

Mathematics
Sample Question Paper – 3
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.
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SECTION A

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

1. The point equidistant from (2, 5) and (2, -3) on the line $x = 2$ is:
(A) (2, 0) (B) (2, 1)
(C) (1, 2) (D) (2, 2)
2. If M is the midpoint of A(-6, 4) and B(2, -2), then M is:
(A) (-2, 1) (B) (-4, 2)
(C) (4, -1) (D) (-2, -1)
3. If $p(x) = -4x + 20$, then $p(3)$ equals:
(A) -8 (B) 8
(C) 12 (D) 32
4. Which linear polynomial represents a quantity starting at 90 and decreasing by 7 for each unit increase in x ?
(A) $90 + 7x$ (B) $7x - 90$
(C) $90 - 7x$ (D) $-90 - 7x$
5. Which of the following lies between $\sqrt{5}$ and $\sqrt{6}$?
(A) 2.1 (B) 2.3
(C) 2.6 (D) 3
6. The decimal expansion of $13/40$ is:
(A) terminating
(B) non-terminating repeating
(C) non-terminating non-repeating
(D) an integer

7. $(a + b + c)^2 - a^2 - b^2 - c^2$ equals:

(A) $ab + bc + ca$

(B) $2(ab + bc + ca)$

(C) $2abc$

(D) $a + b + c$

8. $x^2 - 16$ is equal to:

(A) $(x - 8)(x + 2)$

(B) $(x - 4)^2$

(C) $(x - 4)(x + 4)$

(D) $(x + 8)(x - 2)$

9. The centre of the circumcircle of a right triangle lies:

(A) at a vertex

(B) at the midpoint of its hypotenuse

(C) outside the triangle

(D) at the intersection of medians

10. If an arc subtends 130° at the centre, the angle subtended by the same arc at a point on the remaining circle is:

(A) 65°

(B) 130°

(C) 260°

(D) 50°

11. The length of a semicircular arc of radius 21 cm is:

(A) 33 cm

(B) 44 cm

(C) 66 cm

(D) 132 cm

12. The semi-perimeter of a triangle with sides 9 cm, 10 cm and 17 cm is:

(A) 18 cm

(B) 36 cm

(C) 17 cm

(D) 9 cm

13. A spinner has 8 equal sectors numbered 1 to 8. The probability of landing on a factor of 8 is:

(A) $1/4$

(B) $3/8$

(C) $1/2$

(D) $5/8$

14. In 200 trials an event occurs 46 times. Its experimental probability is:

(A) $23/100$

(B) $46/100$

(C) $77/100$

(D) $154/200$

15. Which rule generates the sequence 6, 11, 16, 21, ...?

(A) $t_n = 5n + 1$

(B) $t_n = 6n - 1$

(C) $t_n = 5n - 1$

(D) $t_n = n + 5$

16. Which term of the AP 4, 10, 16, 22, ... is 70?

(A) 10th

(B) 11th

(C) 12th

(D) 13th

17. The common ratio of the GP $-3, 6, -12, 24, \dots$ is:

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

18. The 6th term of the GP $1, 2, 4, 8, \dots$ is:

- (A) 16 (B) 24
(C) 32 (D) 64

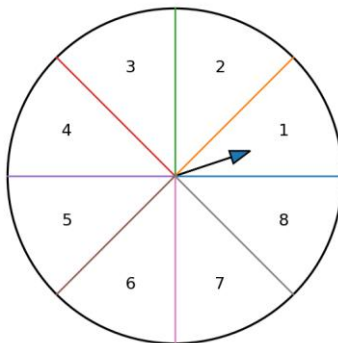


Figure for Question 13

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 midpoint of two points having the same y-coordinate also has that same y-coordinate.

Reason (R): The y-coordinate of the midpoint is the average of the y-coordinates of the two endpoints.

20. Assertion (A): Every diameter of a circle is a chord.

Reason (R): A chord is a line segment joining any two points on a circle.

SECTION B

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

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

22. (a) Find the value of $65^2 - 35^2$ without calculating the two squares separately.

OR

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

23. A circular wheel has radius 35 cm. Find the distance covered in one complete revolution.

24. (a) The 8th term of an AP is 31 and its common difference is 4. Find its first term.

OR

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

25. A coin is tossed and a die is rolled together. How many outcomes are there in the sample space? Find the probability of getting a head and an even number.

SECTION C

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

26. Represent $\sqrt{10}$ on the number line using a right-triangle construction. Write the main construction steps.

27. A quantity decreases linearly as shown in the graph. Find its value at $t = 4$ hours, determine when it becomes zero, and write the linear expression relating quantity y to time t .

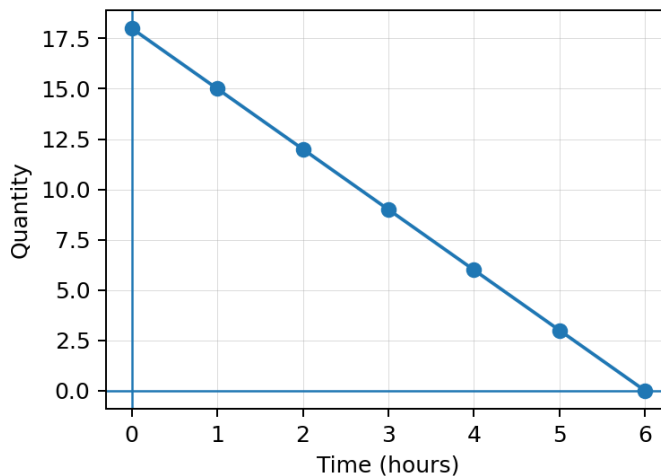


Figure for Question 27

28. (a) The diagram represents the area model of $(x + 2)(x + 5)$. Use it to expand the product and hence factorise $x^2 + 7x + 10$.

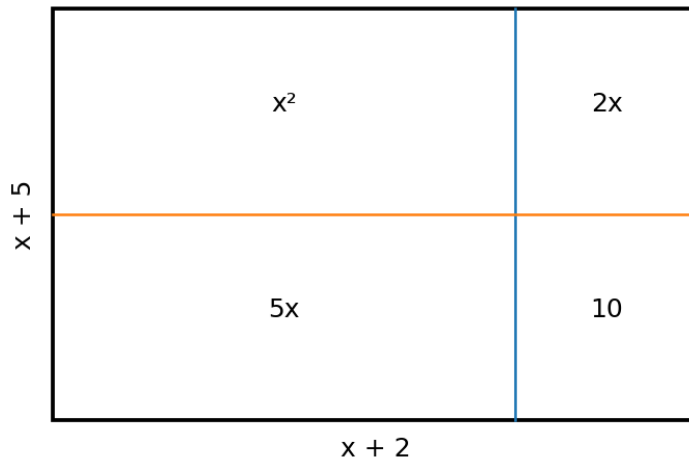


Figure for Question 28(a) only

OR

(b) If $a + b = 13$ and $ab = 36$, find $a^2 + b^2$ and $(a - b)^2$ using identities.

29. In a circle, AB is a chord and M is its midpoint. Prove that $OM \perp AB$, where O is the centre.

30. (a) A ring-shaped walking path lies between two concentric circles of radii 14 m and 10 m. Find the area of the path.

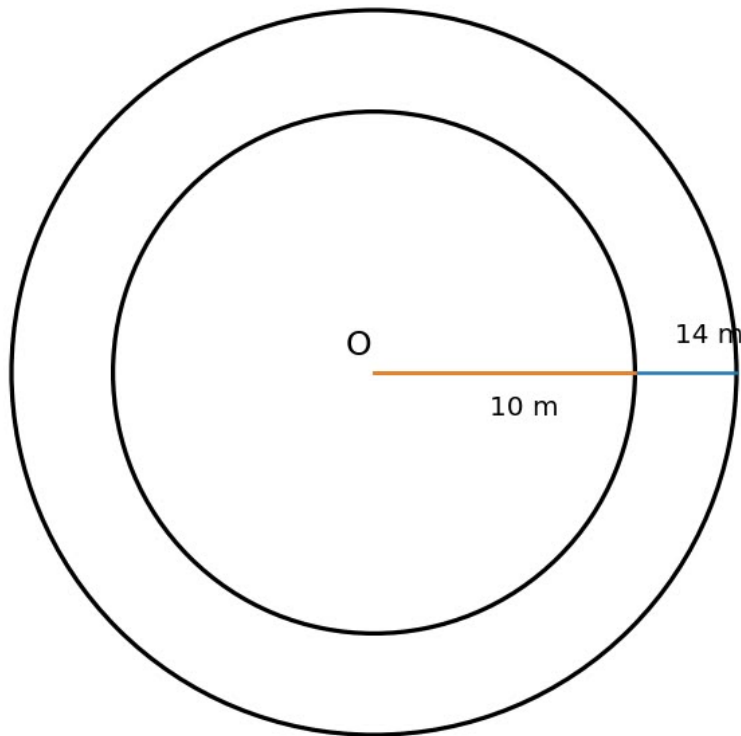


Figure for Question 30(a) only

OR

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

31. The numbers of books read by a student in six months are 2, 5, 8, 11, 14, 17. Show that these form an AP, write its n th term, and predict the number for the 12th month if the pattern continues.

SECTION D

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

32. The points A(-4, 0), B(0, 4), C(4, 0) and D(0, -3) are shown on a coordinate plane.

(i) Find AC and BD.

(ii) Find the midpoint of AC.

(iii) Find AB and BC.

(iv) What can you conclude about triangle ABC? Give reasons.

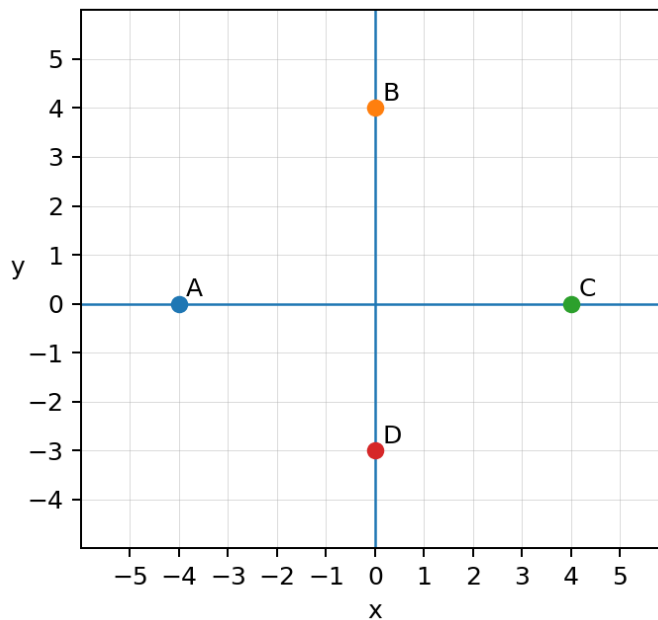


Figure for Question 32

33. (a) The graph of a linear polynomial passes through $(-2, 9)$ and $(4, -3)$. Find the polynomial, its zero, and the points where its graph cuts both coordinate axes.

OR

(b) A water tank contains 2400 L. Water is drained at a constant rate of 120 L per minute. Write a linear expression for the water remaining after n minutes. Find the water left after 13 minutes and determine after how many minutes 600 L remain.

34. (a) Two chords AC and BD of a circle intersect at P as shown. If $\angle APB = 70^\circ$ and $\angle BAC = 35^\circ$, determine suitable angles in the figure using circle-angle properties, giving reasons.

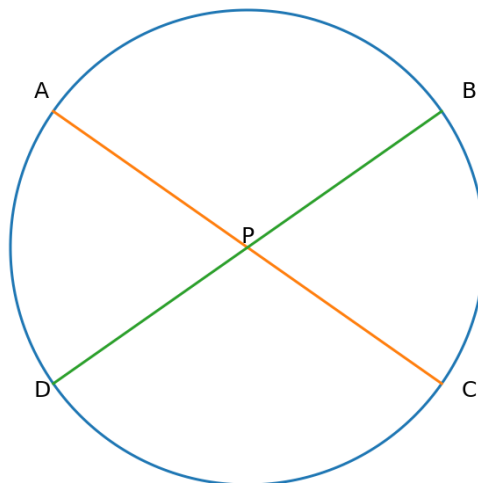


Figure for Question 34(a) only

OR

(b) Construct the circumcircle of a triangle with sides 6 cm, 8 cm and 10 cm. Explain where its circumcentre lies and justify your answer using the nature of the triangle.

35. The triangular dot pattern shown begins with 1, 3, 6 and 10 dots.

(i) Write the next two terms.

(ii) Explain why this is not an AP.

(iii) Use the relation $T_n = n(n+1)/2$ to find T_{20} .

(iv) Find $T_{20} - T_{15}$ and interpret it as a sum of consecutive natural numbers.

Stage 1

Stage 2

Stage 3

Stage 4



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 school bus service charges a fixed monthly amount of ₹350 plus ₹18 for each day the bus is used. If x is the number of days, the monthly charge is $C(x) = 350 + 18x$.

(i) What is $C(0)$? What does it represent?

(ii) Find the charge for 20 days.

(iii) (a) For how many days of use will the charge be ₹890?

OR

(iii) (b) If the monthly budget is ₹1,070, what is the maximum number of days the bus can be used according to this model?

Case Study - 2

37. A circular fountain has radius 10.5 m. Around it is a circular paved region extending to an outer radius of 17.5 m.

(i) Find the circumference of the fountain.

(ii) Find the area of the fountain.

(iii) (a) Find the area of the paved region.

OR

(iii) (b) If paving costs ₹120 per m^2 , find the total paving cost.

Case Study – 3

38. A game consists of tossing a fair coin and then rolling a fair die. For the die, E denotes an even result and O an odd result. The tree diagram shows the four broad outcome types.

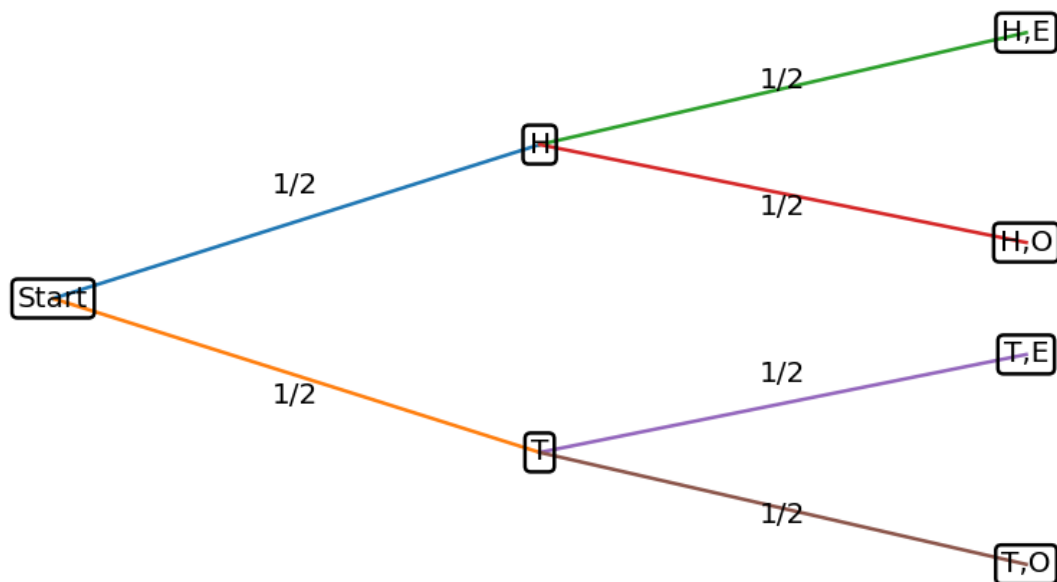


Figure for Question 38

- (i) What is the probability of H on the first step?
- (ii) What is the probability of an even result on the die?
- (iii) (a) Find the probability of getting a head and an even number.

OR

- (iii) (b) List the full 12-outcome sample space using H/T with die numbers 1 to 6, and find the probability of getting a tail with a number greater than 4.