



SAMPLE PAPER 1 2024-25

Class 10 - Mathematics

Time Allowed: 3 hours

Maximum Marks: 80

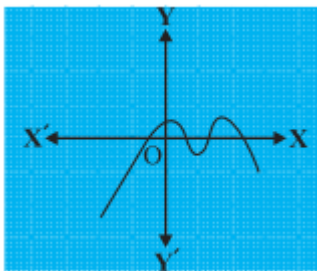
General Instructions:

Read the following instructions carefully and follow them:

1. This question paper contains 38 questions.
2. This Question Paper is divided into 5 Sections A, B, C, D and E.
3. In Section A, Questions no. 1-18 are multiple choice questions (MCQs) and questions no. 19 and 20 are Assertion-Reason based questions of 1 mark each.
4. In Section B, Questions no. 21-25 are very short answer (VSA) type questions, carrying 02 marks each.
5. In Section C, Questions no. 26-31 are short answer (SA) type questions, carrying 03 marks each.
6. In Section D, Questions no. 32-35 are long answer (LA) type questions, carrying 05 marks each.
7. In Section E, Questions no. 36-38 are case study-based questions carrying 4 marks each with sub-parts of the values of 1,1 and 2 marks each respectively.
8. All Questions are compulsory. However, an internal choice in 2 Questions 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.
9. Draw neat and clean figures wherever required.
10. Take $\pi = 22/7$ wherever required if not stated.
11. Use of calculators is not allowed.

Section A

1. The LCM of smallest 2-digit number and smallest composite number is [1]
a) 4 b) 20
c) 40 d) 12
2. Find the number of zeroes of $p(x)$ in the figure given below. [1]

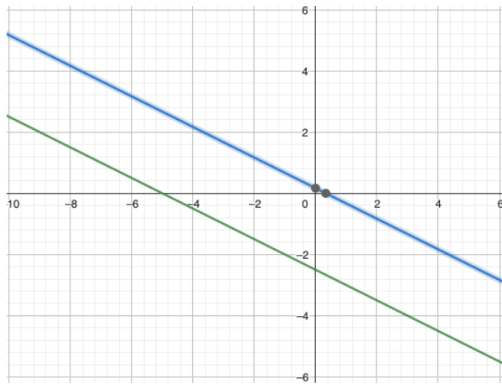


- a) 2 b) 4

c) 1

d) 3

3. The pair of equations $x + 2y + 5 = 0$ and $-3x - 6y + 1 = 0$ have [1]



a) a unique solution

b) infinitely many solutions

c) no solution

d) exactly two solutions

4. Roots of the quadratic equation $x^2 + x - (a + 1)(a + 2) = 0$ are _____. [1]

a) $-(a + 1), (a + 2)$

b) $(a + 1), (a + 2)$

c) $(a + 1), -(a + 2)$

d) $-(a + 1), -(a + 2)$

5. In an A.P., if the first term $(a) = -16$ and the common difference $(d) = -2$, then the sum of first 10 terms is: [1]

a) -70

b) 250

c) -250

d) -200

6. The distance between the points $(-1, -3)$ and $(5, -2)$ is: [1]

a) $\sqrt{17}$ units

b) $\sqrt{37}$ units

c) $\sqrt{61}$ units

d) 5 units

7. The midpoint of the line segment joining the points $(-6, -4)$ and $(0, 4)$ is: [1]

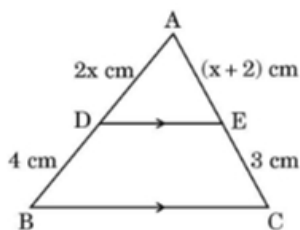
a) $(-6, 0)$

b) $(-3, 0)$

c) $(-6, 8)$

d) $(-6, 4)$

8. In the given figure, in $\triangle ABC$, $DE \parallel BC$. If $AD = 2x$ cm, $AE = (x + 2)$ cm, $DB = 4$ cm, $EC = 3$ cm, then the value of x is: [1]



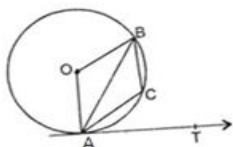
a) 6

b) 4

c) 3

d) 2

9. In figure, AB is a chord of a circle and AT is a tangent at A such that $\angle BAT = 60^\circ$, measure of $\angle ACB$ is: [1]



a) 120°

b) 150°

- c) 90° d) 110°
10. Two chords PQ and RS intersect at T outside the circle. If PQ = 5 cm, QT = 3 cm, TR = 2 cm. length of RS is : [1]
 a) 8 cm b) 15 cm
 c) 12 cm d) 10 cm
11. If $(\cos \theta + \sec \theta) = \frac{5}{2}$ then $(\cos^2 \theta + \sec^2 \theta) = ?$ [1]
 a) $\frac{33}{4}$ b) $\frac{21}{4}$
 c) $\frac{17}{4}$ d) $\frac{29}{4}$
12. For $\theta = 30^\circ$, the value of $(2 \sin \theta \cos \theta)$ is: [1]
 a) $\frac{\sqrt{3}}{4}$ b) 1
 c) $\frac{\sqrt{3}}{2}$ d) $\frac{3}{2}$
13. If the angles of elevation of the top of a tower from two points distant a and b from the base and in the same straight line with it are complementary, then the height of the tower is [1]
 a) ab b) $\frac{a}{b}$
 c) \sqrt{ab} d) $\sqrt{\frac{a}{b}}$
14. In a circle of radius 21 cm, an arc subtends an angle of 60° at the centre. The length of the arc is [1]
 a) 18.16 cm b) 23.5 cm
 c) 22 cm d) 21 cm
15. If the area of a sector of a circle is $\frac{1}{8}$ of the area of the circle, then the central angle of the sector is: [1]
 a) 45° b) 90°
 c) 60° d) 30°
16. If a digit is chosen at random from the digits 1, 2, 3, 4, 5, 6, 7, 8, 9, then the probability that it is odd and is a multiple of 3 is [1]
 a) $\frac{1}{9}$ b) $\frac{2}{9}$
 c) $\frac{2}{3}$ d) $\frac{1}{3}$
17. A girl calculates that the probability of her winning the first prize in a lottery is 0.08. If 6000 tickets are sold, how many tickets has she bought? [1]
 a) 240 b) 750
 c) 480 d) 40
18. The algebraic sum of the deviations of a frequency distribution from its mean is: [1]
 a) 0 b) a non-zero number
 c) always positive d) always negative
19. **Assertion (A):** In a solid hemisphere of radius 10 cm, a right cone of same radius is removed out. The surface area of the remaining solid is 570.74 cm^2 [Take $\pi = 3.14$ and $\sqrt{2} = 1.4$] [1]

Reason (R): **Reason (R):** Expression used here to calculate Surface area of remaining solid = Curved surface area of hemisphere + Curved surface area of cone

- 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):** If S_n is the sum of the first n terms of an A.P., then its n^{th} term a_n is given by $a_n = S_n - S_{n-1}$ [1]

Reason (R): The 10th term of the A.P. 5, 8, 11, 14, ... is 35.

- 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. Prove that $\sqrt{2}$ is an irrational number. [2]
 22. Determine the point which divides a given line segment internally in the ratio 3 : 4. [2]
 23. A tangent PQ at a point P on 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 PQ. [2]
 24. Prove that: $1 + \frac{\cot^2 \theta}{1 + \operatorname{cosec} \theta} = \operatorname{cosec} \theta$ [2]

OR

If $\sin A = \frac{3}{4}$, calculate $\cos A$ and $\tan A$

25. An arc of a circle of radius 10 cm subtends a right angle at the centre of the circle. Find the area of the corresponding major sector. (Use $\pi = 3.14$) [2]

OR

Three horses are tied each with 7 m long rope at three corners of a triangular field having sides 20 m, 34 m and 42 m. Find the area of the plot which can be grazed by the horses.

Section C

26. Mika exercises every 12 days and Nanu every 8 days. Mika and Nanu both exercised today. How many days will it be until they exercise together again? [3]
 27. If one root of the quadratic polynomial $2x^2 - 3x + p$ is 3, find the other root. Also, find the value of p. [3]
 28. The sum of two numbers is 1000 and the difference between their squares is 256000. Find the numbers. [3]

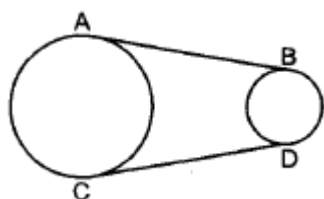
OR

Solve the pair of linear equations $0.2x + 0.3y = 1.3$ and $0.4x + 0.5y = 2.3$ by substitution method.

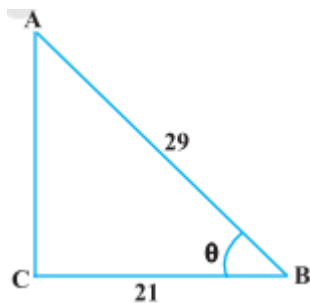
29. A point P is 13 cm from the centre of the circle. The length of the tangent drawn from P to the circle is 12 cm. Find the radius of the circle. [3]

OR

In figure, AB and CD are common tangents to two circles of unequal radii. Prove that $AB = CD$



30. Consider $\triangle ACB$ right angled at C in which $AB = 29$ units, $BC = 21$ units and $\angle ABC = \theta$. Determine the values of (i) $\cos^2 \theta + \sin^2 \theta$ and (ii) $\cos^2 \theta - \sin^2 \theta$ [3]



31. If the mean of the following frequency distribution is 18, find the missing frequency. [3]

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

Section D

32. The sum of ages of a father and his son is 45 years. Five years ago, the product of their ages (in years) was 124. Determine their present ages. [5]

OR

The sum of two numbers is 45. If 5 is subtracted from each of them, the product of these numbers becomes 124. Find the numbers.

33. If a line is drawn parallel to one side of a triangle to intersect the other two sides at distinct points, then prove that the other two sides are divided in the same ratio. [5]

34. A wooden article was made by scooping out a hemisphere from each end of a solid cylinder as shown in the figure. If the height of the cylinder is 10 cm and its base is of radius 3.5 cm, find the total surface area of the article. [5]



OR

A spherical glass vessel has a cylindrical neck 8 cm long and 1 cm in radius. The radius of the spherical part is 9 cm. Find the amount of water (in litres) it can hold, when filled completely.

35. A survey conducted on 20 families in a locality by a group of students resulted in the following frequency table for the number of family members in a family. [5]

Family size	1 - 3	3 - 5	5 - 7	7 - 9	9 - 11
Number of families	7	8	2	4	1

Determine the mean and mode of the above data.

Section E

36. Read the following text carefully and answer the questions that follow: [4]

In a potato race, a bucket is placed at the starting point, which is 5 m 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. (1)
- ii. What is the total distance the competitor has to run? (1)
- iii. Find distance cover after 4 potato drop in the bucket? (2)

OR

Find the distance covered by competitor in order to put 5th potato in the bucket. (2)

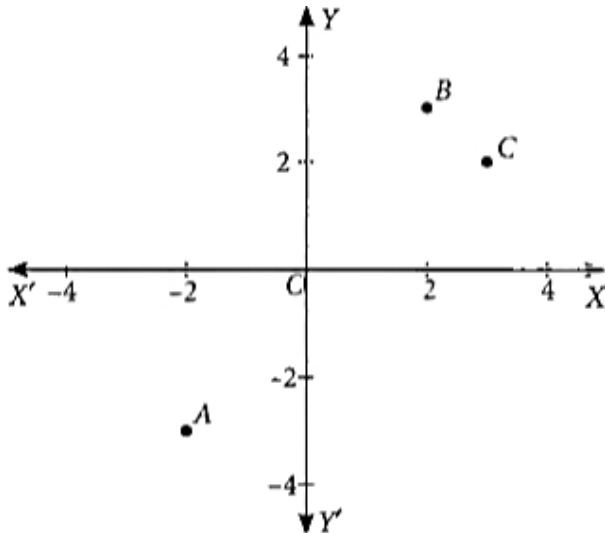
37. **Read the following text carefully and answer the questions that follow:** [4]

There are two routes to travel from source A to destination B by bus. First bus reaches at B via point C and second bus reaches from A to B directly. The position of A, B and C are represented in the following graph: Based on the above information, answer the following questions.



Scale: x-axis : 1 unit = 1 km

y-axis: 1 unit = 1 km



- i. If the fare for the second bus is ₹15/km, then what will be the fare to reach to the destination by this bus? (1)
- ii. What is the distance between A and B? (1)
- iii. What is the distance between A and C? (2)

OR

If it is assumed that both buses have same speed, then by which bus do you want to travel from A to B? (2)

38. **Read the following text carefully and answer the questions that follow:** [4]

Totem poles are made from large trees. These poles are carved with symbols or figures and mostly found in western Canada and northwestern United States.

In the given picture, two such poles of equal heights are standing 28 m apart. From a point somewhere between

them in the same line, the angles of elevation of the top of the two poles are 60° and 30° respectively.



- i. Draw a neat labelled diagram. (1)
- ii. Find the height of the poles. (1)
- iii. If the distances of the top of the poles from the point of observation are taken as p and q , then find a relation between p and q . (2)

OR

Find the location of the point of observation. (2)

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