

Mathematics

Sample Question Paper – 4

Class IX (Ganita Manjari)

Time allowed: 3 hours

Maximum Marks: 80

General Instructions:

- (1) This question paper contains 38 questions. All questions are compulsory.
- (2) The question paper is divided into five Sections - A, B, C, D and E.
- (3) Section A: Questions 1-18 are MCQs and Questions 19-20 are Assertion-Reason questions of 1 mark each.
- (4) Section B: Questions 21-25 are Very Short Answer questions carrying 2 marks each.
- (5) Section C: Questions 26-31 are Short Answer questions carrying 3 marks each.
- (6) Section D: Questions 32-35 are Long Answer questions carrying 5 marks each.
- (7) Section E: Questions 36-38 are case study based questions carrying 4 marks each.
- (8) There is no overall choice. Internal choice is provided in 2 questions in Section B, 2 in Section C, 2 in Section D and the 2-mark part of each case study.
- (9) Use $\pi = 22/7$ wherever required unless stated otherwise. Draw neat diagrams wherever required. Calculators are not allowed.

SECTION A

(Questions 1 to 20 carry 1 mark each. $20 \times 1 = 20$)

1. In the figure, point P represents $\sqrt{5}$ on the number line. Between which two consecutive integers does P lie?

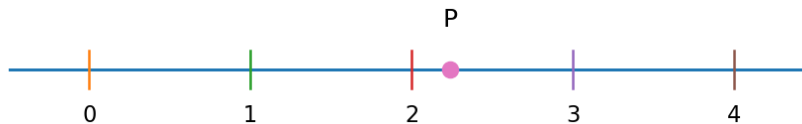


Figure for Question 1

- (A) 0 and 1
(B) 1 and 2
(C) 2 and 3
(D) 3 and 4

2. The point P shown in the coordinate plane lies in:

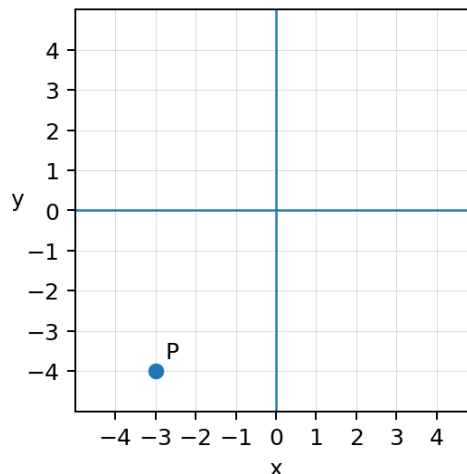


Figure for Question 2

- (A) I quadrant
(B) II quadrant
(C) III quadrant
(D) IV quadrant

3. If the midpoint of A(-6, 4) and B(2, 8) is M, then M is:

- (A) (-2, 6) (B) (-4, 12)
(C) (4, 6) (D) (-2, 4)

4. If $p(x) = 7 - 3x$, then $p(-2)$ equals:

- (A) 1 (B) 5
(C) 13 (D) -13

5. The graph of $y = 5$ is:

- (A) parallel to x-axis (B) parallel to y-axis
(C) passing only through origin (D) not a straight line

6. Which of the following is rational?

- (A) $\sqrt{2}$ (B) $\sqrt{49}$
(C) $\sqrt{13}$ (D) π

7. The decimal expansion of $13/40$ is:

- (A) terminating (B) non-terminating repeating
(C) non-terminating non-repeating (D) not real

8. $(a - 2b)(a + 2b)$ is equal to:

- (A) $a^2 + 4b^2$ (B) $a^2 - 4b^2$
(C) $a^2 - 2b^2$ (D) $a^2 + 2ab - 4b^2$

9. If $x + y = 12$ and $xy = 32$, then $x^2 + y^2$ is:

- (A) 64 (B) 80
(C) 112 (D) 144

10. The angle subtended by a diameter at a point on the circle is:

- (A) 30° (B) 45°
(C) 90° (D) 180°

11. Two chords of a circle are equidistant from the centre. Then the chords are:

- (A) equal (B) perpendicular
(C) diameters (D) parallel

12. The area of a circle whose diameter is 28 cm is:

- (A) 154 cm^2 (B) 308 cm^2
(C) 616 cm^2 (D) 1232 cm^2

13. The length of an arc of 180° in a circle of radius 7 cm is:

- (A) 7 cm (B) 11 cm
(C) 22 cm (D) 44 cm

14. A fair die is rolled. The probability of obtaining a number greater than 4 is:

- (A) $1/6$ (B) $1/3$
(C) $1/2$ (D) $2/3$

15. In 80 trials an event occurred 28 times. Its experimental probability is:

- (A) $7/20$ (B) $13/20$
(C) $28/52$ (D) $20/7$

16. The 12th term of the AP 4, 10, 16, 22, ... is:

- (A) 64 (B) 70
(C) 76 (D) 82

17. Which is the recursive rule for 20, 17, 14, 11, ...?

- (A) $t_1 = 20, t_n = t_{n-1} + 3$ (B) $t_1 = 20, t_n = t_{n-1} - 3$
(C) $t_1 = 17, t_n = t_{n-1} - 3$ (D) $t_1 = 20, t_n = 3t_{n-1}$

18. The next term of the GP 96, 48, 24, 12, ... is:

- (A) 8 (B) 6
(C) 4 (D) 3

Questions 19 and 20 are Assertion-Reason based. Choose:

- (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.

19. Assertion (A): The product of two irrational numbers can be rational.

Reason (R): $\sqrt{2} \times \sqrt{2} = 2$.

20. Assertion (A): Equal chords of the same circle are equidistant from the centre.

Reason (R): Perpendiculars drawn from the centre to equal chords form congruent right triangles.

SECTION B

(Questions 21 to 25 carry 2 marks each. $5 \times 2 = 10$)

21. In the circle shown, $OM \perp AB$. If $AB = 16$ cm, find AM and MB.

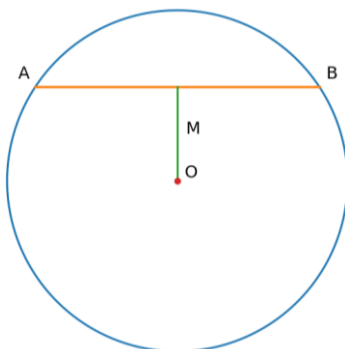


Figure for Question 21

22. (a) Find the distance between A(-1, -2) and B(5, 6).

OR

(b) The midpoint of P(3, 7) and Q(x, -1) is (1, 3). Find x.

23. Simplify: $(5x + 3y)^2 - (5x - 3y)^2$.

24. The dot arrangement shown gives the sequence 2, 3, 4, 5, Write its nth term and find the number of dots in the 25th column.

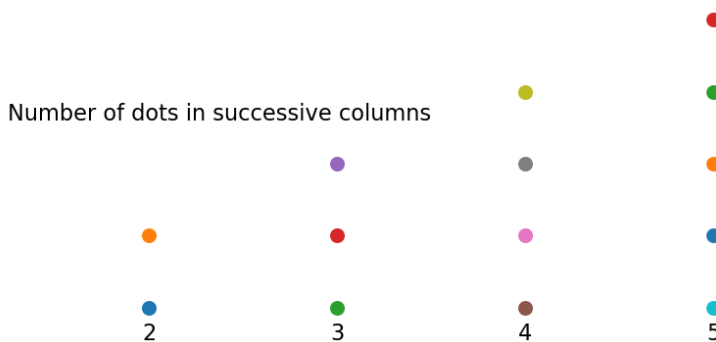


Figure for Question 24

25. (a) A card is selected from cards numbered 11 to 20. Find the probability that the number selected is prime.

OR

(b) A fair coin is tossed three times. How many outcomes are there in the sample space? Write any four of them.

SECTION C

(Questions 26 to 31 carry 3 marks each. $6 \times 3 = 18$)

26. Express 0.272727... as a rational number.

27. The graph of a linear polynomial $p(x) = ax + b$, passes through A (-2, -2) and B (2, 4), as shown. Find the values of a and b and write the polynomial.

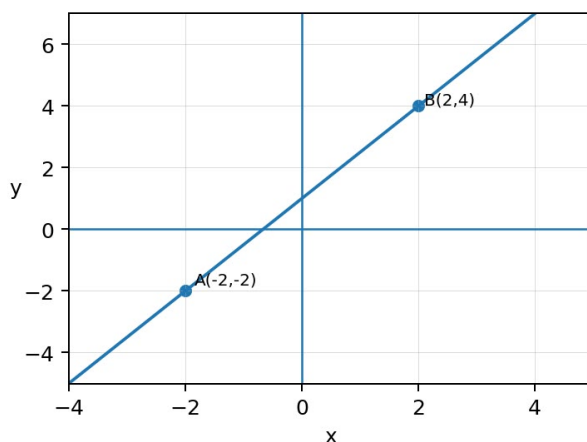


Figure for Question 27

28. (a) Factorise: $6x^2 + 13x + 6$.

OR

(b) If $a + b = 9$ and $ab = 14$, find $a^2 + b^2$ and $(a - b)^2$.

29. In the semicircle shown, AB is a diameter and C is a point on the semicircle. Prove that $\angle ACB = 90^\circ$.

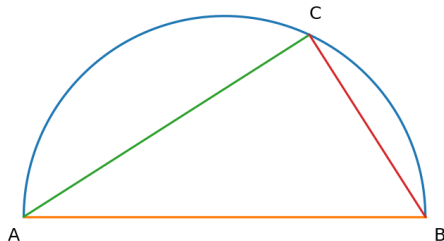


Figure for Question 29

30. (a) Find the area of a triangle whose sides are 10 cm, 10 cm and 12 cm using Heron's formula.

OR

(b) A wheel of radius 35 cm makes 200 complete revolutions. Find the distance travelled by it in metres.

31. In a survey of 120 students, 45 preferred indoor games, 50 preferred outdoor games and the remaining students preferred both equally. If one student is chosen at random, find the experimental probability that the chosen student belongs to each of the three groups.

SECTION D

(Questions 32 to 35 carry 5 marks each. $4 \times 5 = 20$)

32. The vertices of a rectangle are $A(-3, -1)$, $B(3, -1)$, $C(3, 3)$ and $D(-3, 3)$, as shown.

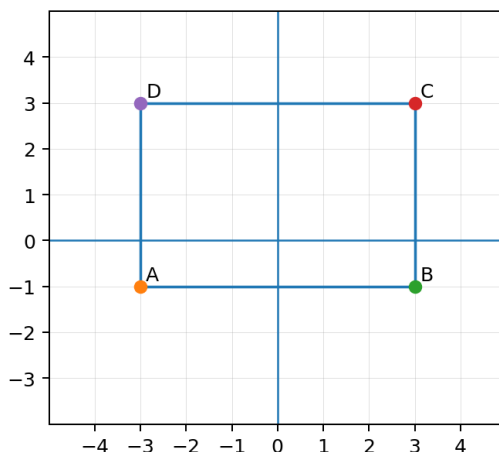


Figure for Question 32

(i) Find AB and BC.

(ii) Find the coordinates of the point of intersection of the diagonals.

(iii) Find the length of a diagonal.

(iv) Verify from coordinates that the diagonals have the same midpoint.

33. (a) A circular pond has radius 14 m. A path 3.5 m wide is constructed all around it outside the pond. Find the area of the path and the cost of paving it at ₹120 per m^2 .

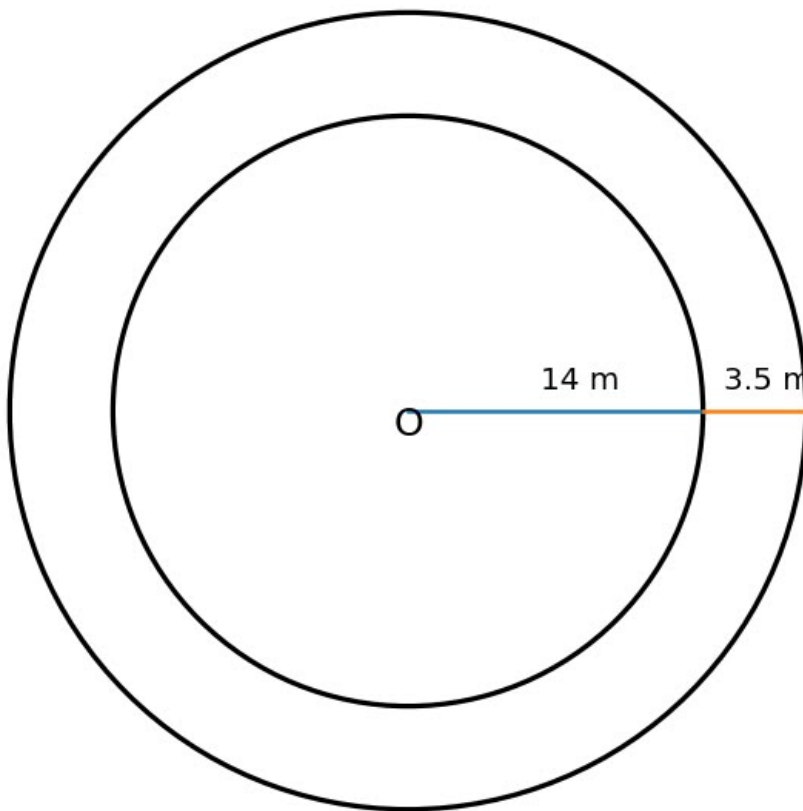


Figure for Question 33(a) only

OR

(b) A triangular plot has sides 17 m, 25 m and 28 m. Find its area by Heron's formula. A circular flower bed of radius 3.5 m is made inside it. Find the area of the remaining plot.

34. (a) The 5th term of an AP is 23 and its 17th term is 71. Find the first term and common difference. Hence find the 30th term and the sum of the first 20 natural numbers using the formula studied in the chapter.

OR

(b) A GP has first term 160 and common ratio $\frac{1}{2}$. Write its first six terms, find its 10th term, and write both its explicit and recursive rules.

35. A bag contains 2 red, 3 blue and 1 yellow token. One token is selected at random, its colour recorded and it is replaced. A second token is then selected.

(i) Draw a tree diagram showing the colour outcomes.

(ii) Find the probability of getting two blue tokens.

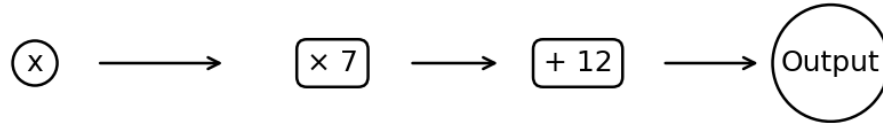
(iii) Find the probability of getting tokens of two different colours.

SECTION E

(Questions 36 to 38 are case study based and carry 4 marks each. $3 \times 4 = 12$)

Case Study – 1

36. A school printing machine uses the rule shown below to calculate the total charge y (in rupees) for x printed booklets.



Input-output rule for Question 36

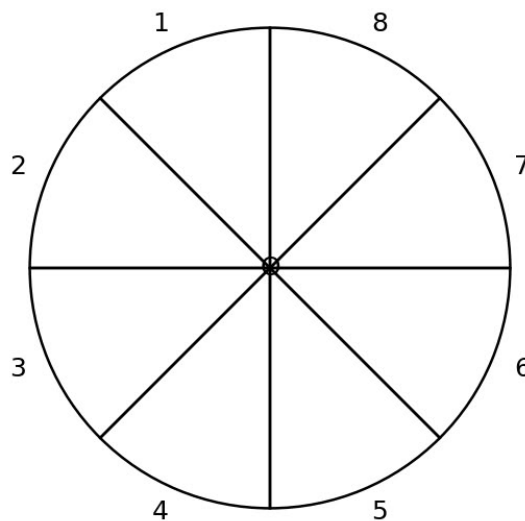
- (i) Write y as a linear polynomial in x .
- (ii) Find the charge for 8 booklets.
- (iii) (a) How many booklets were printed if the charge was ₹222?

OR

- (iii) (b) Make a table of values for $x = 0, 1, 2, 3$ and state by how much the output increases each time.

Case Study – 2

37. At a mathematics fair, an eight-sector spinner numbered 1 to 8 is spun once. All sectors are equal.



Spinner for Question 37

- (i) Write the sample space.
- (ii) Find the probability of obtaining a perfect square.
- (iii) (a) Find the probability of obtaining a prime number or 1.

OR

- (iii) (b) Find the probability of obtaining a number that is neither even nor prime.

Case Study – 3

38. A triangular park has side lengths 13 m, 14 m and 15 m. A circular fountain of radius 2 m is planned inside the park.

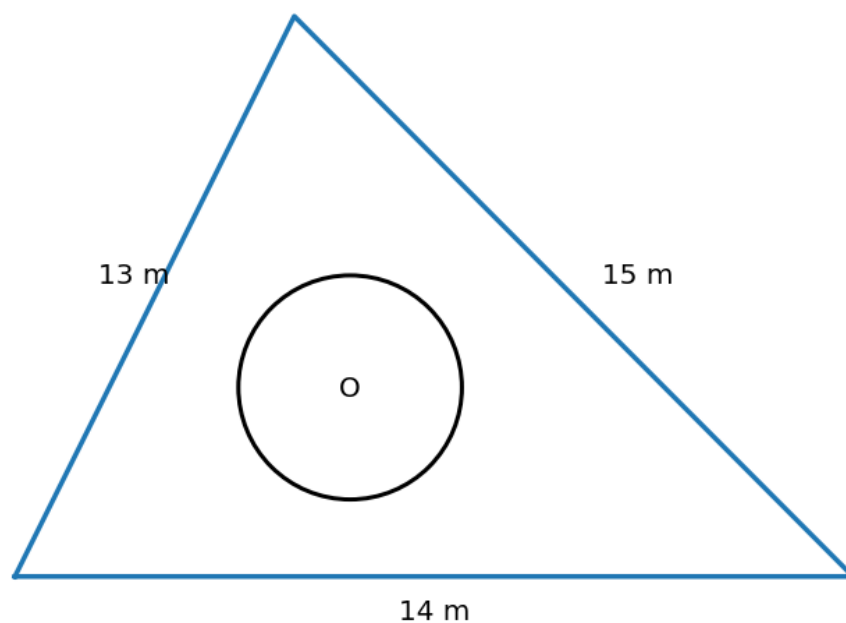


Figure for Question 38

- (i) Find the semi-perimeter of the triangular park.
- (ii) Find the area of the triangular park using Heron's formula.
- (iii) (a) Find the area left after constructing the circular fountain. Use $\pi = 22/7$.

OR

- (iii) (b) If grassing the whole triangular park costs ₹25 per m^2 , find the total grassing cost before the fountain is constructed.