CBSE
Class X Mathematics (Standard)
Sample Paper – 3 (2024-25)

Time: 3 Hours **Total Marks: 80**

General Instructions:

1. This Question Paper has 5 Sections A - E.
2. Section A has 18 multiple choice questions and 2 Assertion-Reason based questions 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 subparts of the values of 1, 1 and 2 marks each respectively.
7. All Questions are compulsory. However, an internal choice in 2 Qs of 5 marks, 2 Qs of 3 marks and 2 Questions of 2 marks has been provided. An internal choice has been provided in the 2 marks questions of Section E.
8. Draw neat figures wherever required. Take π = 22/7 wherever required if not stated.

Section A

Section A consists of 20 questions of 1 mark each.

Choose the correct answers to the questions from the given options. **[20]**

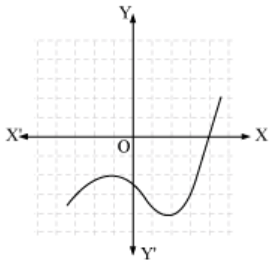
1. If 'a' and 'b' are two prime numbers, what is their HCF?

   A. a
   B. b
   C. 1
   D. Ab

2. Find the value of k for which x = 1 is a root of the equation $x^2 + kx + 3 = 0$.

   A. 4
   B. 3
   C. -4
   D. -3

3. The graph of y = p(x) is given in the following figure for some polynomial p(x). Find the number of zeroes of p(x).

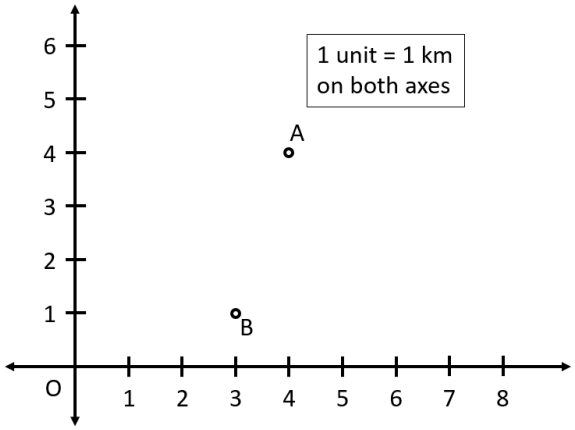


A. 2
B. 1
C. 0
D. 3

4. A two-digit number has the sum of digits 10. If the difference between digits is 2, then the number is
A. 91
B. 82
C. 73
D. 64

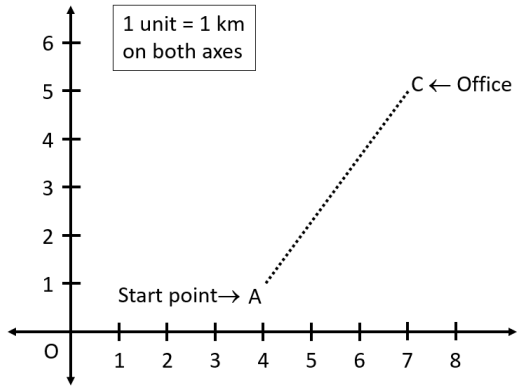
5. Find the value of a so that the point (3, a) lies on the line represented by 2x – 3y = 5.
A. -3
B. -1/3
C. 3
D. 1/3

6. The position of Atul (A) and Bipin (B) is shown by the graph below.



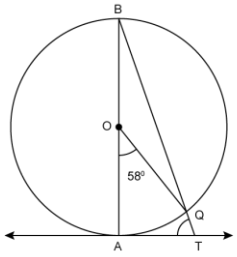
Find the distance between their positions.
A. $5\sqrt{2}$ km
B. $2\sqrt{5}$ km
C. $\sqrt{10}$ km
D. 10 km

7. Amey travels to office daily (refer to the graph). Half way along the path lies the house of his friend Raju. Find the co-ordinates of Raju's house.



A. (4.5, 2)
B. (2, 4.5)
C. (3, 5.5)
D. (5.5, 3)

8. In the given figure, AB is a diameter of a circle with centre O and AT is a tangent. If ∠AOQ = 58°, find ∠ATQ.



A. 29°
B. 58°
C. 61°
D. 90°

9. ΔABC ~ ΔDEF, such that AB = 3 cm, BC = 2 cm, CA = 2.5 cm, EF = 4 cm. The perimeter of ΔABC is
A. 15 cm
B. 20 cm
C. 12 cm
D. 18 cm

10. All equilateral triangles are _____ to each other
A. equal
B. congruent
C. similar
D. None of above

11. Arjun was writing down the values of cot θ, for the different angles. He knew that cot θ was not defined for a particular angle, but couldn't remember it. So what is this particular angle?
A. 0°
B. 30°
C. 60°
D. 90°

12. $2 \sin 2A = \sqrt{3}$, then the value of A is
    A. 30°
    B. 45°
    C. 60°
    D. 90°

13. $\cos^4 \theta - \sin^4 \theta =$
    A. $2\cos^2 \theta - 1$
    B. $1 - 2\sin^2 \theta$
    C. Both A and B
    D. None of these

14. Find the area of a sector with radius 7 cm and central angle 90°
    A. 38 cm^2
    B. 39 cm^2
    C. 38.5 cm^2
    D. 37.5 cm2

15. Find the volume of a right circular cone of height 70 cm and radius 9 cm.
    A. 5490 cm^3
    B. 5940 cm^3
    C. 5740 cm^3
    D. 5690 cm^3

16. Find the mode

Marks obtained	Frequency
11	11
20	15
23	20
25	30
29	14
30	10

    A. 20
    B. 23
    C. 25
    D. 29

17. A letter is chosen at random from the letters P, R, O, G, R, E, S, I, O and N. Find the probability that the chosen letter is a vowel.
    A. 5/2
    B. 2/5
    C. 1/5
    D. 3/5

18. If a point (c, d) lies in the 3rd quadrant, which of the following is true?
    A. c is positive and d is negative
    B. both c and d are positive
    C. both c and d are negative
    D. c is negative and d is positive

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

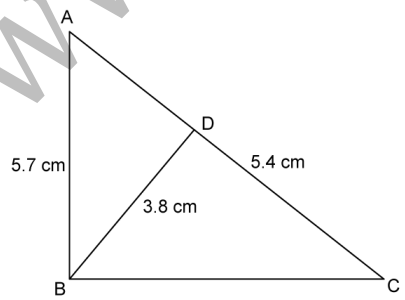
19. **Statement A (Assertion):** The length of a chain used as the boundary of a semi-circular park is 90 m. Hence the area of the park will be 481.25 m^2.
    Statement R (Reason): If the radius of the circle is 'r', then, $\pi r + 2r = 90$.
    A. Both assertion (A) and reason (R) are true and reason (R) is the correct explanation of assertion (A)
    B. Both assertion (A) and reason (R) are true and reason (R) is not the correct explanation of assertion (A)
    C. Assertion (A) is true but reason (R) is false.
    D. Assertion (A) is false but reason (R) is true.

20. **Statement A (Assertion):** If (p – q), p and (p + q) are the zeros of the polynomial $x^3 - 12x^2 + 19x - 28$, then the value of p is –4.
    Statement R (Reason): Sum of the zeros $= -\frac{\text{Coefficient of } x^2}{\text{Coefficient of } x^3}$
    A. Both assertion (A) and reason (R) are true and reason (R) is the correct explanation of assertion (A).
    B. Both assertion (A) and reason (R) are true and reason (R) is not the correct explanation of assertion (A).
    C. Assertion (A) is true but reason (R) is false.
    D. Assertion (A) is false but reason (R) is true.

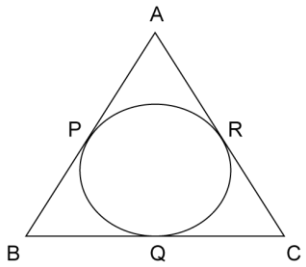
Section B

21. If HCF (185, 25) = 5, then find LCM (185, 25). [2]

22. In the given figure, $\angle ABC = 90°$ and $BD \perp AC$. If AB = 5.7 cm, BD = 3.8 cm and CD = 5.4 cm, find BC. [2]



23. A circle is inscribed in a ΔABC, touching AB, BC and AC at P, Q and R, respectively. If AB = 10 cm, AR = 7 cm and CR = 5 cm, find the length of BC. [2]



24. Prove: $\frac{\sin\theta}{\text{cosec }\theta} + \frac{\cos\theta}{\sec\theta} = 1$ [2]

OR

Show that $\cos 1° \cos 2° \cos 3° \ldots\ldots \cos 180° = 0$

25. The inner circumference of a circular track is 440 m, and the track is 14 m wide. Calculate the length of the outer boundary of the track. [2]

OR

A chord of a circle of radius 10 cm subtends a right angle at the centre. Find the area of the corresponding minor sector. (Use $\pi = 3.14$)

Section C

Section C consists of 6 questions of 3 marks each.

26. In a seminar, the number of participants in Hindi, English and Mathematics is 60, 84 and 108, respectively. Find the minimum number of rooms required, if in each room the same number of participants are to be seated and all of them being in the same subject. [3]

27. Find the zeroes of the quadratic polynomials $4s^2 - 4s + 1$ and verify the relationship between the zeroes and the coefficients. [3]

28. A train travels a distance of 480 km at a uniform speed. If the speed had been 8 km/h less, then it would have taken 3 hours more to cover the same distance. We need to find the speed of the train. [3]

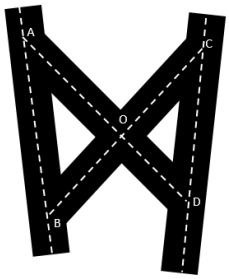
OR

Find the four angles of a cyclic quadrilateral ABCD in which $\angle A = (x + y + 10)°$, $\angle B = (y + 20)°$, $\angle C = (x + y - 30)°$ and $\angle D = (x + y)°$.

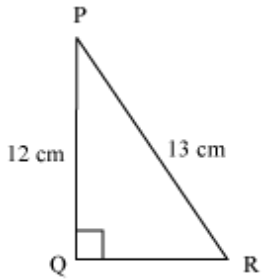
29. Raja is walking away from the base of a lamp-post at a speed of 2 m/s. If the lamp is 3 m above the ground, find the length of his shadow after 4 seconds, if Raja's height is 90 cm. [3]

OR

We have a system of intersecting roads as shown in the figure.
If AO = 6 m, OB = 4 m, AB = 8 m, OD = 2 m and OC = 3 m, then find the length of CD.



30. In the given figure find tan P – cot R. [3]



31. Two dice are thrown simultaneously. What is the probability that [3]
    i. 5 will not come up on either of them?
    ii. 5 will not come up on at least one?
    iii. 5 will come up at both dice?

Section D

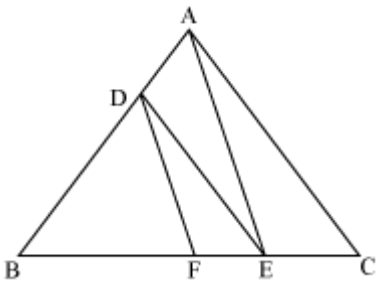
Section D consists of 4 questions of 5 marks each.

32. In a class test, the sum of Kamal's marks in Mathematics and English is 40. Had he got 3 marks more in Mathematics and 4 marks less in English, the product of the marks would have been 360. Find his marks in two subjects separate. [5]

OR

A passenger train takes 2 hours less for a journey of 300 km if its speed is increased by 5 km/hr from its usual speed. Find its usual speed.

33. In figure, DE || AC and DF || AE. Prove that $\frac{BF}{FE} = \frac{BE}{EC}$ [5]



34. A tent is in the shape of a right circular cylinder up to a height of 3 m and conical above it. The total height of the tent is 13.5 m, and the radius of its base is 14 m. Find the cost of cloth required to make the tent at the rate of Rs. 80 per square metre. Take $\pi = 22/7$. [5]

OR

A toy is in the form of a cone of radius 3.5 cm mounted on a hemisphere of same radius. The total height of the toy is 15.5 cm. Find the total surface area of the toy.

35. Consider the following distribution of daily wages of 50 workers in a factory. [5]

Daily wages (in Rs)	100 – 120	120 – 140	140 –160	160 – 180	180 – 200
Number of workers	12	14	8	6	10

Find the mean daily wages of the factory workers using an appropriate method.

Section E

Case study based questions are compulsory.

36. India is competitively manufacturing location due to the low cost of manpower and strong technical and engineering capabilities contributing to higher quality production runs. The production of TV sets in a factory increases uniformly by a fixed number every year. It produced 16000 sets in 6^{th} year and 22600 in 9^{th} year.

Based on the above information, answer the following questions.

i. Find the production during first year. [2]

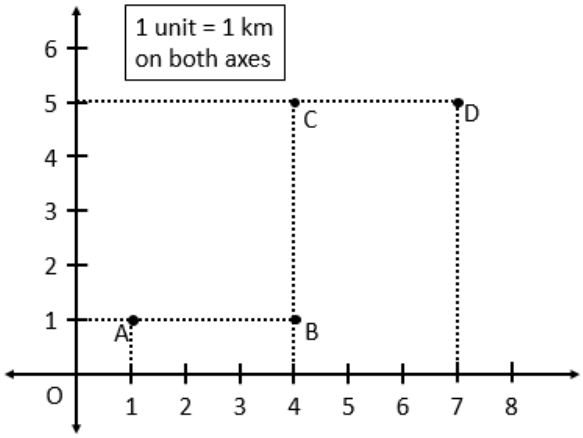
OR

Find the difference in production between two consecutive years. [2]

ii. Find the production during 8^{th} year. [1]

iii. Find the production during first 3 years. [1]

37. Amey runs a grocery store that offers home delivery of fresh groceries to its customers. His store is located at location A as indicated in the graph below. Now, he receives regular orders from the families living in the colonies located at B, C and D. Now, using the data given, answer the following questions.



i. Find the shortest distance between locations A and C. [2]

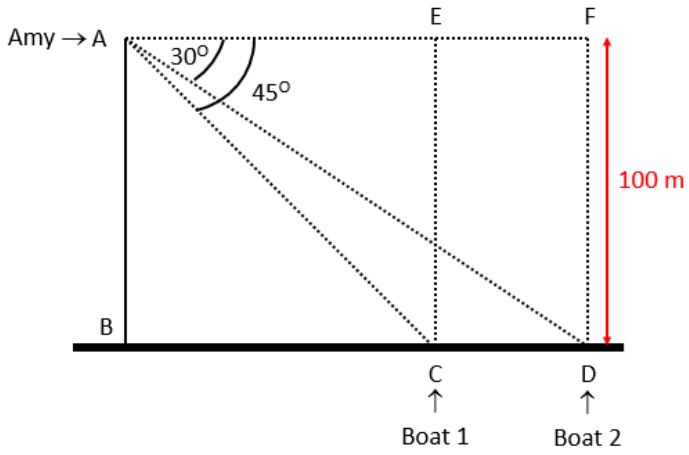
OR

Find the shortest distance between locations B and D. [2]

ii. Find the shortest distance between locations B and A. [1]

iii. Find the shortest distance between locations C and B. [1]

38. Amy, with her school friends, visit a lighthouse. On reaching the lighthouse, they went up to the topmost floor of the lighthouse to see the entire area. The lighthouse is 100m tall, and at the top, one can get a beautiful clear view of the vast ocean. Now Amy saw two boats approaching the lighthouse from the same direction. One of the boats is at an angle of depression 45°, and the other is at 30°. Using the given data, answer the following questions.



i. Find the distance between Boat 1 and the base of the lighthouse. [2]

OR

Find the distance between Boat 2 and the base of the lighthouse. [2]

ii. Find the length of AC. [1]

iii. Find the length of AD. [1]