ST. JOHN'S HIGH SCHOOL
SECTOR 26, CHANDIGARH
CLASS- X
MATHEMATICS
PREBOARD –I (2025-26)

Time Allowed: 3 Hrs. M M: 80

General Instructions:

1. This Question Paper has 5 Sections A-E.
2. Section A has 20 MCQs carrying 1 mark each
3. Section B has 5 questions carrying 02 marks each.
4. Section C has 6 questions carrying 03 marks each.
5. Section D has 4 questions carrying 05 marks each.
6. Section E has 3 case based integrated units of assessment (04 marks each) with sub-parts of the values of 1, 1 and 2 marks each respectively.

SECTION A

1. If the distance between the points (4, p) and (1, 0) is 5 units, then the value of p is

(a) 4 (b) ± 4 (c) -4 (d) 0

2. If A(1,3), B(-1,2), C(2,5) and D(x,4) are the vertices of a ||gm ABCD then the value of x is

(a) 3 (b) 4 (c) 0 (d) 3/2

3. If the zeroes of the quadratic polynomial $x^2 + (a + 1)x + b$ are 2 and -3, then

(a) $a = -7, b = -1$ (b) $a = 5, b = -1$

(c) $a = 2, b = -6$ (d) $a = 0, b = -6$

4. If α, β are the zeroes of $2x^2 + 6x - 6$, then

(a) $\alpha + \beta = -\alpha\beta$ (b) $\alpha + \beta = \alpha\beta$

(c) $\alpha + \beta < \alpha\beta$ (d) $\alpha + \beta > \alpha\beta$

5. If a pair of linear equations is consistent, then the lines are:

(a) Parallel (b) Always coincident

(c) Always intersecting (d) Intersecting or coincident

6. The number of terms in the AP: 20,25,30 ……,140 are

(a) 22 (b) 25 (c) 23 (d) 24

7. A circle touches all the four sides of quadrilateral ABCD with AD = 3cm, BC = 7 cm and CD = 4 cm, then length of AB is

(a) 3 cm (b) 4 cm (c) 5 cm (d) 6 cm

8. The two consecutive odd integers, sum of whose squares is 290 are

(a) 13,15 (b) 11,13 (c) 7,9 (d) 5,7

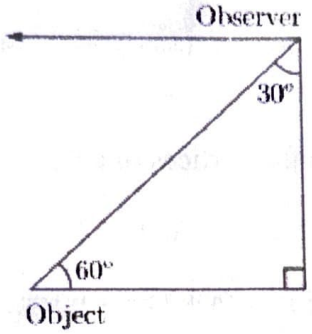
9. PQRS is a Trapezium with PQ || SR and diagonals intersect at point O. Also, OP = x – 1, OR = x – 2, OQ = x + 5, OS = x + 3. The value of 'x' is:

(a) 7 (b) 5 (c) 6 (d) 3

10. If $\text{cosec } \theta - \cot \theta = \frac{1}{3}$, then the value of $(\text{cosec } \theta + \cot \theta)$ is

(a) 1 (b) 2 (c) 3 (d) 4

11. In the given figure, the positions of the observer and the object are mentioned, the angle of depression is



(a) 30° (b) 90° (c) 60° (d) 45°

12. cos 1° × cos 2° × cos 3° ×……× cos 90° is equal to:

(a) 0 (b) 1 (c) ½ (d) -1

13. A pendulum swings through an angle of 60^0 and describes an arc 8.8 cm in length. The length of the pendulum is

(a) 4.2 cm (b) 2.1 cm (c) 8.4 cm (d) 6.3 cm

14. A piece of paper is in the shape of a semi-circular region of radius 10 cm. It is rolled to form a right circular cone. The slant height is

(a) 5 cm (b) 10 cm (c) 15 cm (d) 20 cm

15. If the area and circumference of a circle are numerically equal, then the diameter of the circle is:

(a) 3 units (b) 5 units (c) 4 units (d) 2 units

16. The mean and mode of a frequency distribution are 28 and 16 respectively. The median is

(a) 24.5 (b) 24 (c) 23.5 (d) 2

17. 2 cards of hearts and 4 cards of spades are missing from a pack of 52 cards. A card is drawn at random from the remaining pack. The probability of drawing a black card is

(a) $\frac{22}{52}$ (b) $\frac{22}{46}$ (c) $\frac{24}{52}$ (d) $\frac{24}{46}$

18. The probability of getting a bad egg in a lot of 400 is 0.035. The number of bad eggs in the lot is

(a) 7 (b) 21 (c) 14 (d) 28

NOTE: In question number 19 and 20, a statement of **ASSERTION(A)** is followed by a statement of **REASON(R)**. Choose the correct option.

19. Assertion(A): PA and PB are two tangents to a circle with centre O. Such that $< AOB = 110^{\circ}$,

then $< APB = 90^{\circ}$.

Reason(R) : The length of two tangents drawn from an external point are equal.

(a) Both A and R are true, and R is the correct explanation of the assertion.

(b) Both A and R are true, but R is not the correct explanation of the assertion.

(c) A is true, but R is false.

(d) A is false, but R is true.

20. Assertion(A): The H.C.F. of two numbers is 16 and their product is 2592. Then their L.C.M. = 162.

Reason(R): If a and b are two positive integers, then H.C.F. × L.C.M. = a × b.

(a) Both A and R are true, and R is the correct explanation of the assertion.

(b) Both A and R are true, but R is not the correct explanation of the assertion.

(c) A is true, but R is false.

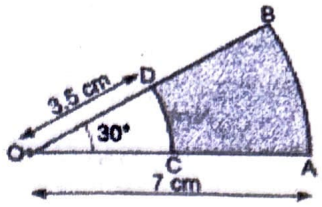
(d) A is false, but R is true.

SECTION B

21. If $4x + 6y = 15$ and $6x - 8y = 14$, find the value of $3x - 2y$.

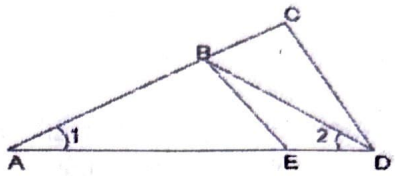
22. Prove that the tangents drawn at the ends of a diameter of a circle are parallel.

23. Find the area of the shaded region (using the given figure) enclosed between sectors of two concentric circles.



24. In the given figure, $\frac{AD}{AE} = \frac{AC}{BD}$ and $\angle 1 = \angle 2$.

Show that $\Delta BAE \sim \Delta CAD$.



25. If $\cos x = \frac{\sqrt{3}}{2}$, then find the value of $3 \sin x - 4 \sin^3 x$

SECTION C

26. Prove that: $\frac{\sin\theta}{1+\cos\theta} + \frac{1+\cos\theta}{\sin\theta} = 2 \operatorname{cosec}\theta$

27. The faces of a red cube and a yellow cube are numbered 1 to 6. Both cubes are rolled together. Find the probability that

(i) top face of each cube has the same number

(ii) sum of numbers appearing on the top faces is 9

(iii) top face of each cube has even number

28. The length, breadth and height of a room are 825 cm, 675 cm and 450 cm respectively. Find the length of the longest tape which can measure the three dimensions of the room exactly.

29. 200 logs are stacked in the following manner: 20 logs in the bottom row, 19 in the next row, 18 in the row next to it and so on. In how many rows are the 200 logs placed and how many logs are in the top row?

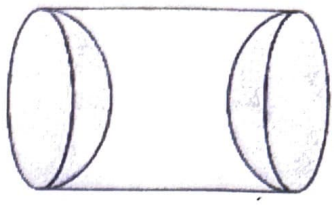
30. If α, β are zeroes of quadratic polynomial $5x^2 + 5x + 1$, then find the value of

a) $\alpha^2 + \beta^2$ b) $\frac{1}{\alpha} + \frac{1}{\beta}$

31. Prove that opposite sides of a quadrilateral circumscribing a circle subtend supplementary angles at the centre of the circle.

SECTION D

32. A wooden article was made by scooping out a hemisphere from each end of a solid cylinder, as shown in figure.



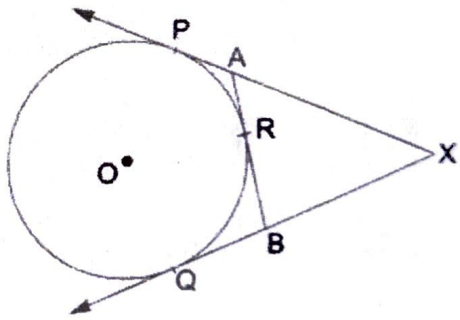
If the length of the cylinder is 10 cm and its base is of radius 3.5 cm, find the total surface area of the article. Also, find the volume of the wood required to make the article.

33. The mean of the following frequency distribution is 18. Find the missing frequency 'f'. Hence, find the mode of this distribution.

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

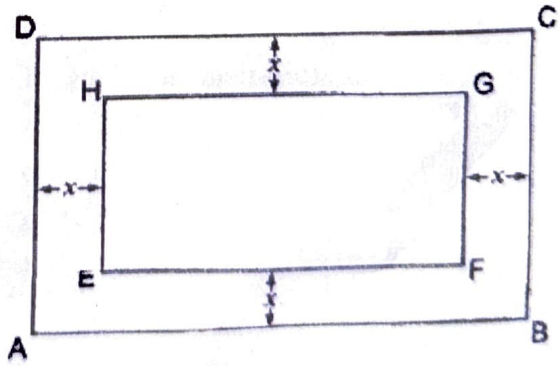
34. a) Prove that the lengths of tangents drawn from an external point to a circle are equal.

b) XP and XQ are two tangents to the circle with centre O, drawn from an external point X. ARB is another tangent, touching the circle at R. Prove that XA+ AR= XB+ BR



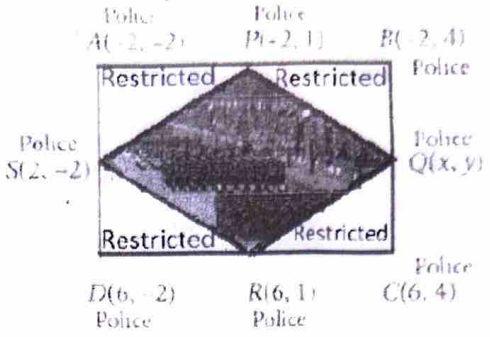
35. In a rectangular park of dimensions 50m X 40m, a rectangular pond is constructed so that the area of the grass strip of uniform width surrounding the pond would be 1184m^2.

Find the length and breadth of the pond.



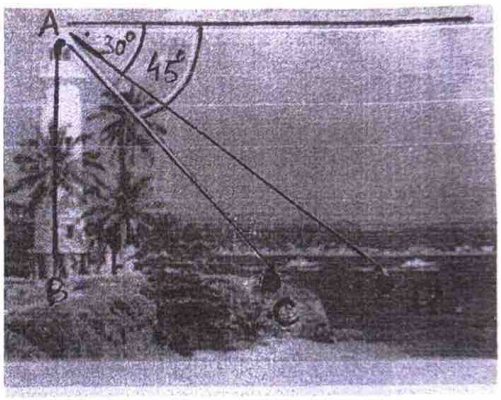
SECTION E
(Case Study Based Questions)

36. In order to facilitate smooth passage of the parade, movement of traffic on certain roads leading to the route of the Parade and Tableaux were restricted. To avoid traffic on the road Delhi Police decided to construct a rectangular route plan, as shown in the figure.



(i) If Q is the midpoint of BC, then what are the coordinates of Q?
(ii) What is the length of the sides of quadrilateral PQRS?
(iii) What is the length of route PQRS? (1+2+1)

37.An observer on the top of a 40m tall light house (including height of the observer) observes a ship at an angle of depression 30° coming towards the base of the light house along straight line joining the ship and the base of the light house. The angle of depression of ship changes to 45° after 6 seconds.



(i) Find the distance of ship from the base of the light house after 6 seconds from the initial position when angle of depression is 45°.
(ii) Find the distance of ship from the base of the light house when angle of depression is 30°.
(iii) Find the distance (correct to two places of decimal) between two positions of ship after 6 seconds?

(1+1+2)

38. Ms. Sheela visited a store near her house and found that the glass jars are arranged one above the other in a specific pattern. On the top layer there are 3 jars. In the next layer there are 6 jars. In the 3rd layer from the top, there are 9 jars and so on till the 8th layer. On the basis of the above information, answer the following questions:

(i) Write an A.P whose terms represent the number of jars in different layers starting from top. Also, find the common difference.
(ii) Is it possible to arrange 34 jars in a layer if this pattern is continued? Justify your answer.
(iii) If there are 'n' number of rows in a layer, then find the expression for finding the total number of jars in terms of 'n'. Hence find S_8. (1+1+2)