Mathematics

Sample Question Paper – 8

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 π = 22/7 unless otherwise stated. Calculators are not allowed.

SECTION A

(Questions 1 to 20 carry 1 mark each. 20 × 1 = 20)

1. The point (0, – 8) lies on:

(A) x-axis
(B) y-axis
(C) origin
(D) IV quadrant

2. The distance between A(– 3, – 2) and B(1, – 2) is:

(A) 2
(B) 4
(C) 5
(D) $\sqrt{20}$

3. The zero of p(x) = 9 – 3x is:

(A) –3
(B) 1
(C) 3
(D) 9

4. If y = 6x + 1, then the increase in y when x increases by 1 is:

(A) 1
(B) 5
(C) 6
(D) 7

5. Which is a non-terminating recurring decimal?

(A) 3/8
(B) 5/6
(C) $\sqrt{5}$
(D) 7/20

6. In the number-line figure, which labelled point represents a number between 3 and 4?

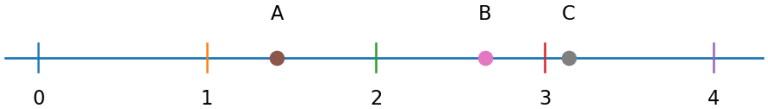


Figure for Question 6

(A) A only
(B) B only
(C) C only
(D) B and C

7. $(2x - y)^2$ equals:
(A) $4x^2 - y^2$ (B) $4x^2 - 4xy + y^2$
(C) $2x^2 - 4xy + y^2$ (D) $4x^2 + 4xy + y^2$

8. $x^3 + 27$ factorises as:
(A) $(x + 3)(x^2 - 3x + 9)$
(B) $(x - 3)(x^2 + 3x + 9)$
(C) $(x + 27)(x^2 + 1)$
(D) $(x + 3)^3$

9. If two chords of a circle are equal, their distances from the centre are:
(A) equal (B) in ratio 2:1
(C) unequal (D) zero

10. An angle of 55° at the circumference subtends at the centre an angle of:
(A) 27.5° (B) 55°
(C) 110° (D) 125°

11. Area of a circle of circumference 44 cm is:
(A) 44 cm^2 (B) 77 cm^2
(C) 154 cm^2 (D) 308 cm^2

12. A triangle has sides 6,8,10. Its area is:
(A) 24 (B) 30
(C) 40 (D) 48 square units

13. Probability of drawing an odd-numbered card from cards 1 to 8 is:
(A) 1/4 (B) 1/2
(C) 5/8 (D) 3/4

14. In 200 tosses, a coin gives heads 108 times. Relative frequency of tails is:
(A) 23/50 (B) 27/50
(C) 54/100 (D) 108/200

15. The common difference of AP –7, –2, 3, 8, ... is:
(A) –5 (B) 3
(C) 5 (D) 7

16. The nth term of AP 12, 9, 6, 3, ... is:
(A) 15 – 3n (B) 12 – 3n
(C) 9 – 3n (D) 3n + 9

17. The pattern shown has 1, 2, 4, 8 squares. It forms a:

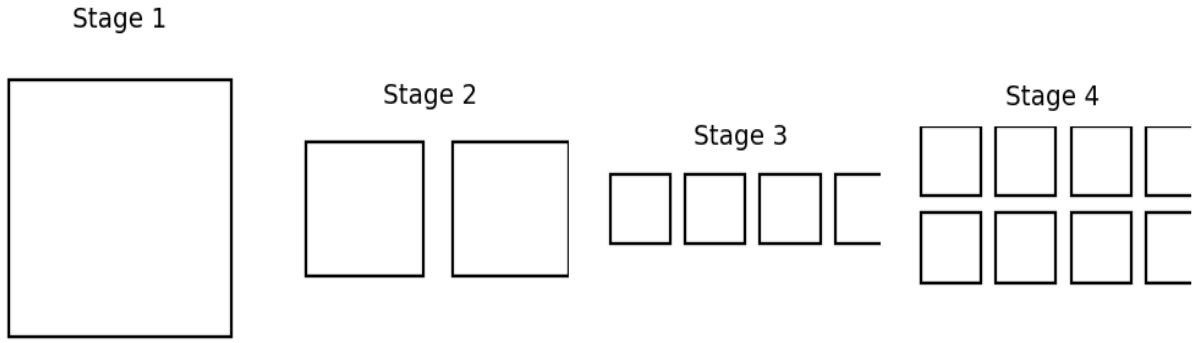


Figure for Question 17

(A) AP with d = 1
(B) GP with r = 2
(C) AP with d = 2
(D) GP with r = 4

18. The 6th term of GP 3, 6, 12, 24, ... is:
(A) 48
(B) 72
(C) 96
(D) 192

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): $\sqrt{18}$ is irrational.
Reason (R): $\sqrt{18} = 3\sqrt{2}$ and a non-zero rational multiple of an irrational number is irrational.

20. Assertion (A): The perpendicular from the centre of a circle to a chord bisects it.
Reason (R): The two right triangles formed have equal hypotenuses and a common perpendicular side.

SECTION B

(Questions 21 to 25 carry 2 marks each. 5 × 2 = 10)

21. (a) Find the point midway between (– 8, 5) and (4, – 1).

OR

(b) A point is 5 units from the x-axis and 3 units from the y-axis in the II quadrant. Write its coordinates.

22. If p(x) = 5x + b and p(–2) = 3, find b and p(1).

23. A chord AB of length 16 cm is 6 cm from the centre O, as shown. Find the radius of the circle.

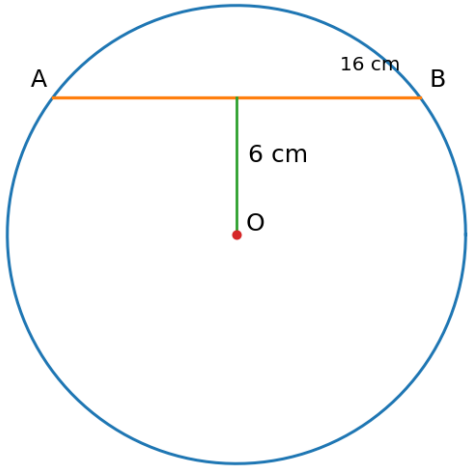


Figure for Question 23

24. (a) Evaluate 104^2 using an algebraic identity.

OR

(b) Factorise $25m^2 - 30mn + 9n^2$.

25. The quadrilateral shown has vertices A(– 3, 0), B(0, 4), C(3, 0), D(0, – 2). Find the lengths AC and BD.

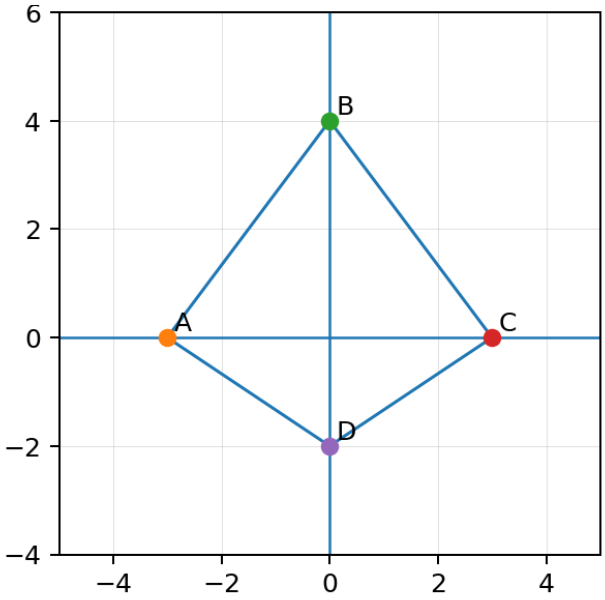


Figure for Question 25

SECTION C

(Questions 26 to 31 carry 3 marks each. 6 × 3 = 18)

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

27. Find the 32nd term of the AP 15, 11, 7, 3... and determine whether –101 is a term of this AP.

28. (a) Factorise: $2x^2 + 9x + 10$.

OR

(b) If $x - y = 6$ and $xy = 16$, find $x^2 + y^2$ and $(x + y)^2$.

29. The graph shown is $y = -2x + 4$. Find its x-intercept and y-intercept. Also write the zero of the corresponding linear polynomial.

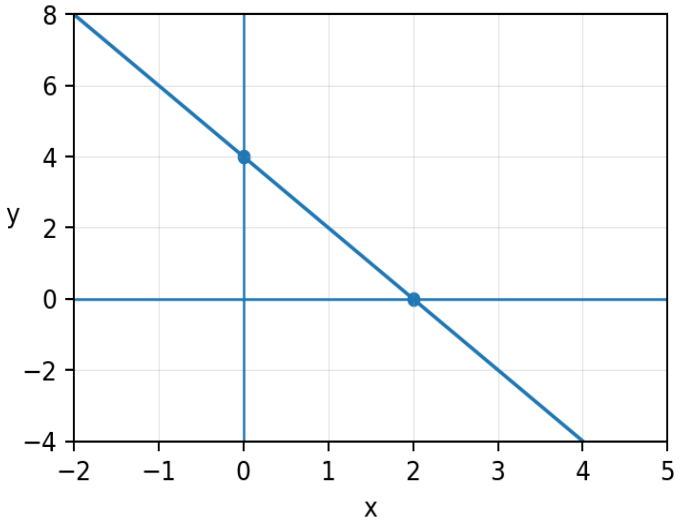


Figure for Question 29

30. Prove that opposite angles of a cyclic quadrilateral are supplementary.

31. (a) A sector of radius 10 cm subtends 72° at the centre, as shown. Find its arc length and area.

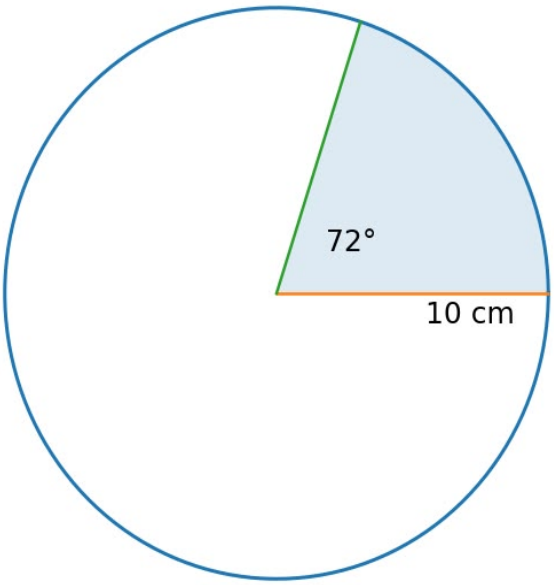


Figure for Question 31(a) only

OR

(b) A circular field has diameter 42 m. Find its circumference and area.

SECTION D

(Questions 32 to 35 carry 5 marks each. 4 × 5 = 20)

32. Two chords AB and CD of a circle are shown at different distances from centre O.

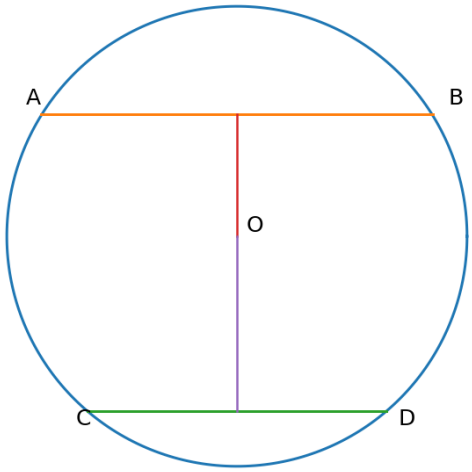


Figure for Question 32

(i) State the relation between chord length and distance from the centre.
(ii) If AB = CD, prove that their perpendicular distances from O are equal.
(iii) If one chord is nearer O than the other, which is longer? Justify.

33. (a) A triangle has sides 26 m, 28 m and 30 m. Find its area using Heron's formula and the altitude corresponding to the side 28 m.

OR

(b) A circular lawn of radius 21 m is surrounded by a path 7 m wide. Find the area of the path and its paving cost at ₹95 per m^2.

34. A staircase tile pattern is shown. The number of tiles in successive stages is 2, 4, 6, 8, ...

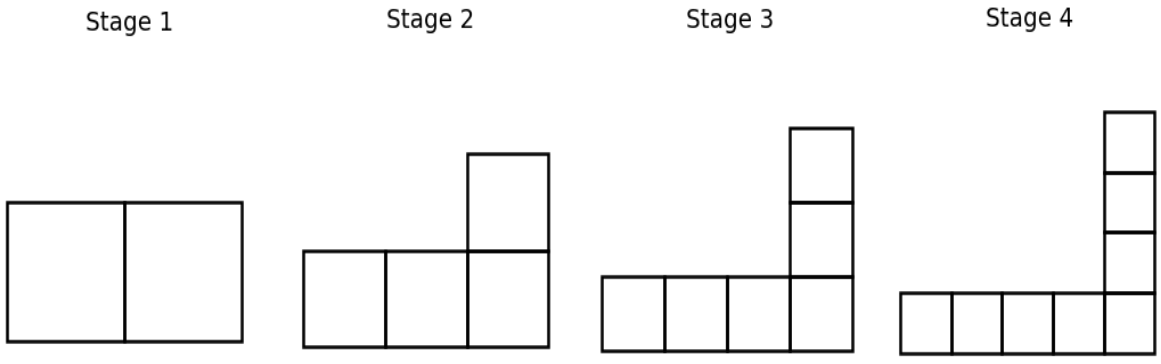


Figure for Question 34

(i) Identify the progression and common difference.
(ii) Write the nth term.
(iii) Find the number of tiles in Stage 35.
(iv) Which stage has 120 tiles?

35. (a) The 6th term of an AP is 27 and the 18th term is 75. Find the first term, common difference and 30th term.

OR

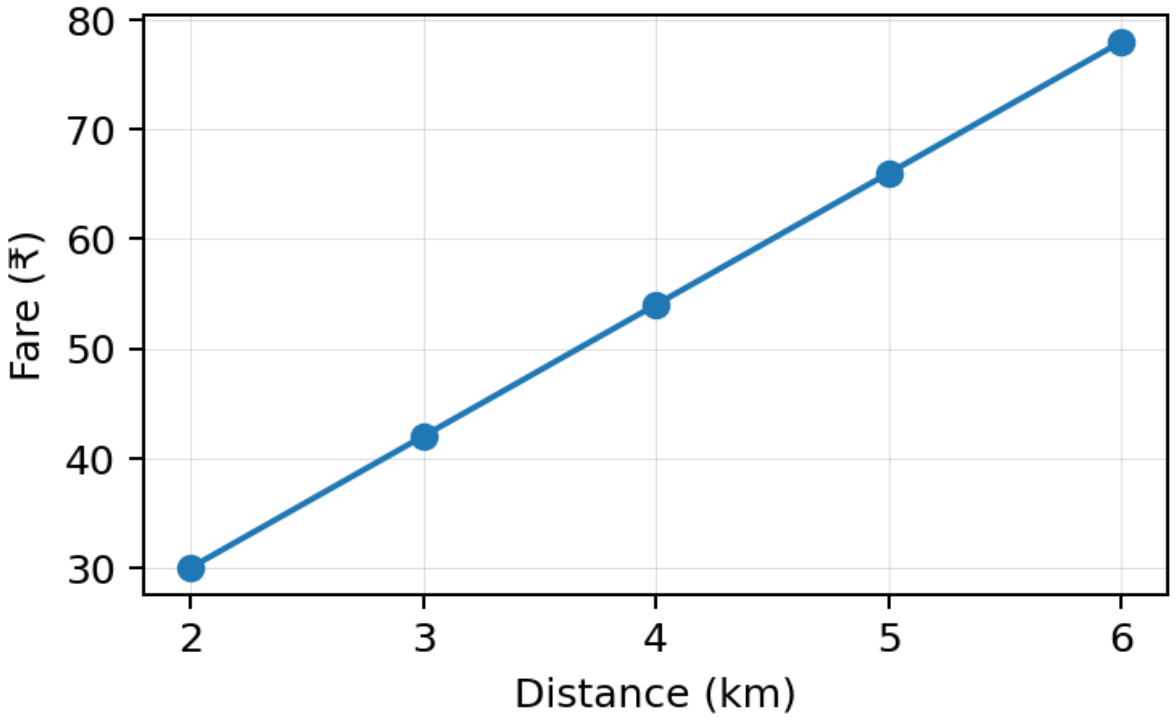
(b) The 2nd term of a GP is 10 and the 5th term is 80. Find the positive common ratio, first term and 8th term.

SECTION E

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

Case Study – 1

36. An auto-rickshaw charges ₹30 for the first 2 km and then ₹12 for each additional kilometre. The graph illustrates the fare pattern after 2 km.



Fare pattern for Question 36

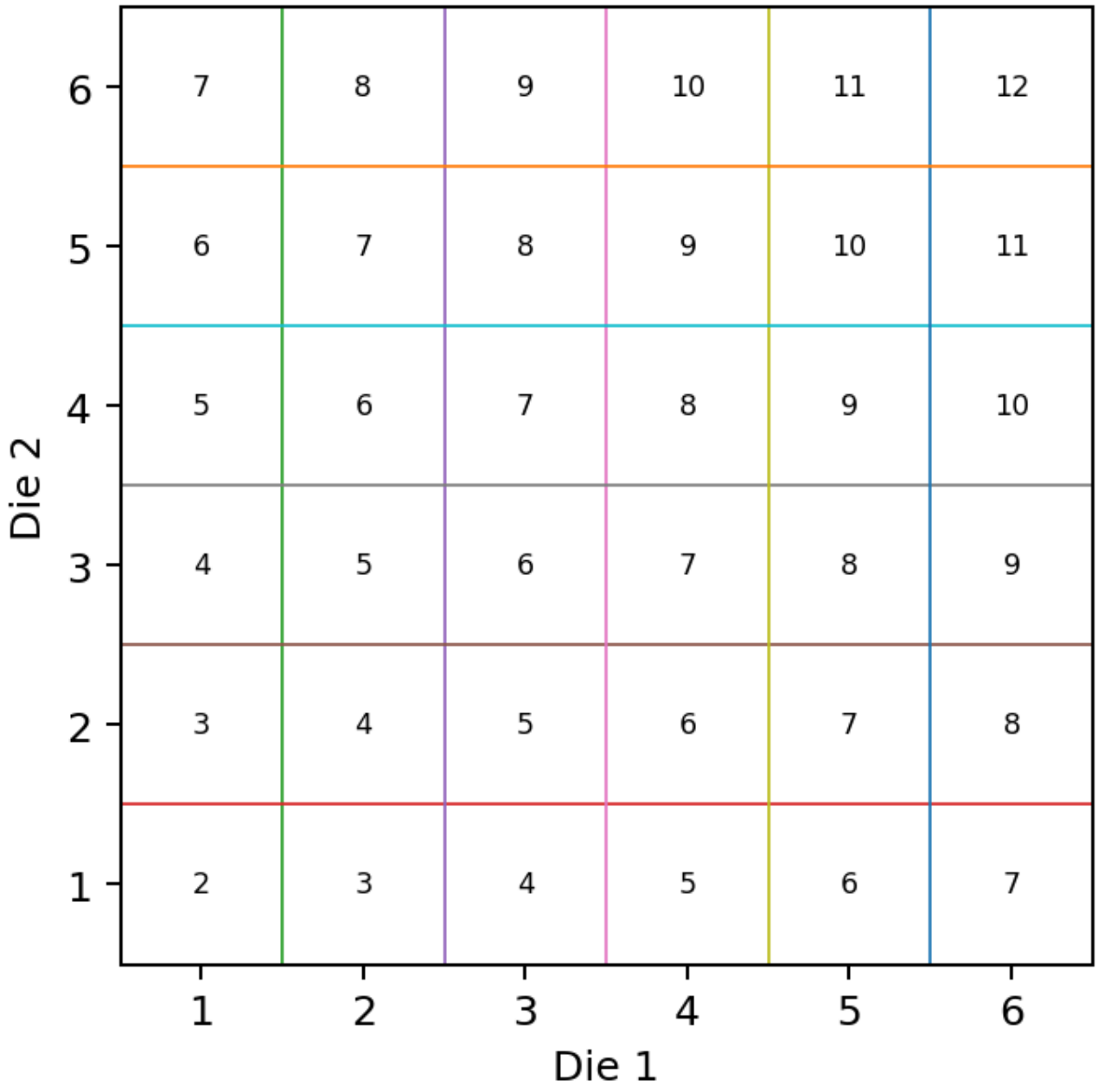
(i) Find the fare for 3 km.
(ii) By how much does the fare increase per additional kilometre?
(iii) (a) Write a linear expression for the fare for n km, n≥2, and find the fare for 10 km.

OR

(iii) (b) For what distance will the fare be ₹126?

Case Study – 2

37. Two fair dice are rolled. The grid shows the sum for each ordered pair of outcomes.



Sum grid for Question 37

(i) How many outcomes are in the sample space?
(ii) How many outcomes give sum 7?
(iii) (a) Find the probability of obtaining sum 8.

OR

(iii) (b) Find the probability of obtaining a sum less than 5.

Case Study – 3

38. A square is inscribed in a circle of radius 7 m, as shown. The diagonals of the square are diameters of the circle.

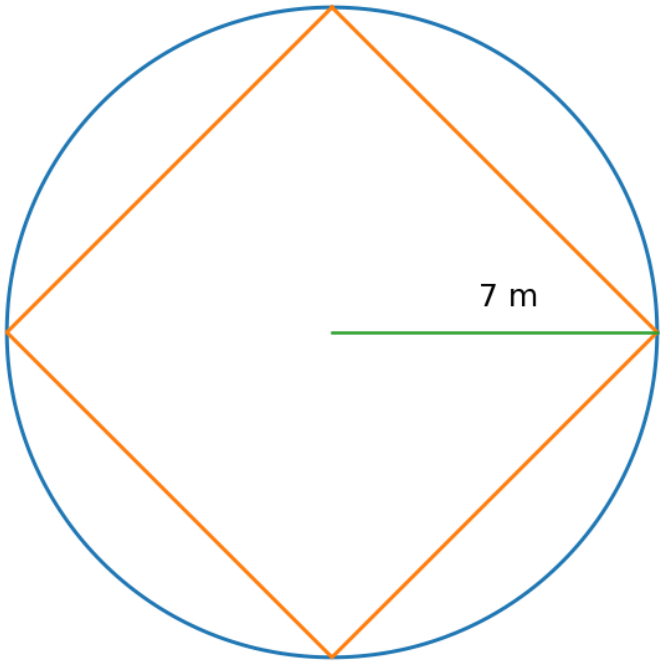


Figure for Question 38

(i) Find the area of the circle.
(ii) Find the diagonal of the square.
(iii) (a) Find the area of the square and hence the area inside the circle but outside the square.

OR

(iii) (b) Find the perimeter of the square.