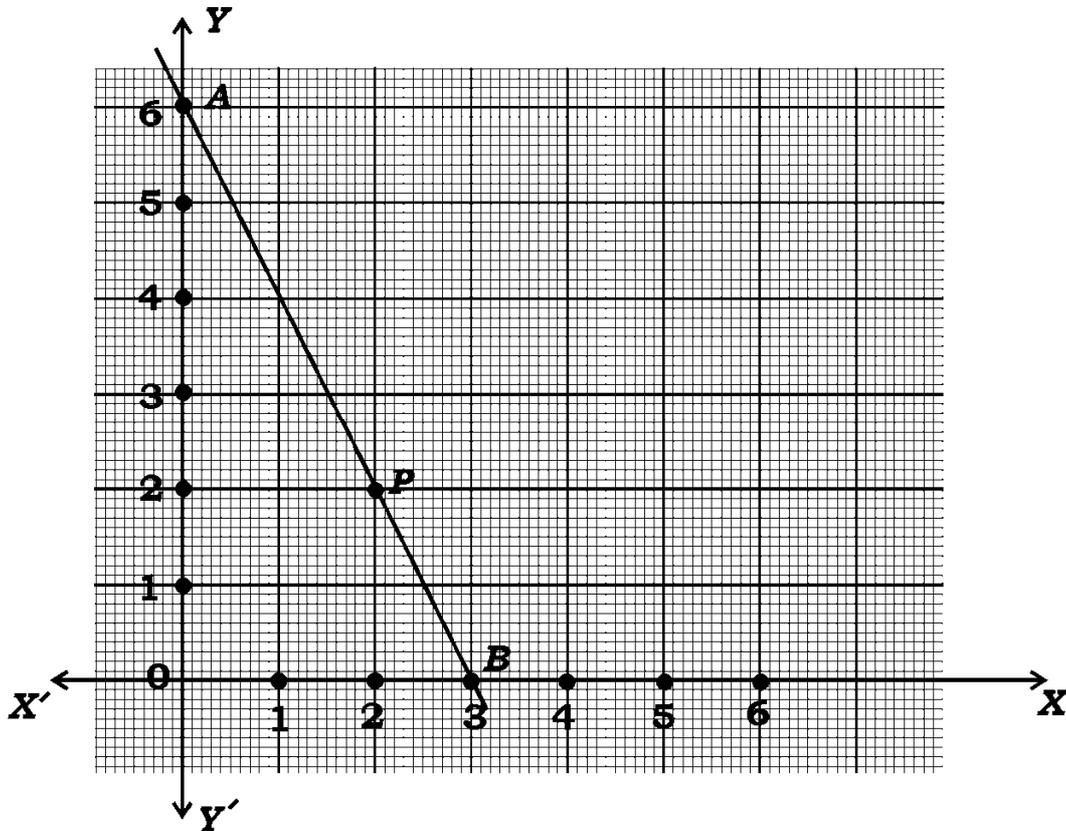
OR

Prove that $\dfrac{1}{\sec A - 1} + \dfrac{1}{\sec A + 1} = 2 \operatorname{cosec} A . \cot A$

29. The length of the minute hand in a clock is 14 cm. Find the area swept by the minute hand in 10 minutes.
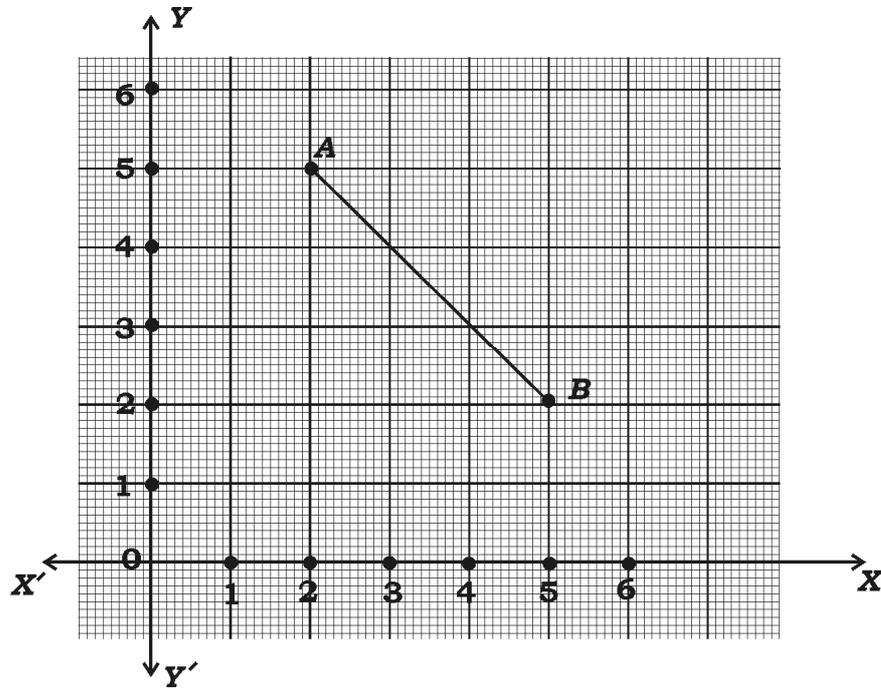
OR

Find the area of the quadrant of a circle whose radius is 20 cm and also find the perimeter of the quadrant.

30. In the figure, find the ratio in which the point 'P' divides the line segment AB using formula.


OR

Find the coordinates of the point which divides the line segment *AB* given in the figure, internally in the ratio 1 : 2 using section formula.

31. Prove that "The tangent at any point of a circle is perpendicular to the radius through the point of contact".

32. A student bought some books for Rs. 60. Had he bought 5 more books for the same amount each book would have cost Re. 1 less. Then find the number of books bought by him.

33. In the figure *A, B* and *C* are the points on *OP, OQ* and *OC* respectively. If *AB || PQ* and *AC || PR*, then show that *BC || QR*.

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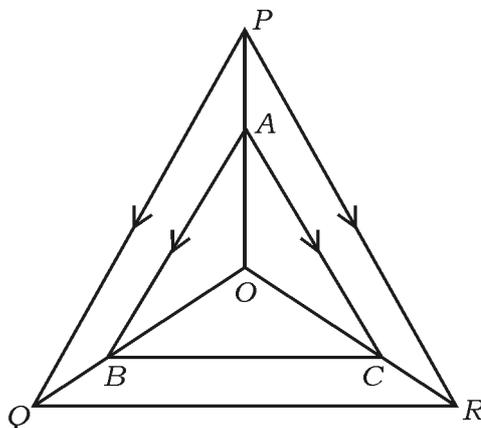
V.   **Answer the following questions :**   **4 × 4 = 16**

34. The 8th term of an arithmetic progression is half of its second term and 11th term of the progression exceeds one third of its 4th term by 1. Find the 15th term of the progression.

<div align="center">OR</div>

An arithmetic progression consists of 37 terms. If the sum of its 3 middle terms is 225 and sum of its last 3 terms is 429, then find the progression.

35. Solve the given pair of linear equations by graphical method :

$2x + y = 6$

$x + y = 4$

36. "If one angle of a triangle is equal to one angle of the other triangle and the sides including these angles are proportional then prove that the two triangles are similar."

37. A rope is tied from the tip of a vertical pole of length 37 m to a peg on a level ground. Another rope is tied to the same pole little below from its tip to a peg on the ground opposite to it as shown in the figure. Each rope is making an angle 30° with the ground. If the difference of the lengths of the ropes is 8 m, then find the height of the pole at which the shorter rope is tied. Also find the lengths of the ropes.
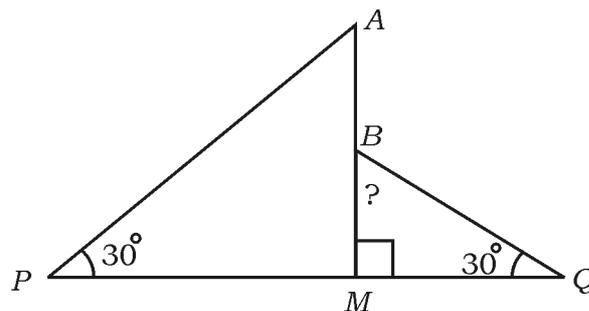
VI. Answer the following question :   **1 × 5 = 5**

38. The tent of a circus company is built by canvas cloth such that a cone is

surmounted on the cylindrical shape. If the height of the cylindrical shape

is 9 m, the diameter of the base of the tent is 30 m and the total height of

the tent is 17 m, then find the —

(a) area of the ground occupied by the tent

(b) area of the canvas cloth used for building the tent.

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