CBSE
Class X Mathematics (Standard)
Sample Paper – 1 (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 study based questions carrying 4 marks each with subparts of 1, 1, and 2 marks each, respectively.
7. All Questions are compulsory. However, an internal choice in 2 Question of Section B, 2 Questions of Section C and 2 Questions of Section D has been provided. An internal choice has been provided in all 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. The LCM of 12, 15 and 21 is
A. 410
B. 420
C. 440
D. 450

2. Find the roots of $x^2 - 3x - 10$.
A. 5 and -2
B. -5 and 2
C. -5 and -2
D. 5 and 2

3. Find a quadratic polynomial with $\frac{1}{4}, -1$ as the sum and product of its zeroes respectively.

A. $k(4x^2 - x + 4)=0$
B. $k(4x^2 + x - 4)=0$
C. $k(4x^2 - x - 4)=0$
D. $k(4x^2 + x + 4)=0$

4. The lines $5x - 4y + 8 = 0$ and $7x + 6y - 9 = 0$ are

A. parallel
B. intersecting
C. coincident
D. none of above

5. For three terms p, s, q to be in AP…

A. 2p = p + s
B. p > s > q
C. p < s < q
D. 2s = p + q

6. 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

7. Find the distance between the points (0, 0) and (36, 15).

A. 29
B. 39
C. 49
D. 59

8. A circle can have _____ tangent/tangents.

A. one
B. two
C. four
D. infinite

9. Which of the following is not a test of similarity?

A. SSS
B. SAS
C. AAA
D. SSA

10. Corresponding _____ of similar triangles are equal.

A. Sides
B. Areas
C. Perimeters
D. Angles

11. If $\cot \theta = \frac{7}{8}$, then evaluate $\tan^2 \theta$.

A. 8/7
B. 49/8
C. 49/64
D. 64/49

12. If $\sin A = \frac{3}{4}$, calculate tan A.

A. $\frac{3}{\sqrt{2}}$
B. $\frac{3}{\sqrt{5}}$
C. $\frac{3}{\sqrt{7}}$
D. $\frac{3}{\sqrt{11}}$

13. Raju's teacher checked a question of Raju and found zero errors. So he wrote the following:
"Congratulations Raju! The number of errors in your question is equal to cos Θ".
What will be the value of Θ here?

A. 0^o
B. 30^o
C. 60^o
D. 90^o

14. Find the area of a sector of a circle with radius 6 cm, if angle of the sector is 60°.

A. $\frac{132}{3}$ cm^2
B. $\frac{132}{2}$ cm^2
C. $\frac{132}{7}$ cm^2
D. $\frac{132}{5}$ cm^2

15. A chord of a circle of radius 10 cm subtends a right angle at the centre. Find the area of the corresponding minor segment.

A. 28.6 cm^2
B. 26.6 cm^2
C. 24.6 cm^2
D. 22.6 cm^2

16. Time taken by a group of swimmers for different range of ages is being recorded and maintained in a table. Which formula could be used to find the middle-most age?

A. $\frac{\sum fx}{\sum f}$

B. $a + \frac{\sum fd}{\sum f}$

C. $l + \left(\frac{f_1 - f_0}{2f_1 - f_0 - f_2} \right) \times h$

D. $l + \left(\frac{\frac{n}{2} - cf}{f} \right) \times h$

17. Two coins are tossed simultaneously. Find the probability of getting at most one head.

A. 1/4
B. 1/2
C. 3/4
D. None of above

18. Find the mode.

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

A. 100
B. 120
C. 160
D. 180

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)**: A spherical glass vessel has a cylindrical neck 7 cm long and 4 cm in diameter. The diameter of the spherical part is 21 cm. Hence the quantity of water it can hold is 4939 cm^3. Use = $\pi = \frac{22}{7}$.

Statement R (Reason): Quantity of water it can hold = volume of spherical glass vessel + volume of cylindrical neck

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 the solution of system of equations x – y = 4 and x + y = 6 is x = p and y = 2q then p = 4.

Statement R (Reason): A pair of linear equations in two variables can be algebraically solved by elimination method.

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. The number of fruits of each kind A, B and C are 50, 90 and 110 respectively. In each basket, the equal number of fruits of same kind are to be kept. Find the minimum number of baskets required to accommodate all fruits. [2]

22. E is a point on the side AD produced of a parallelogram ABCD and BE intersects CD at F. Show that $\Delta ABE \sim \Delta CFB$. [2]

23. A tangent PQ at a point P of a circle of radius 5 cm meets a line through the centre O at a point Q so that OQ = 12 cm. Find the length of PQ. [2]

24. ΔABC is right-angled at B. If $\tan A = \frac{1}{\sqrt{3}}$, find the value of sin A cos C + cos A sin C. [2]

OR

In ΔPQR, right-angled at Q, PR + QR = 25 cm and PQ = 5 cm. Determine the values of sin P, cos P and tan P.

25. Find the area of a quadrant of a circle whose circumference is 22 cm. [2]

OR

The length of the minute hand of a clock is 14 cm. Find the area swept by the minute hand in 5 minutes.

Section C
Section C consists of 6 questions of 3 marks each.

26. There is a circular path around a sports field. Sonia takes 18 minutes to drive one round of the field, while Ravi takes 12 minutes for the same. Suppose they both start at the same point and at the same time, and go in the same direction. After how many minutes will they meet again at the starting point?[3]

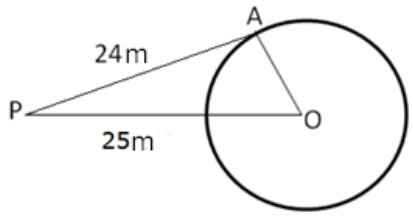
27. A cottage industry produces a certain number of pottery articles in a day. It was observed on a particular day that the cost of production of each article (in rupees) was 3 more than twice the number of articles produced on that day. If the total cost of production on that day was Rs. 90, find the number of articles produced and the cost of each article. [3]

28. The coach of a cricket team buys 7 bats and 6 balls for Rs. 3800. Later, she buys 3 bats and 5 balls for Rs. 1750. Find the cost of each bat and each ball.[3]

OR

Five years hence, the age of Jacob will be three times that of his son. Five years ago, Jacob's age was seven times that of his son. What are their present ages?

29. Arjun is standing at a point P, which is 25 m away from the centre (O) of a circular park, and the length of a road from the point P to the gate of the park (A) is 24 m. [3]



Find the distance from the centre of the park to the gate.

OR

If two tangents inclined at an angle of 60° are drawn to a circle of radius 3 cm, then find the length of each tangent.

30. Express the trigonometric ratios sin A, sec A and tan A in terms of cot A. [3]

31. A box contains 20 balls bearing numbers 1, 2, 3, …, 20, respectively. A ball is taken out at random from the box. What is the probability that the number on the ball is [3]

i. an odd number?
ii. divisible by 2 or 3?
iii. a prime number?
iv. not divisible by 10?

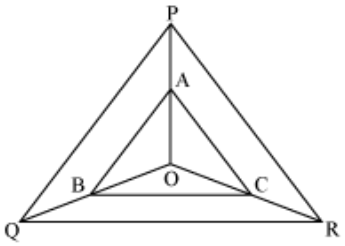
Section D
Section D consists of 4 questions of 5 marks each.

32. The sum of the reciprocals of Rehman's ages, (in years) 3 years ago and 5 years from now is $\frac{1}{3}$. Find his present age. [5]

OR

The difference of squares of two numbers is 180. The square of the smaller number is 8 times the larger number. Find the two numbers.

33. In figure, A, B and C are points on OP, OQ and OR respectively such that AB || PQ and AC || PR. Show that BC || QR. [5]



34. A spherical glass vessel has a cylindrical neck 8 cm long, 2 cm in diameter; the diameter of the spherical part is 8.5 cm. By measuring the amount of water it holds, a child finds its volume to be 345 cm^3. Check whether she is correct, taking the above as the inside measurements, and π = 3.14. [5]

OR

A tent is in the shape of a cylinder surmounted by a conical top. If the height and diameter of the cylindrical part are 2.1 m and 4 m respectively, and the slant height of the top is 2.8 m, find the area of the canvas used for making the tent. Also, find the cost of the canvas of the tent at the rate of Rs. 500 per m^2.

35. A class teacher has the following absentee record of 40 students of a class for the whole term. Find the mean number of days a student was absent. [5]

Number of days	0–6	6–10	10–14	14–20	20–28	28–38	38–40
Number of students	11	10	7	4	4	3	1

Section E

Case study based questions are compulsory.

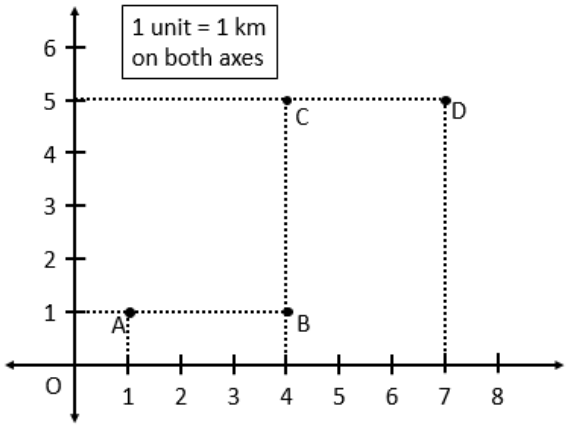
36. Your elder brother wants to buy a car and plans to take loan from a bank for his car. He repays his total loan of Rs. 118000 by paying every month starting with the first instalment of Rs. 1000. If he increases the instalment by Rs. 100 every month, then answer the following questions.

i. Find the amount paid by him in 30^{th} instalment. [1]
ii. Find the amount to be paid in the 40^{th} instalment. [1]
iii. Find the ratio of the 19^{th} instalment to the 28^{th} instalment. [2]

OR

Find the total amount paid by him in 30 instalments.

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.

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

38. There are two poles of equal height on either side of the road. Each pole has one hoarding on it. A car is standing on the road at point A. From A, the angle of elevation of the top of the poles are 60° and 30° respectively.

If height of each pole is 30 m, then answer the following questions.

i. Find the distance between the left pole and point A. [2]

OR

Find the distance between the right pole and point A.

ii. Find the width of the road. [1]

iii. Name the angle formed by the line of sight with the horizontal when the point being viewed is above the horizontal level. [1]