

# UNIQUE STUDY POINT

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<b>Class:</b> VI	<b>Subject:</b> Mathematics	<b>Session:</b> 2025-26
<b>Chapter:</b> 06 - Perimeter and Area	<b>Time:</b> 1½ Hours	<b>Max. Marks:</b> 40

## General Instructions:

1. All questions are compulsory.
2. This question paper contains 20 questions divided into five sections A, B, C, D and E.
3. Section A contains 10 MCQs of 1 mark each.
4. Section B contains 4 questions of 2 marks each.
5. Section C contains 3 questions of 3 marks each.
6. Section D contains 1 question of 5 marks.
7. Section E contains 2 Case Study Based questions of 4 marks each.

## SECTION A - Multiple Choice Questions (1 mark each)

1. The area of a square plot is 2025 sq m. Its perimeter is:  
(a) 45 m  
(b) 90 m  
(c) 180 m  
(d) 135 m
2. A string of length 144 cm can form:  
(a) A square of side 36 cm  
(b) A rectangle of dimensions 40 cm × 32 cm  
(c) An equilateral triangle of side 48 cm  
(d) All of the above
3. The perimeter of a rectangle is 100 m. If the length is 30 m more than the breadth, the length is:  
(a) 20 m  
(b) 35 m  
(c) 40 m  
(d) 50 m
4. Which of the following cannot be the perimeter of a triangle with sides as whole numbers?  
(a) 15 cm  
(b) 20 cm  
(c) 5 cm  
(d) 12 cm
5. A room 5 m long and 4 m wide is surrounded by a verandah. If verandah's width is 2 m, the area of verandah is:  
(a) 48 sq m

- (b) 36 sq m  
(c) 52 sq m  
(d) 60 sq m
6. The cost of fencing a square field at ₹18 per metre is ₹1872. The length of each side is:  
(a) 26 m  
(b) 52 m  
(c) 104 m  
(d) 208 m
7. If the perimeter and area of a square are numerically equal, the side of square is:  
(a) 1 unit  
(b) 2 units  
(c) 4 units  
(d) 8 units
8. A wire can form a rectangle of length 12 cm and breadth 8 cm. If the same wire is bent to form a circle, its circumference will be:  
(a) 20 cm  
(b) 40 cm  
(c) 32 cm  
(d) 48 cm
9. A rectangular field has area equal to 150 sq m and perimeter equal to 50 m. Its length is:  
(a) 10 m  
(b) 12 m  
(c) 15 m  
(d) 20 m
10. Among all rectangles with same perimeter, which has the maximum area?  
(a) The one with length = 2 × breadth  
(b) The one with length = 3 × breadth  
(c) The one with length = breadth (square)  
(d) All have equal area

### SECTION B - Short Answer Questions (2 marks each)

11. A rectangular garden is 90 m long and 75 m wide. Two paths run through the center of the garden - one parallel to length (2 m wide) and one parallel to breadth (3 m wide). Find the area of the paths.
12. A square and a rectangle have equal areas. If the side of the square is 16 cm and the length of rectangle is 32 cm, find the breadth of rectangle and the perimeter of both figures.
13. Find the perimeter of a regular pentagon if each side measures 8 cm. If a wire of this length is bent to form a rectangle with length 12 cm, find the area of rectangle.
14. The perimeter of a rectangular plot is 300 m. If the length is increased by 10 m and breadth is decreased by 10 m, the perimeter remains unchanged. Find the original dimensions.

### SECTION C - Short Answer Questions (3 marks each)

15. A rectangular field is 48 m long and 30 m wide. Three square flower beds each of side 6 m are prepared inside it. Find the area of remaining field. If it costs ₹50 per sq m to plant grass, find the total cost.

**16.** Two rectangles have the same perimeter 56 cm. Rectangle A measures 18 cm by 10 cm. If rectangle B is a square, compare their areas.

**17.** A 36 m long and 24 m wide lawn has a path 3 m wide all around it on the outside. Find the cost of constructing the path at ₹60 per sq m.

#### SECTION D - Long Answer Question (5 marks)

- 18.** A rectangular hall 20 m long and 16 m wide is to be paved with square tiles.
- What is the largest size of such a tile? (Hint: Tile size must divide both dimensions)
  - How many tiles will be required if each tile is 4 m × 4 m?
  - Find the cost of tiles at ₹500 per tile.
  - A carpet is placed in the center leaving 2 m margin from all sides. Find the carpet's dimensions.
  - Find the area not covered by the carpet.

#### SECTION E - Case Study Based Questions (4 marks each)

##### 19. Photo Frame

Rahul wants to make a photo frame. The photo is 20 cm long and 15 cm wide. He wants a uniform border of 2.5 cm width all around the photo.

- Find the dimensions of the frame with border. (1 mark)
- Find the area of the photo. (1 mark)
- Find the total area of the frame with border. (1 mark)
- Find the area of the border alone. (1 mark)

##### 20. Comparative Plots

Mr. Sharma has to choose between two plots for building a house. Plot X is square with side 50 m. Plot Y is rectangular with length 60 m and breadth 40 m. The cost per sq m is same for both.

- Which plot has greater area and by how much? (1 mark)
- Mr. Sharma decides to fence the larger plot with 4 rounds of barbed wire. How much wire is needed? (1 mark)
- Find the cost of wire at ₹12 per metre. (1 mark)
- If he builds a house occupying 30% of the plot area, how much area remains for a garden? (1 mark)

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SECTION A - Answers to MCQs

1. (c) 180 m

$$\text{Side} = \sqrt{2025} = 45 \text{ m}$$

$$\text{Perimeter} = 4 \times 45 = 180 \text{ m}$$

2. (d) All of the above

$$\text{Square: } 4 \times 36 = 144 \text{ cm } \checkmark$$

$$\text{Rectangle: } 2 \times (40 + 32) = 144 \text{ cm } \checkmark$$

$$\text{Triangle: } 3 \times 48 = 144 \text{ cm } \checkmark$$

3. (c) 40 m

$$\text{Let breadth} = x, \text{ length} = x + 30$$

$$2(x + x + 30) = 100$$

$$4x + 60 = 100, x = 10$$

$$\text{Length} = 40 \text{ m}$$

4. (c) 5 cm

Triangle inequality: sum of two sides must be greater than third side.

For perimeter 5 cm, no valid whole number sides exist.

(e.g.,  $1+1 < 3$ ,  $1+2=3$ )

5. (c) 52 sq m

$$\text{Room area} = 5 \times 4 = 20 \text{ sq m}$$

$$\text{Total area with verandah} = 9 \times 8 = 72 \text{ sq m}$$

$$\text{Verandah area} = 72 - 20 = 52 \text{ sq m}$$

6. (a) 26 m

$$\text{Perimeter} = 1872 \div 18 = 104 \text{ m}$$

$$\text{Side} = 104 \div 4 = 26 \text{ m}$$

7. (c) 4 units

$$4a = a^2, \text{ where } a \text{ is side}$$

$$a = 4 \text{ units}$$

8. (b) 40 cm

$$\text{Perimeter of rectangle} = 2(12 + 8) = 40 \text{ cm}$$

Same wire forms circle, so circumference = 40 cm

9. (c) 15 m

$$2(l + b) = 50, \text{ so } l + b = 25$$

$$l \times b = 150$$

$$\text{Solving: } l = 15 \text{ m, } b = 10 \text{ m}$$

10. (c) The one with length = breadth (square)

For a fixed perimeter, a square encloses maximum area.

This is a fundamental geometric property.

## SECTION B - Answers to Short Answer Questions

11.

**Given:** Garden =  $90 \text{ m} \times 75 \text{ m}$ , Path widths =  $2 \text{ m}$  and  $3 \text{ m}$

**Step 1:** Path parallel to length =  $90 \times 3 = 270 \text{ sq m}$

**Step 2:** Path parallel to breadth =  $75 \times 2 = 150 \text{ sq m}$

**Step 3:** Intersection =  $2 \times 3 = 6 \text{ sq m}$

**Step 4:** Total =  $270 + 150 - 6 = 414 \text{ sq m}$

**Answer:** Area of paths =  $414 \text{ sq m}$

12.

**Given:** Square side =  $16 \text{ cm}$ , Rectangle length =  $32 \text{ cm}$ , Equal areas

**Step 1:** Area =  $16 \times 16 = 256 \text{ sq cm}$

**Step 2:** Breadth =  $256 \div 32 = 8 \text{ cm}$

**Step 3:** Perimeter of square =  $64 \text{ cm}$

**Step 4:** Perimeter of rectangle =  $2(32 + 8) = 80 \text{ cm}$

**Answer:** Breadth =  $8 \text{ cm}$ , Perimeters:  $64 \text{ cm}$  and  $80 \text{ cm}$

13.

**Given:** Pentagon side =  $8 \text{ cm}$ , Rectangle length =  $12 \text{ cm}$

**Step 1:** Perimeter of pentagon =  $5 \times 8 = 40 \text{ cm}$

**Step 2:** Wire length =  $40 \text{ cm}$

**Step 3:**  $2(12 + b) = 40$ ,  $b = 8 \text{ cm}$

**Step 4:** Area =  $12 \times 8 = 96 \text{ sq cm}$

**Answer:** Perimeter =  $40 \text{ cm}$ , Area =  $96 \text{ sq cm}$

14.

**Given:** Perimeter =  $300 \text{ m}$ , Remains unchanged after changes

**Step 1:**  $2(l + b) = 300$ , so  $l + b = 150$

**Step 2:** After changes:  $2(l+10 + b-10) = 300$  (satisfied for any  $l, b$ )

**Note:** Any dimensions with  $l + b = 150$  work

**Example:**  $80 \text{ m} \times 70 \text{ m}$ ,  $90 \text{ m} \times 60 \text{ m}$ , etc.

**Answer:** Any dimensions where  $l + b = 150 \text{ m}$

## SECTION C - Answers to Short Answer Questions

15.

**Given:** Field =  $48 \text{ m} \times 30 \text{ m}$ , 3 flower beds of  $6 \text{ m} \times 6 \text{ m}$ , Rate = ₹50/sq m

**Step 1:** Area of field =  $48 \times 30 = 1440 \text{ sq m}$

**Step 2:** Area of one bed =  $6 \times 6 = 36 \text{ sq m}$

**Step 3:** Total bed area =  $3 \times 36 = 108 \text{ sq m}$

**Step 4:** Remaining area =  $1440 - 108 = 1332 \text{ sq m}$

**Step 5:** Cost =  $1332 \times 50 = ₹66,600$

**Answer:** Remaining area =  $1332 \text{ sq m}$ , Cost = ₹66,600

16.

**Given:** Both perimeter =  $56 \text{ cm}$ , A =  $18 \text{ cm} \times 10 \text{ cm}$ , B = square

**Verification:**  $2(18 + 10) = 56 \checkmark$

**Step 1:** Side of B =  $56 \div 4 = 14 \text{ cm}$

**Step 2:** Area of A =  $18 \times 10 = 180 \text{ sq cm}$

**Step 3:** Area of B =  $14 \times 14 = 196 \text{ sq cm}$

**Step 4:** Difference =  $196 - 180 = 16$  sq cm

**Answer:** Square B has 16 sq cm more area

17.

**Given:** Lawn =  $36 \text{ m} \times 24 \text{ m}$ , Path = 3 m wide (outside), Rate = ₹60/sq m

**Step 1:** Outer dimensions =  $(36+6) \times (24+6) = 42 \times 30$

**Step 2:** Total area =  $42 \times 30 = 1260$  sq m

**Step 3:** Lawn area =  $36 \times 24 = 864$  sq m

**Step 4:** Path area =  $1260 - 864 = 396$  sq m

**Step 5:** Cost =  $396 \times 60 = ₹23,760$

**Answer:** Cost = ₹23,760

## SECTION D - Answer to Long Answer Question

18.

**Given:** Hall =  $20 \text{ m} \times 16 \text{ m}$

**(a) Largest tile size:**

HCF of 20 and 16 = 4 m

Largest tile =  $4 \text{ m} \times 4 \text{ m}$

**(b) Number of tiles:**

Area of hall = 320 sq m

Area of one tile = 16 sq m

Tiles needed =  $320 \div 16 = 20$  tiles

**(c) Cost of tiles:**

Cost =  $20 \times 500 = ₹10,000$

**(d) Carpet dimensions:**

Length =  $20 - 2 \times 2 = 16 \text{ m}$

Breadth =  $16 - 2 \times 2 = 12 \text{ m}$

Dimensions:  $16 \text{ m} \times 12 \text{ m}$

**(e) Uncovered area:**

Carpet area =  $16 \times 12 = 192$  sq m

Uncovered =  $320 - 192 = 128$  sq m

**Answers:** (a)  $4 \text{ m} \times 4 \text{ m}$ , (b) 20 tiles, (c) ₹10,000, (d)  $16 \text{ m} \times 12 \text{ m}$ , (e) 128 sq m

## SECTION E - Answers to Case Study Based Questions

19.

**(a) Dimensions with border:**

Length =  $20 + 2 \times 2.5 = 25 \text{ cm}$

Width =  $15 + 2 \times 2.5 = 20 \text{ cm}$

Dimensions:  $25 \text{ cm} \times 20 \text{ cm}$

**(b) Area of photo:**

Area =  $20 \times 15 = 300$  sq cm

**(c) Total area with border:**

$$\text{Area} = 25 \times 20 = 500 \text{ sq cm}$$

**(d) Area of border alone:**

$$\text{Border area} = 500 - 300 = 200 \text{ sq cm}$$

**Answers:** (a)  $25 \text{ cm} \times 20 \text{ cm}$ , (b)  $300 \text{ sq cm}$ , (c)  $500 \text{ sq cm}$ , (d)  $200 \text{ sq cm}$

**20.**

**(a) Comparing areas:**

$$\text{Plot X: } 50 \times 50 = 2500 \text{ sq m}$$

$$\text{Plot Y: } 60 \times 40 = 2400 \text{ sq m}$$

Plot X is greater by  $100 \text{ sq m}$

**(b) Wire needed:**

$$\text{Perimeter of X} = 4 \times 50 = 200 \text{ m}$$

$$\text{Wire for 4 rounds} = 200 \times 4 = 800 \text{ m}$$

**(c) Cost of wire:**

$$\text{Cost} = 800 \times 12 = ₹9600$$

**(d) Garden area:**

$$\text{House area} = 30\% \text{ of } 2500 = 750 \text{ sq m}$$

$$\text{Garden} = 2500 - 750 = 1750 \text{ sq m}$$

**Answers:** (a) Plot X by  $100 \text{ sq m}$ , (b)  $800 \text{ m}$ , (c) ₹9600, (d)  $1750 \text{ sq m}$

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