

SAMPLE PAPER – 2 CBSE BOARD CLASS - X MATHS

Time : 3 Hours

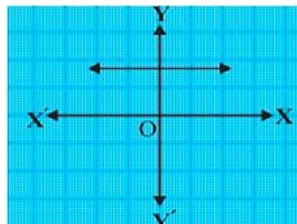
Max. Marks : 80

General Instructions:

1. This Question Paper has 5 Sections A, B, C, D, and E.
2. Section A has 20 MCQs carrying 1 mark each.
3. Section B has 5 questions carrying 2 marks each.
4. Section C has 6 questions carrying 3 marks each.
5. Section D has 4 questions carrying 5 marks each.
6. Section E has 3 Case Based integrated units of assessment (4 marks each) with sub-parts of the values of 1, 1 and 2 marks each respectively.
7. All Questions are compulsory. However, an internal choice in 2 questions of 2 marks, 2 questions of 3 marks and 2 Questions of 5 marks has been provided. An internal choice has been provided in the 2 Questions of 2 marks of Section E.

SECTION – A

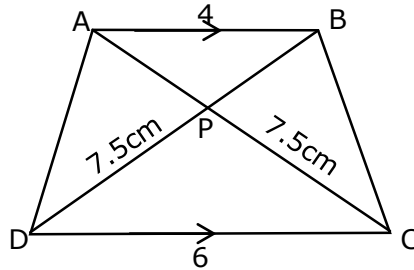
1. If the LCM of a and 18 is 36 and the HCF of a and 18 is 2, then a =
(A) 1 (B) 2 (C) 4 (D) 3
2. The graph of $y = p(x)$ in a figure given below, for some polynomial $p(x)$. Find the number of zeroes of $p(x)$.



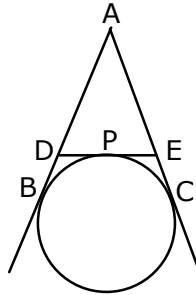
- (A) 4 (B) 0 (C) 1 (D) 2
3. The number of solutions of two linear equations representing intersecting lines is/are -

(A) 1 (B) 2 (C) 0 (D) ∞
 4. If the equation $x^2 - bx + 1 = 0$ does not possess real roots, then -
(A) $-3 < b < 3$ (B) $b > 2$ (C) $-2 < b < 2$ (D) $b < -2$

5. The first term of an A.P., if its $S_n = n^2 + 2n$ is -
 (A) 0 (B) 1 (C) 3 (D) 2
6. The distance of the point (4, 7) from the y-axis is -
 (A) 11 (B) 4 (C) $\sqrt{65}$ (D) 7
7. The coordinates of the fourth vertex of the rectangle formed by the points (0, 0)(2, 0), (0, 3) are
 (A) (2, 3) (B) (3, 0) (C) (3, 2) (D) (0, 2)
8. In the given figure, AP is equal to -



- (A) 7cm (B) 6cm (C) 5cm (D) 5.5cm
9. In the given figure, AB = 8cm. If PE = 3 cm, then the measure of AE is -

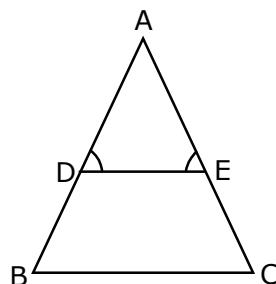


- (A) 3cm (B) 11cm (C) 5cm (D) 7cm
10. AP and PQ are tangents drawn from a point A to a circle with centre O and radius 9cm. If OA = 15cm, then AP + AQ =
 (A) 18cm (B) 36cm (C) 12cm (D) 24cm
11. $9 \sec^2 A - 9 \tan^2 A =$
 (A) 9 (B) 1 (C) 0 (D) 99
12. If $x \tan 45^\circ \cos 60^\circ = \sin 60^\circ \cot 60^\circ$, then x is equal to -
 (A) $\frac{1}{2}$ (B) 1 (C) $\frac{1}{\sqrt{2}}$ (D) $\sqrt{3}$
13. From the top of a building 60m high, the angles of depression of the top and the bottom of a tower are observed to be 30° and 60° . The height of the tower is -
 (A) 40m (B) 60m (C) 45m (D) 50m
14. If the area of a sector of a circle is $\frac{7}{20}$ of the area of the circle, the sector angle is equal to -
 (A) 110° (B) 100° (C) 130° (D) 126°

15. A piece of wire 20cm long is bent into the form of an arc of a circle subtending an angle of 60° at its centre. The radius of the circle is -
 (A) $\frac{20}{6+\pi}$ cm (B) $\frac{30}{6+\pi}$ cm (C) $\frac{60}{\pi}$ cm (D) $\frac{13}{6+\pi}$ cm
16. The probability of an impossible event is -
 (A) $\frac{1}{2}$ (B) not defined (C) 0 (D) 1
17. From a well shuffled pack of 52 cards, one card is drawn at random. The probability of getting a black king is -
 (A) None of these (B) $\frac{1}{26}$ (C) $\frac{1}{13}$ (D) $\frac{2}{39}$
18. 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) 22
19. **Assertion (A):** A piece of cloth is required to completely cover a solid object. The solid object is composed of a hemisphere and a cone surmounted on it. If the common radius is 7m and height of the cone is 1m, 463.39 cm^2 is the area of cloth required.
Reason (R): Surface area of hemisphere = $2\pi r^2$.
 (A) Both A and R are true and R is the correct explanation of A.
 (B) Both A and R are true but R is not the correct explanation of A.
 (C) A is true but R is false.
 (D) A is false but R is true.
20. **Assertion (A):** Common difference of an AP in which $a_{21} - a_7 = 84$ is 14
Reason (R): n^{th} term of AP is given by $a_n = a + (n - 1)d$
 (A) Both A and R are true and R is the correct explanation of A.
 (B) Both A and R are true but R is not the correct explanation of A.
 (C) A is true but R is false.
 (D) A is false but R is true.

SECTION – B

21. What is the smallest number which when divided by 20, 25, 35 and 40 leaves a remainder of 14, 19, 29 and 34 respectively.
22. In given figure $\angle D = \angle E$ and $\frac{AD}{DB} = \frac{AE}{EC}$. Prove that BAC is an isosceles triangle.



23. PQ is a tangent drawn from a point P to a circle of centre O and QOR is a diameter of the circle such that $\angle POR = 110^\circ$, Find $\angle OPQ$.
24. Prove the trigonometric identity: $\frac{\sec\theta - 1}{\sec\theta + 1} = \left(\frac{\sin\theta}{1 + \cos\theta} \right)^2$

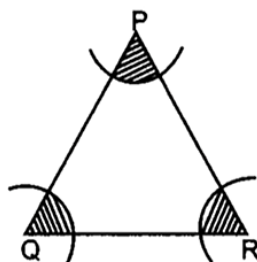
OR

Evaluate: $\cot^2 30^\circ - 2\cos^2 30^\circ - \frac{3}{4}\sec^2 45^\circ + \frac{1}{4}\operatorname{cosec}^2 30^\circ$

25. A car has two wipers which do not overlap. Each wiper has a blade of length 25cm sweeping through an angle of 115° . Find the total area cleaned at each sweep of the blades.

OR

In figure, arcs have been drawn with radii 14 cm each and with centres P, Q and R. Find the area of the shaded region.



SECTION – C

26. In a school there are two sections, namely A and B, of class X. There are 30 students in section A and 28 students in section B. Find the minimum number of books required for their class library so that they can be distributed equally among students of section A or section B.
27. Find a quadratic polynomial whose sum and product of the zeroes are $\frac{-3}{2\sqrt{5}}$, $-\frac{1}{2}$ respectively. Also find the zeroes of the polynomial by factorization.
28. If we add 1 to the numerator and subtract 1 from the denominator, a fraction reduces to 1. It becomes $\frac{1}{2}$ if we only add 1 to the denominator. What is the fraction? Solve the pair of the linear equation obtained by the elimination method.

OR

Graphically, solve the following pair of equations:

$$2x + y = 6$$

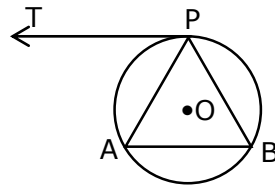
$$2x - y + 2 = 0$$

Find the ratio of the areas of the two triangles formed by the lines representing these equations with x-axis and the lines with the y-axis.

29. If all the sides of a parallelogram touch a circle, show that the parallelogram is a rhombus.

OR

A tangent PT is drawn parallel to a chord AB as shown in figure. Prove that APB is an isosceles triangle.



30. Prove: $\sin^6 A + 3 \sin^2 A = 1 - \cos^6 A$
31. Find median for the following data:

Class Interval	Frequency
10 - 19	2
20 - 29	4
30 - 39	8
40 - 49	9
50 - 59	4
60 - 69	2
70 - 79	1

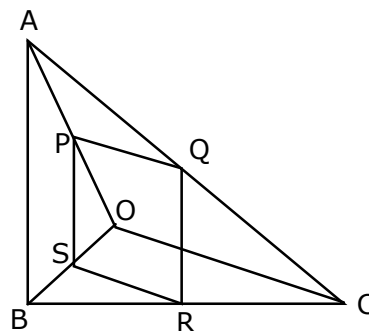
SECTION - D

32. Solve $\frac{x-1}{2x+1} + \frac{2x+1}{x-1} = 2$, $x \neq -\frac{1}{2}, 1$

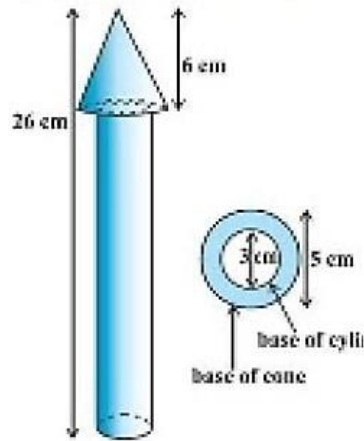
OR

In a flight of 600km, an aircraft was slowed down due to bad weather. Its average speed for the trip was reduced by 200 km/hr and the time of flight was increased by 30 minutes. Find the duration of flight.

33. In the figure, if PQRS is a parallelogram and $AB \parallel PS$, the prove that $OC \parallel SR$.



34. A wooden toy rocket is in the shape of a cone mounted on a cylinder as shown in given figure. The height of the entire rocket is 26cm, while the height of the conical part is 6 cm. The base of the conical portion has a diameter of 5 cm, while the base diameter of the cylindrical portion is 3 cm. If the conical portion is to be painted orange and the cylindrical portion yellow, find the are of the rocket painted with each of these colors. (Take $\pi = 3.14$)



OR

An iron pillar consists of a cylindrical portion 2.8m high and 20 cm in diameter and a cone 42 cm high is surrounding it. Find the weight of the pillar, given that 1cm^3 of iron weighs 7.5g.

35. Find the median from the following data:

Class	1-5	6-10	11-15	16-20	21-25	26-30	31-35	36-40	41-45
Frequency	7	1	16	32	24	16	11	5	2

Hint: Convert it to exclusive form.

SECTION – E

36. Read the text carefully and answer the questions:

In a potato race, a bucket is placed at the starting point, which is 5 cm from the first potato, and the other potatoes are placed 3 m apart in a straight line. There are ten potatoes in the line. A competitor starts from the bucket, picks up the nearest potato, runs back with it, drops it in the bucket, runs back to pick up the next potato, runs to the bucket to drop it in, and she continues in the same way until all the potatoes are in the bucket. What is the total distance the competitor has to run ?



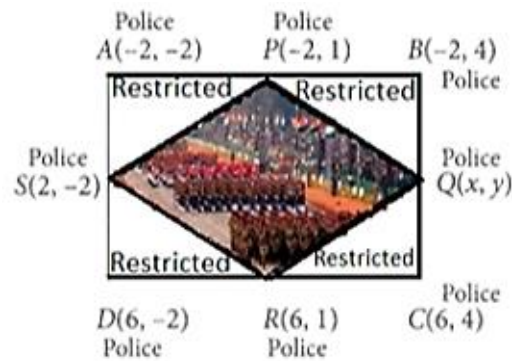
- (i) Find the terms of AP formed in above situation.
 (ii) What is the total distance the competitor has to run ?

OR

- (ii) Find distance cover after 4 potato drop in the bucket ?

37. **Read the text carefully and answer the questions:**

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



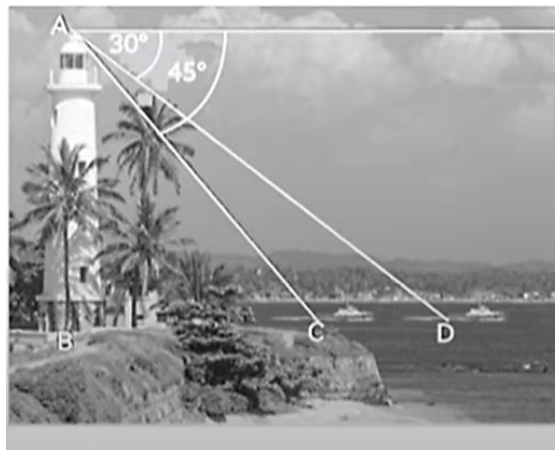
- (i) If Q is the mid-point of BC, then what are the coordinates of Q ?
 (ii) What is the length of the sides of quadrilateral PQRS ?

OR

- What is the length of route ABCD ?
 (iii) What is the length of route PQRS ?

38. Read the text carefully and answer the questions:

An observer on the top of a 40m tall light house (including height of the observer) observer 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 between two position of ship after 6 seconds ?

OR

Find the distance of ship from the base of the light house when angle of depression is 30° .