

**Mathematics**  
**Sample Question Paper – 9**  
**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 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 in 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.
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**SECTION A**

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

1. The reflection of  $(-5, 7)$  in the x-axis is:

- |               |                |
|---------------|----------------|
| (A) $(5, 7)$  | (B) $(-5, -7)$ |
| (C) $(5, -7)$ | (D) $(-7, 5)$  |

2. If  $A(1, 3)$  and  $B(7, 11)$ , then AB is:

- |        |        |
|--------|--------|
| (A) 8  | (B) 10 |
| (C) 12 | (D) 14 |

3. If  $p(x) = 2x + 7$ , then its zero is:

- |            |            |
|------------|------------|
| (A) $7/2$  | (B) $-7/2$ |
| (C) $-2/7$ | (D) $2/7$  |

4. A line with equation  $y = -5x + 9$  has y-intercept:

- |        |        |
|--------|--------|
| (A) -5 | (B) 5  |
| (C) 9  | (D) -9 |

5. Which is irrational?

- (A)  $\sqrt{81}$   
(B) 0.444...  
(C)  $\sqrt{15}$   
(D)  $17/8$

6. The rationalising factor of  $\sqrt{7}$  is:

- |                |                  |
|----------------|------------------|
| (A) 7          | (B) $1/\sqrt{7}$ |
| (C) $\sqrt{7}$ | (D) $2\sqrt{7}$  |

7.  $(a + b)^3 - (a - b)^3$  equals:

(A)  $2b(3a^2 + b^2)$

(B)  $2a(a^2 + 3b^2)$

(C)  $6ab$

(D)  $2b(a^2 + b^2)$

8. The area model shown represents:

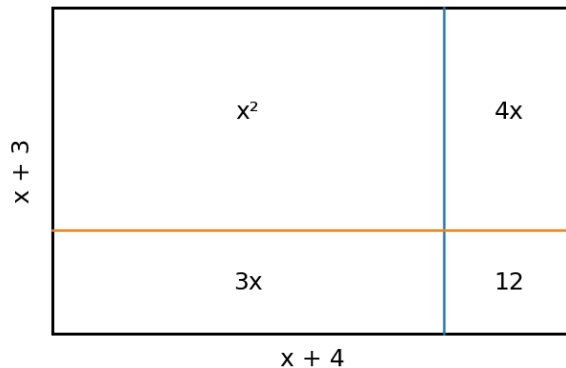


Figure for Question 8

(A)  $(x + 3)(x + 4)$

(B)  $(x - 3)(x + 4)$

(C)  $x(x + 7)$

(D)  $(x + 12)(x + 1)$

9. The perpendicular distance of a diameter from the centre is:

(A) radius

(B) diameter

(C) zero

(D) half the radius

10. If a chord subtends  $130^\circ$  at the centre, the angle subtended by it at a point on the remaining circle is:

(A)  $55^\circ$

(B)  $65^\circ$

(C)  $130^\circ$

(D)  $230^\circ$

11. A triangle with sides 5 cm, 12 cm and 13 cm has area:

(A)  $24 \text{ cm}^2$

(B)  $30 \text{ cm}^2$

(C)  $60 \text{ cm}^2$

(D)  $78 \text{ cm}^2$

12. The area of a  $45^\circ$  sector of radius 28 cm is:

(A)  $154 \text{ cm}^2$

(B)  $308 \text{ cm}^2$

(C)  $616 \text{ cm}^2$

(D)  $1232 \text{ cm}^2$

13. A number is chosen randomly from 1 to 15. Probability that it is a multiple of 5 is:

(A)  $1/15$

(B)  $1/5$

(C)  $2/5$

(D)  $3/5$

14. A coin is tossed 250 times and heads occurs 140 times. Experimental probability of tails is:

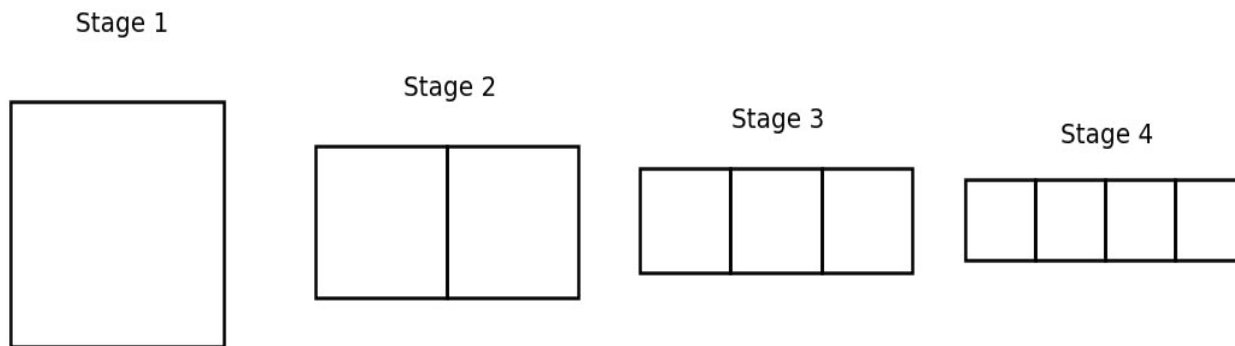
(A)  $11/25$

(B)  $14/25$

(C)  $7/10$

(D)  $3/5$

15. The matchstick pattern shown uses 4, 7, 10, 13, ... matchsticks. Its common difference is:



*Figure for Question 15*

- (A) 2 (B) 3  
(C) 4 (D) 7

16. If the 10th term of an AP is 38 and  $d = 4$ , the first term is:

- (A) 2 (B) 4  
(C) 6 (D) 8

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

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

18. The next term of 1, 3, 9, 27, ... is:

- (A) 54 (B) 72  
(C) 81 (D) 108

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

- (A) Both A and R are true and R correctly explains A.  
(B) Both A and R are true but R does not correctly explain A.  
(C) A is true but R is false.  
(D) A is false but R is true.

19. Assertion (A): The sum of a rational number and an irrational number is irrational.

Reason (R): If the sum were rational, subtracting the rational number would make the irrational number rational.

20. Assertion (A): Equal chords of a circle subtend equal angles at the centre.

Reason (R): The radii joining the endpoints of the equal chords form congruent triangles.

## SECTION B

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

21. Points A(-4, -2) and B(2, 4) are shown. Find the midpoint of AB and state the quadrant in which the midpoint lies.

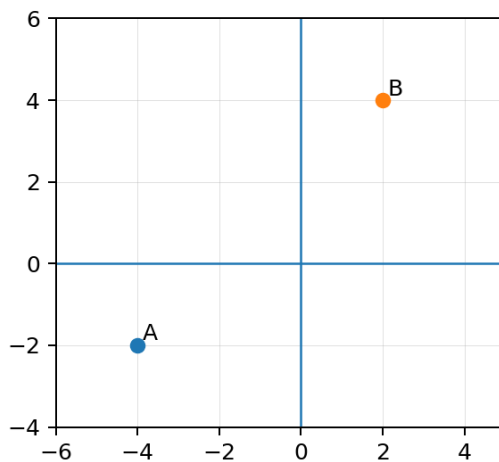


Figure for Question 21

22. (a) Express  $0.363636\dots$  in the form  $p/q$ .

OR

(b) Find three rational numbers between  $7/10$  and  $4/5$ .

23. Factorise:  $8x^3 + 27y^3$ .

24. A chord AB is 24 cm long and its perpendicular distance from the centre O is 5 cm. Find the radius.

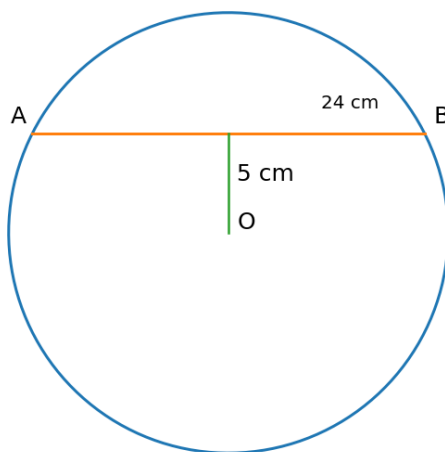


Figure for Question 24

25. (a) Find the 18th term of the AP 22, 17, 12, 7, ...

OR

(b) Find the 7th term of the GP 128, 64, 32, ...

## SECTION C

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

26. The graph shown represents a linear polynomial. Find its x-intercept and y-intercept and hence write the polynomial in the form  $ax + b$ , taking  $a = 1/2$ .

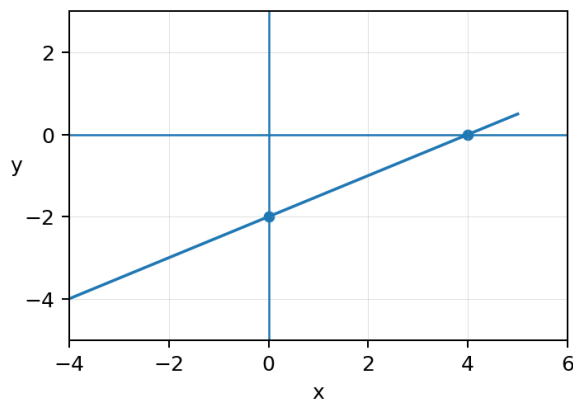


Figure for Question 26

27. (a) Using identities, evaluate  $1005^2 - 995^2$ .

**OR**

(b) Factorise completely:  $3x^2 - 14x - 5$ .

28. Prove that  $\sqrt{3} + \sqrt{5}$  is irrational.

29. A triangular plot has sides 20 m, 21 m and 29 m. Find its area using Heron's formula.

30. PQRS is a cyclic quadrilateral. If  $\angle P = 74^\circ$ , find  $\angle R$ . If  $\angle Q = 96^\circ$ , find  $\angle S$ . State the theorem used.

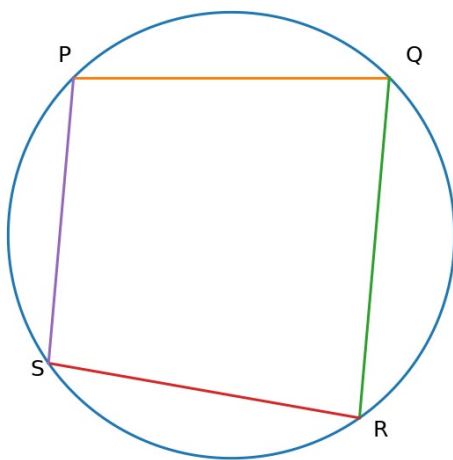


Figure for Question 30

31. (a) A box contains cards numbered 1 to 12. One card is selected. Find the probability that the number is (i) a factor of 12, (ii) neither prime nor 1.

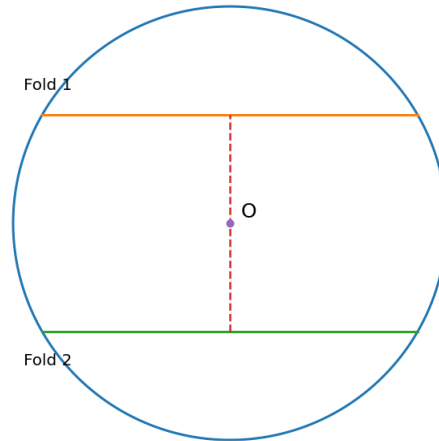
**OR**

(b) Two coins are tossed. Write the sample space and find the probability of getting exactly one head.

## SECTION D

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

32. In an activity, two chords are drawn at equal perpendicular distances from the centre O, as shown.



*Activity figure for Question 32*

- (i) What do you expect about the lengths of the two chords?
- (ii) Prove your observation using congruent right triangles.
- (iii) State the converse theorem.
- (iv) If one chord is 18 cm long, find the length of the other.

33. (a) The 7th term of an AP is 31 and the 21st term is 87. Find the first term, common difference, 40th term and write the recursive rule.

**OR**

(b) A GP has 4th term 54 and 7th term 1458. If the common ratio is positive, find the first term, common ratio and 9th term.

34. A branching dot activity produces 1, 3, 9 and 27 dots in successive stages.

Stage 1  
1 dots

Stage 2  
3 dots

Stage 3  
9 dots

Stage 4  
27 dots



*Activity pattern for Question 34*

- (i) Identify the progression and common ratio.
- (ii) Write the explicit rule for Stage n.
- (iii) Find the number of dots at Stage 8.
- (iv) Determine which stage contains 2187 dots.

35. (a) A quarter-circular path has inner radius 14 m and width 3.5 m, as shown. Find the area of the path and the difference between its outer and inner arc lengths.

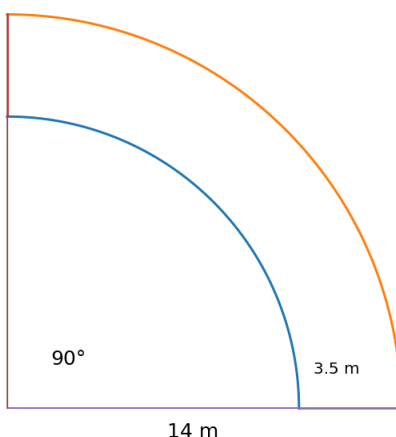


Figure for Question 35(a) only

**OR**

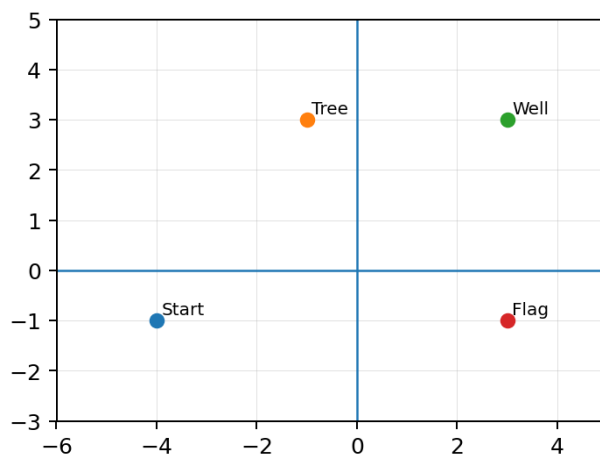
(b) A triangular field has sides 25 m, 25 m and 14 m. Find its area using Heron's formula and the cost of fencing it at ₹180 per metre.

### SECTION E

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

#### Case Study – 1

36. A treasure-hunt map uses coordinates: Start  $(-4, -1)$ , Tree  $(-1, 3)$ , Well  $(3, 3)$  and Flag  $(3, -1)$ .



Coordinate map for Question 36

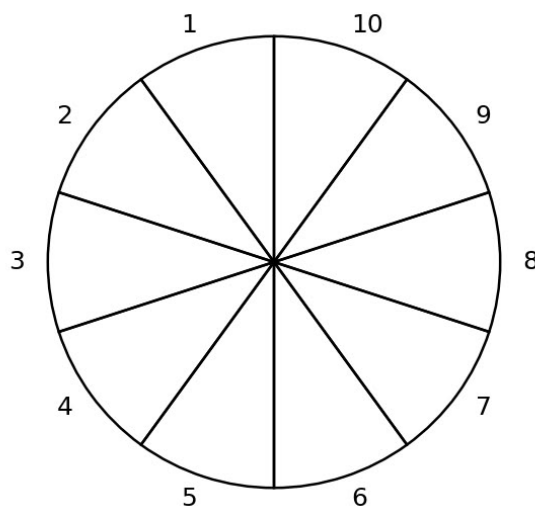
- (i) Find the distance from Tree to Well.
- (ii) Find the midpoint of Start and Flag.
- (iii) (a) Find the distance from Start to Tree.

**OR**

- (iii) (b) Find the distance from Well to Flag and state whether Tree-Well-Flag forms a right angle at Well.

### Case Study – 2

37. A fair wheel has ten equal sectors numbered 1 to 10 and is spun once.



*Wheel for Question 37*

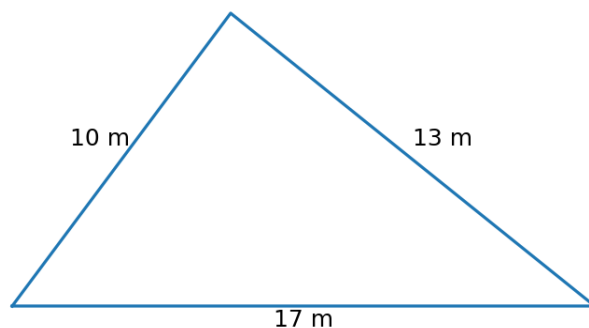
- (i) Find the probability of obtaining 10.
- (ii) Find the probability of obtaining an even number.
- (iii) (a) Find the probability of obtaining a prime number.

**OR**

- (iii) (b) Find the probability of obtaining a number that is a factor of 10.

### Case Study – 3

38. A triangular field has side lengths 10 m, 13 m and 17 m.



*Schematic figure for Question 38*

- (i) Find its semi-perimeter.
- (ii) Write Heron's formula for its area.
- (iii) (a) Calculate the area of the field.

**OR**

- (iii) (b) If grassing costs ₹40 per  $\text{m}^2$ , find the total cost of grassing the field.