

Mathematics
Sample Question Paper – 10
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 carry 2 marks each.
 - (5) Section C: Questions 26-31 carry 3 marks each.
 - (6) Section D: Questions 32-35 carry 5 marks each.
 - (7) Section E: Questions 36-38 are case study based and carry 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. Calculators are not allowed.
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SECTION A

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

1. The midpoint of $(-7, 3)$ and $(5, 9)$ is:

- | | |
|----------------|---------------|
| (A) $(-1, 6)$ | (B) $(1, 6)$ |
| (C) $(-2, 12)$ | (D) $(6, -1)$ |

2. A point on the x-axis has ordinate:

- | | |
|-------|---------------------|
| (A) 1 | (B) -1 |
| (C) 0 | (D) any real number |

3. The zero of $4x + 20$ is:

- | | |
|--------|-------|
| (A) -5 | (B) 5 |
| (C) -4 | (D) 4 |

4. If $p(x) = 2 - 7x$, then $p(-1) =$:

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

5. From the graph, the x-intercept of $y = 3 - x$ is:

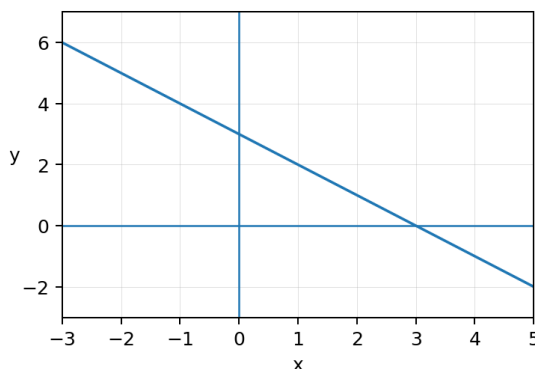


Figure for Question 5

- | | |
|--------|-------|
| (A) -3 | (B) 0 |
| (C) 1 | (D) 3 |

6. Which number is rational?

(A) $\sqrt{6}$

(C) π

(B) $\sqrt{121}$

(D) $\sqrt{19}$

7. The decimal expansion of $17/125$ is:

(A) terminating

(C) non-repeating

(B) recurring only

(D) irrational

8. $(3a + 2b)(3a - 2b) =$:

(A) $9a^2 - 4b^2$

(C) $6a^2 - 4b^2$

(B) $9a^2 + 4b^2$

(D) $9a^2 - 12ab + 4b^2$

9. One factor of $x^2 + x - 20$ is:

(A) $x - 4$

(C) $x - 10$

(B) $x + 4$

(D) $x + 10$

10. A chord passing through the centre is called:

(A) radius

(C) diameter

(B) tangent

(D) arc

11. In the figure, $\angle AOB = 120^\circ$. The angle subtended by chord AB at a point on the major arc is:

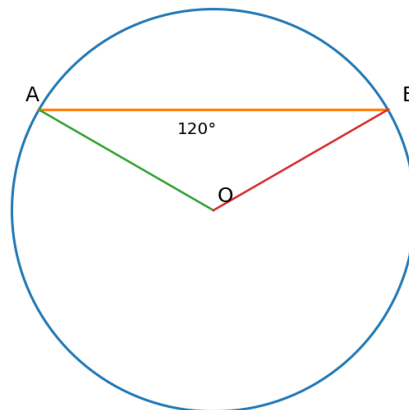


Figure for Question 11

(A) 30°

(C) 120°

(B) 60°

(D) 240°

12. Semi-perimeter of a triangle with sides 11, 13, 16 is:

(A) 20

(C) 40

(B) 30

(D) 80

13. Circumference of a circle of radius 10.5 cm is:

(A) 33 cm

(C) 66 cm

(B) 44 cm

(D) 132 cm

14. A bag has 3 green and 7 yellow balls. Probability of green is:

- (A) $\frac{3}{7}$ (B) $\frac{3}{10}$
(C) $\frac{7}{10}$ (D) $\frac{1}{3}$

15. An event occurs 72 times in 180 trials. Experimental probability is:

- (A) $\frac{2}{5}$ (B) $\frac{3}{5}$
(C) $\frac{4}{5}$ (D) $\frac{5}{2}$

16. The 14th term of AP 6, 10, 14, ... is:

- (A) 54 (B) 58
(C) 62 (D) 66

17. The 5th term of GP 4, 12, 36, ... is:

- (A) 108 (B) 216
(C) 324 (D) 972

18. The activity pattern shown gives 5, 9, 13, 17, ... objects. The n th term is:

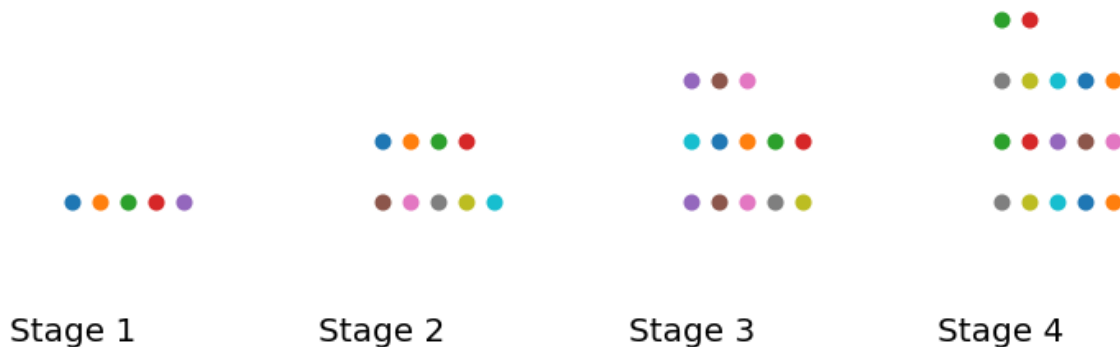


Figure for Question 18

- (A) $4n + 1$ (B) $5n - 1$
(C) $4n + 5$ (D) $n + 4$

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): Between $\sqrt{2}$ and $\sqrt{3}$ there are infinitely many rational numbers.

Reason (R): Between any two distinct real numbers there are infinitely many rational numbers.

20. Assertion (A): The angle in a semicircle is a right angle.

Reason (R): The angle subtended by a diameter at the centre is 180° , and the angle at the circle is half of it.

SECTION B

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

21. (a) Find the distance between $(-6, 2)$ and $(2, 2)$.

OR

(b) Find the reflection of $(4, -7)$ in the origin.

22. $P(-2, 4)$ and $Q(4, -4)$ are shown. Find the midpoint of PQ .

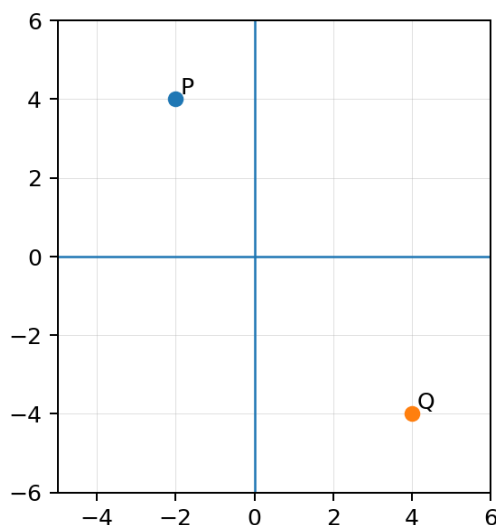


Figure for Question 22

23. Simplify using identities: $(7x + 4y)^2 - (7x - 4y)^2$.

24. A chord AB of length 12 cm is 8 cm from the centre O . Find the radius.

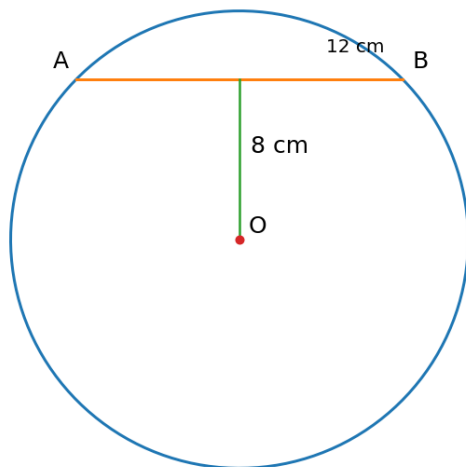


Figure for Question 24

25. (a) Find the 25th term of AP $-3, 2, 7, 12, \dots$

OR

(b) Write the next four terms of GP $625, 125, 25, \dots$

SECTION C

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

26. Express 0.16666... in the form p/q .

27. The area model contains regions x^2 , $5x$, $-2x$ and -10 . Write the corresponding product and hence factorise $x^2 + 3x - 10$.

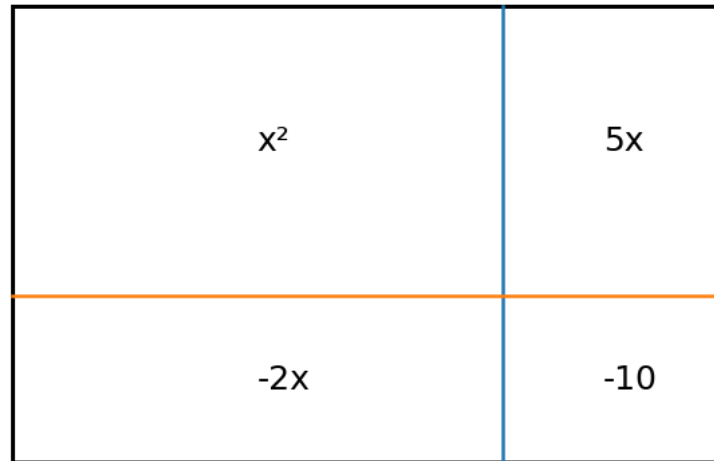


Figure for Question 27

28. (a) For $p(x) = 5x + b$, $p(3) = 19$. Find b , $p(-2)$ and the zero of $p(x)$.

OR

(b) A line has equation $y = 4x - 12$. Find its intercepts on both axes.

29. Prove that equal chords of a circle are equidistant from the centre.

30. ABCD is a cyclic quadrilateral. If $\angle A = 68^\circ$ and $\angle B = 103^\circ$, find $\angle C$ and $\angle D$.

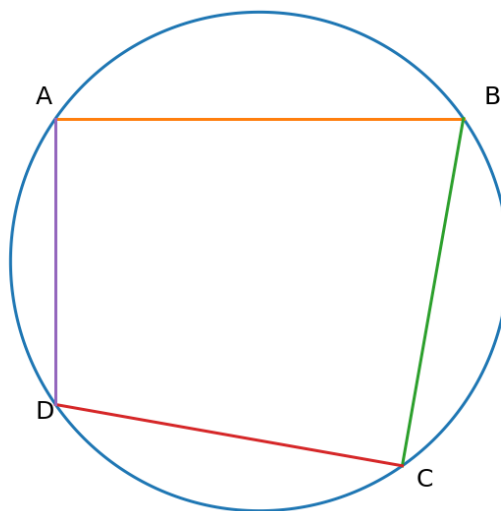


Figure for Question 30

31. (a) A die is thrown once. Find the probability of obtaining (i) a prime number, (ii) a number not exceeding 2.

OR

(b) Cards numbered 31 to 40 are placed in a box. Find the probability that a selected card shows (i) a multiple of 4, (ii) an odd number.

SECTION D

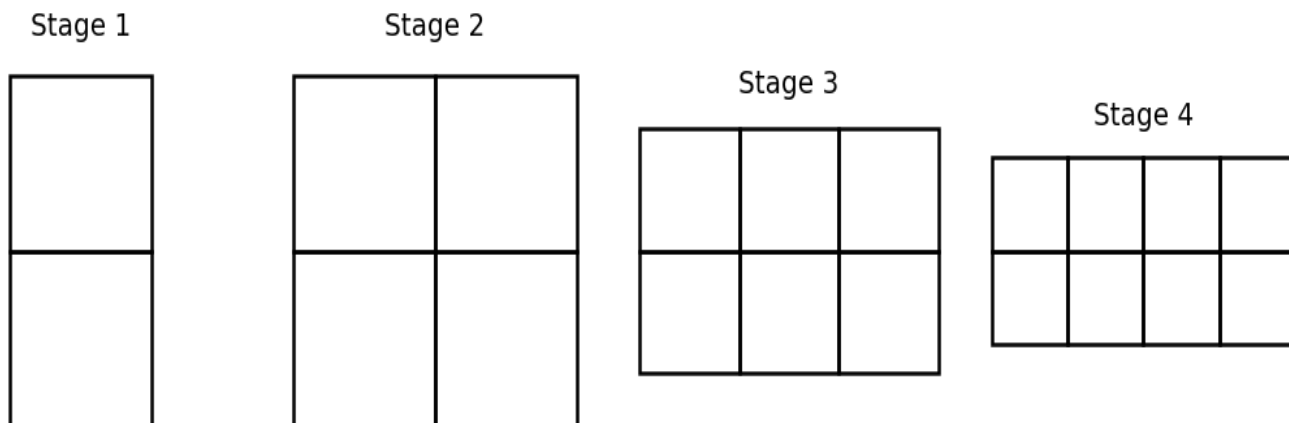
(Questions 32 to 35 carry 5 marks each. $4 \times 5 = 20$)

32. (a) A triangular field has sides 18 m, 24 m and 30 m. Find its area by Heron's formula. Also find the altitude corresponding to the side 24 m.

OR

(b) A circular garden of radius 14 m is surrounded by a path 7 m wide. Find the area of the path and the cost of fencing the outer boundary at ₹150 per metre.

33. A tile activity has 2, 4, 6, 8, ... tiles in successive stages, as illustrated.



Activity figure for Question 33

- (i) Identify the progression.
- (ii) Write its common difference and nth term.
- (iii) Find the number of tiles at Stage 50.
- (iv) Find the stage containing 144 tiles.

34. (a) The 8th term of an AP is 37 and the 23rd term is 112. Find the first term, common difference, 35th term and recursive rule.

OR

(b) The first term of a GP is 5 and its 6th term is 1215. If the common ratio is positive, find the common ratio and 8th term.

35. A 120° sector of radius 7 cm is shown.

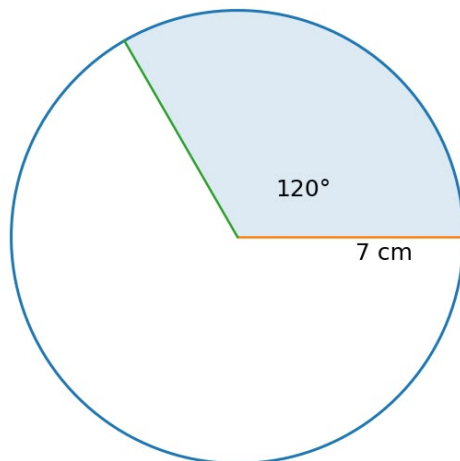


Figure for Question 35

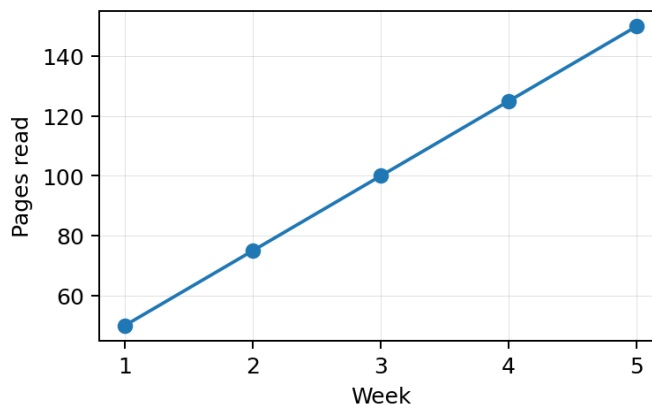
- (i) Find its arc length.
- (ii) Find its area.
- (iii) Find the perimeter of the sector.
- (iv) If three such sectors are joined without overlap, find their total area.

SECTION E

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

Case Study – 1

36. A student reads 50 pages in Week 1 and increases the total by 25 pages each week. The graph shows the pattern.



Reading pattern for Question 36

- (i) Identify the common difference.
- (ii) How many pages are read in Week 5?
- (iii) (a) Write the n th-term rule and find the number for Week 12.

OR

- (iii) (b) In which week will the number first be 250 pages?

Case Study – 2

37. Ten cards carrying the even numbers 2, 4, 6, ..., 20 are placed in a box. One card is chosen at random.



Cards for Question 37

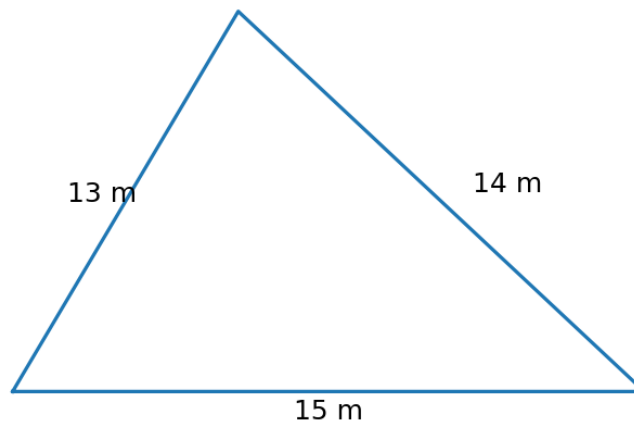
- (i) How many possible outcomes are there?
- (ii) Find the probability of selecting 20.
- (iii) (a) Find the probability of selecting a multiple of 6.

OR

- (iii) (b) Find the probability of selecting a number divisible by 4.

Case Study – 3

38. A triangular field has sides 13 m, 14 m and 15 m.



Schematic field for Question 38

- (i) Find the semi-perimeter.
- (ii) Write Heron's formula using the given side lengths.
- (iii) (a) Find the area of the field.

OR

- (iii) (b) Find the cost of grassing it at ₹60 per m².