

Mathematics
Sample Question Paper – 5
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 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 of 2 marks each.
- (5) Section C: Questions 26-31 are Short Answer questions of 3 marks each.
- (6) Section D: Questions 32-35 are Long Answer questions of 5 marks each.
- (7) Section E: Questions 36-38 are case study based questions of 4 marks each.
- (8) There is no overall choice. Internal choice is provided in 2 questions of Section B, 2 of Section C, 2 of Section D and the 2-mark part of each case study.
- (9) Use $\pi = 22/7$ unless otherwise stated. Draw neat figures wherever required. Calculators are not allowed.

SECTION A

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

1. The distance of the point $(7, -4)$ from the x-axis is:
(A) 7 units (B) 4 units
(C) 11 units (D) 3 units
2. The midpoint of $(-5, 3)$ and $(7, -1)$ is:
(A) $(1, 1)$ (B) $(2, 2)$
(C) $(-1, 1)$ (D) $(1, -1)$
3. If $p(x) = 6x - 5$, then $p(4)$ is:
(A) 19 (B) 24
(C) -19 (D) 29
4. The zero of $8x + 24$ is:
(A) 3 (B) -3
(C) 8 (D) -8
5. The graph shown represents $y = 2x + 1$. Its y-intercept is:

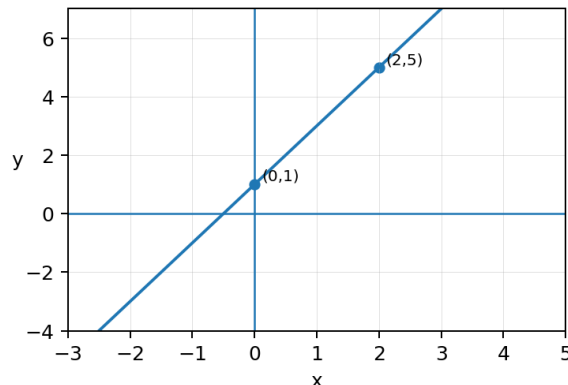


Figure for Question 5

- (A) -1 (B) 0
(C) 1 (D) 2

6. Which of the following is irrational?

(A) $\sqrt{64}$

(B) 0.125

(C) $\sqrt{10}$

(D) $17/5$

7. Which fraction has a terminating decimal expansion?

(A) $7/12$

(B) $11/30$

(C) $13/25$

(D) $8/21$

8. $(x + 7)(x - 7)$ equals:

(A) $x^2 - 49$

(B) $x^2 + 49$

(C) $x^2 - 14x + 49$

(D) $x^2 + 14x + 49$

9. If $a - b = 5$ and $ab = 6$, then $a^2 + b^2$ is:

(A) 13

(B) 25

(C) 37

(D) 49

10. A chord of a circle passing through its centre is called:

(A) radius

(B) diameter

(C) arc

(D) sector

11. If two equal chords AB and CD of a circle subtend angles at the centre, then:

(A) $\angle AOB > \angle COD$

(B) $\angle AOB < \angle COD$

(C) $\angle AOB = \angle COD$

(D) no relation exists

12. The area of a semicircle of radius 14 cm is:

(A) 154 cm^2

(B) 308 cm^2

(C) 616 cm^2

(D) 88 cm^2

13. The semi-perimeter of a triangle with sides 13 cm, 14 cm and 15 cm is:

(A) 21 cm

(B) 42 cm

(C) 28 cm

(D) 14 cm

14. The spinner shown has six equal sectors. The probability of obtaining A is:

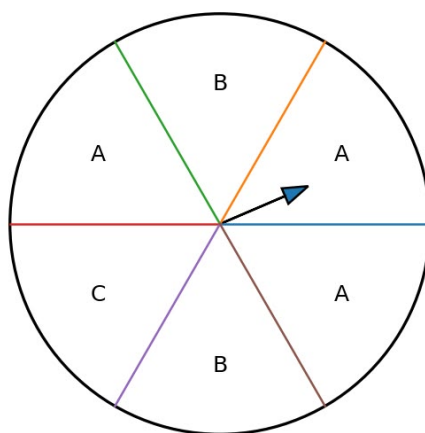


Figure for Question 14

(A) $1/6$

(B) $1/3$

(C) $1/2$

(D) $2/3$

15. A fair die is rolled once. The probability of getting neither 1 nor 6 is:

- (A) $\frac{1}{3}$
- (B) $\frac{1}{2}$
- (C) $\frac{2}{3}$
- (D) $\frac{5}{6}$

16. The common difference of the AP 31, 25, 19, 13, ... is:

- (A) 6
- (B) -6
- (C) -5
- (D) 12

17. The 15th term of the AP 2, 7, 12, 17, ... is:

- (A) 67
- (B) 72
- (C) 77
- (D) 82

18. The common ratio of the GP 162, 54, 18, 6, ... is:

- (A) 3
- (B) $\frac{1}{3}$
- (C) -3
- (D) $\frac{2}{3}$

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): A non-terminating, non-repeating decimal represents an irrational number.
Reason (R): Every rational number has a decimal expansion that either terminates or repeats.

20. Assertion (A): The perpendicular from the centre of a circle to a chord bisects the chord.
Reason (R): The two radii to the endpoints of the chord, together with the perpendicular, form congruent right triangles.

SECTION B

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

21. (a) Find the coordinates of the point which divides the segment joining A(-4, 6) and B(6, 6) into two equal parts.

OR

(b) Find the distance between P(-3, 2) and Q(-3, -5).

22. Factorise: $12x^2 - 27y^2$.

23. The rectangle shown represents the product $(x + 2)(x + 3)$. Use the parts of the rectangle to expand the product and hence factorise $x^2 + 5x + 6$.

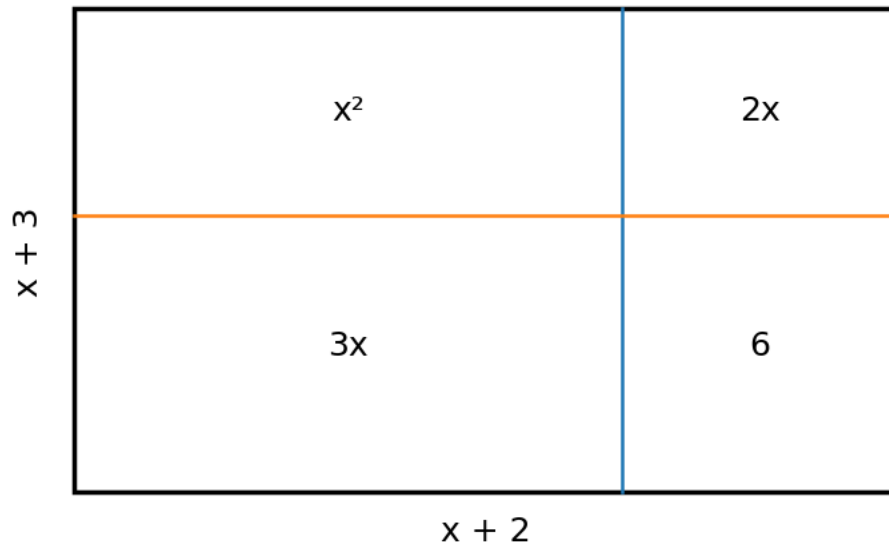


Figure for Question 23

24. (a) Find the 18th term of the AP 9, 14, 19, 24, ...

OR

(b) The first term of a GP is 64 and its common ratio is $\frac{1}{2}$. Write its first five terms.

25. In the circle shown, $\angle AOB = 120^\circ$. Find the angle subtended by chord AB at a point C on the major arc AB.

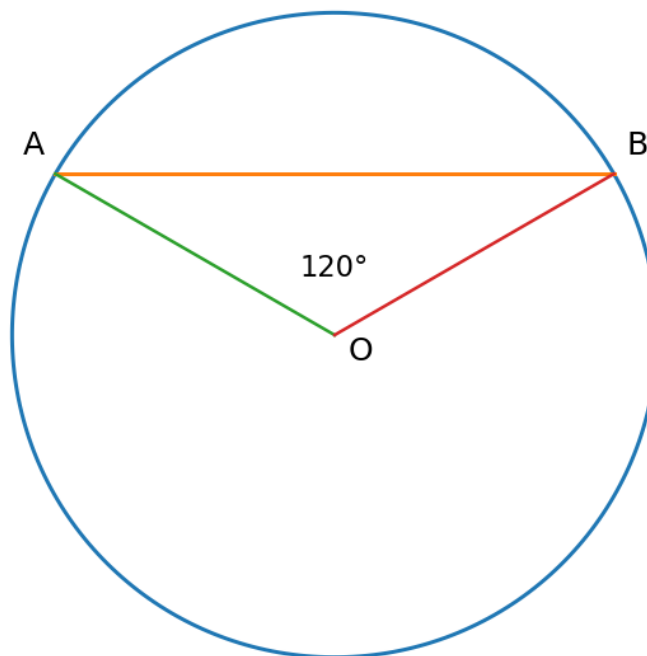


Figure for Question 25

SECTION C

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

26. The triangle ABC is shown on the coordinate plane. Find AB, BC and AC. Hence state whether the triangle is right-angled.

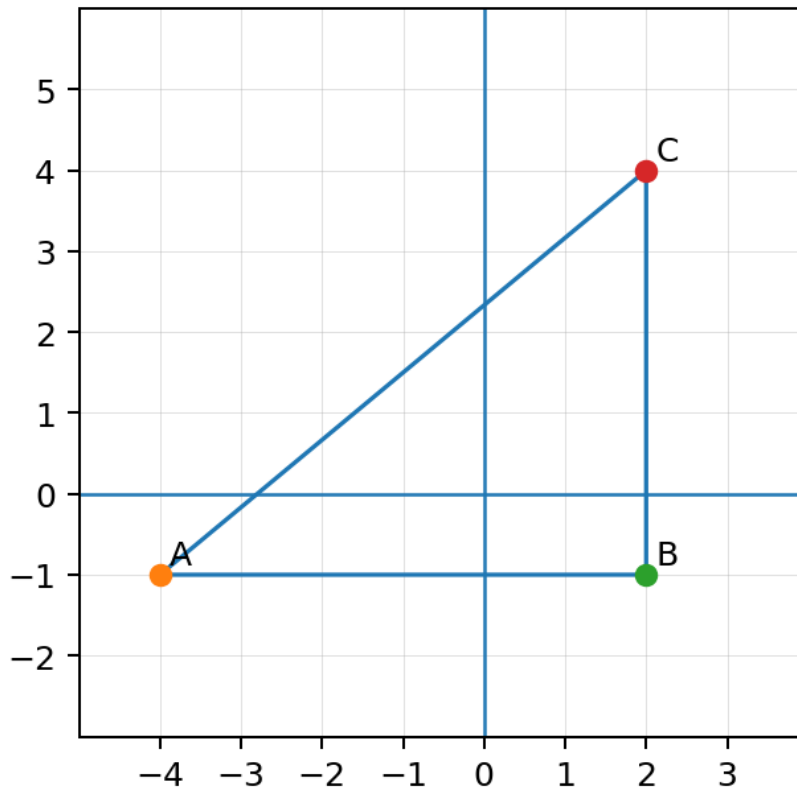


Figure for Question 26

27. Prove that $\sqrt{7}$ is irrational.

28. (a) A linear polynomial $p(x) = ax + b$ satisfies $p(1) = 5$ and $p(4) = 17$. Find a , b and the zero of $p(x)$.

OR

(b) A quantity is 240 initially and decreases by 12 every hour. Write a linear expression for the quantity after t hours and find when it becomes 96.

29. Factorise completely: $2x^2 + 9x + 10$. Verify your answer by multiplication.

30. (a) A circular sector has radius 21 cm and central angle 60° . Find its arc length and area.

OR

(b) A triangle has sides 15 cm, 14 cm and 13 cm. Find its area using Heron's formula.

31. A box contains 2 red and 3 blue pens. A pen is selected, its colour noted and it is replaced. A second pen is selected. The tree diagram is shown. Find the probability of (i) two red pens, and (ii) pens of different colours.

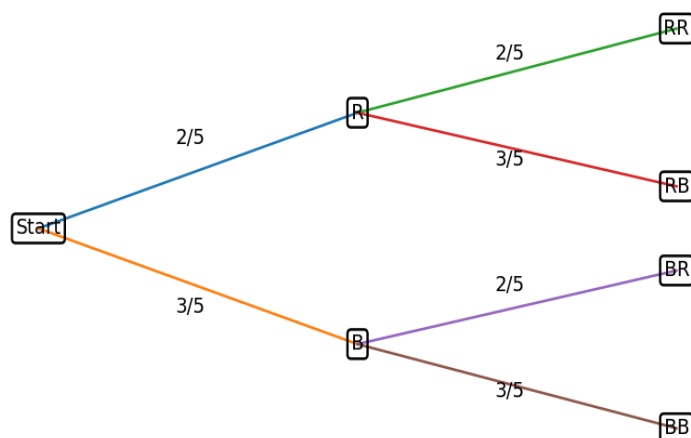


Figure for Question 31

SECTION D

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

32. (a) If $x+y=11$ and $xy=24$, use identities to find x^2+y^2 and x^3+y^3 . Hence find $(x-y)^2$.

OR

(b) Factorise x^3-4x^2-x+4 by grouping. Hence find all values of x for which the expression is zero.

33. A circular field has radius 28 m. A 90° sector is used as a flower garden. Find (i) the area of the flower garden, (ii) the length of its curved boundary, and (iii) the area of the remaining part of the field.

34. (a) An AP has 4th term 18 and 12th term 50. Find its first term, common difference and 25th term. Also write its recursive rule.

OR

(b) In the figure, a chord AB is 6 cm from the centre O of a circle of radius 10 cm. Find the length of AB. State the theorem used.

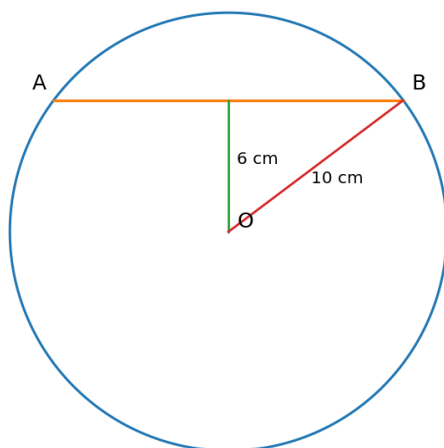


Figure for Question 34(b) only

35. A square-frame pattern grows as shown. Count the unit squares in Stages 1 to 4. Determine a rule for the number of boundary squares at Stage n , and find the number at Stage 25. Explain why the pattern is linear from Stage 2 onward.

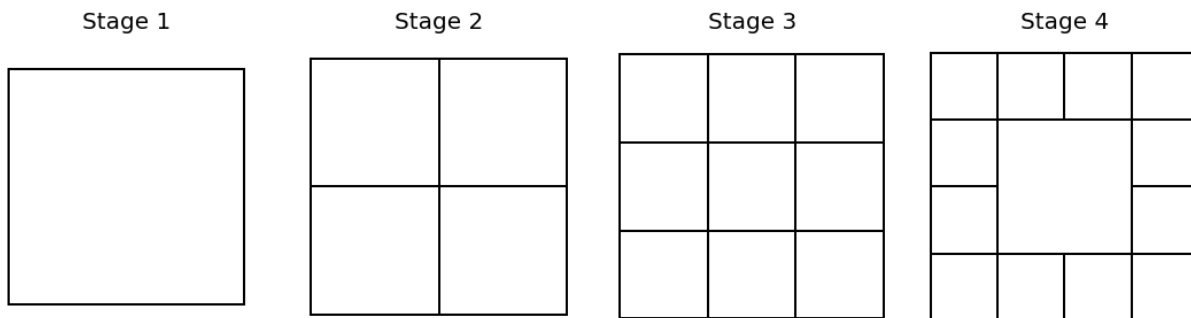


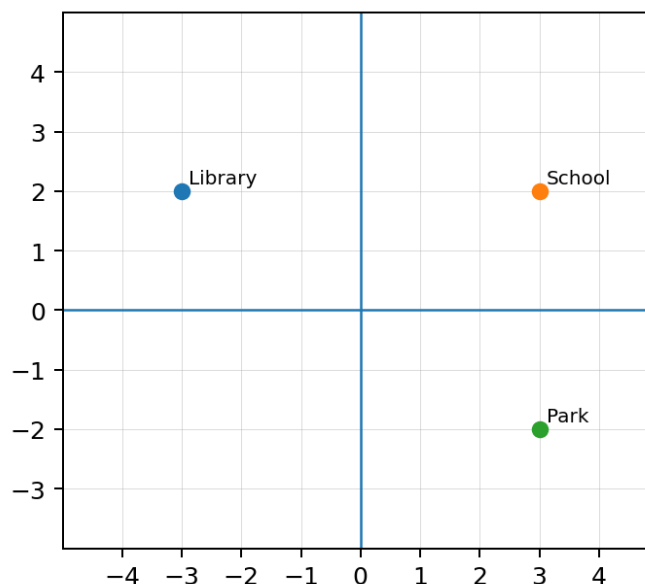
Figure for Question 35

SECTION E

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

Case Study – 1

36. A town map uses a coordinate grid. The Library is at $(-3, 2)$, the School at $(3, 2)$ and the Park at $(3, -2)$, as shown.



Map for Question 36

- Find the distance from the Library to the School.
- Which road segment is parallel to the y-axis?
- (a) Find the midpoint of the Library-School segment and its distance from the Park.

OR

- (b) A new centre is to be located midway between the School and Park. Find its coordinates and its distance from the School.

Case Study – 2

37. A circular running track has radius 21 m. During a warm-up, a runner covers an arc corresponding to a central angle of 60° .

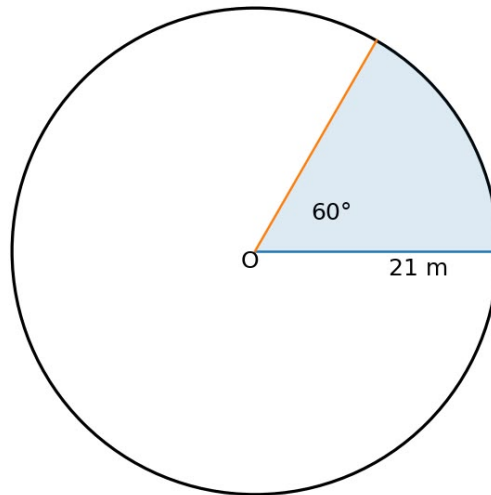


Figure for Question 37

- (i) Find the circumference of the full track.
- (ii) What fraction of one complete round is the 60° arc?
- (iii) (a) Find the length of the 60° arc.

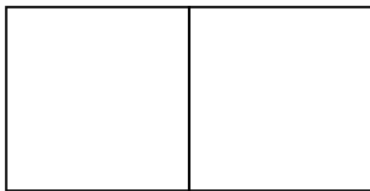
OR

- (iii) (b) Find the area of the 60° sector.

Case Study – 3

38. In a tile display, the number of tiles in the first three stages is 2, 6 and 18, as illustrated. The same multiplicative pattern continues.

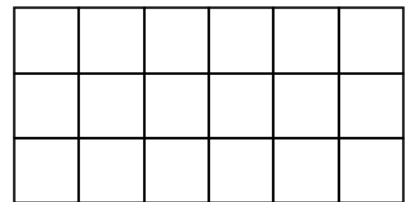
Stage 1: 2



Stage 2: 6



Stage 3: 18



Growing tile pattern for Question 38

- (i) Identify whether the sequence is an AP or a GP and state the relevant constant.
- (ii) Find the number of tiles in Stage 4.
- (iii) (a) Write the n th-term rule and find the number of tiles in Stage 6.

OR

- (iii) (b) Write a recursive rule and determine whether 486 tiles occur in the pattern.