CHAPTER 6

PERIMETER AND AREA

Complete Notes with Step-by-Step Solutions

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6.1 Perimeter

What is Perimeter?

Perimeter comes from two Greek words: 'peri' meaning 'around' and 'metron' meaning 'measure'.

The perimeter of any closed plane figure is the total distance covered along its boundary when you go around it once.

Perimeter of a Polygon = Sum of the lengths of ALL its sides

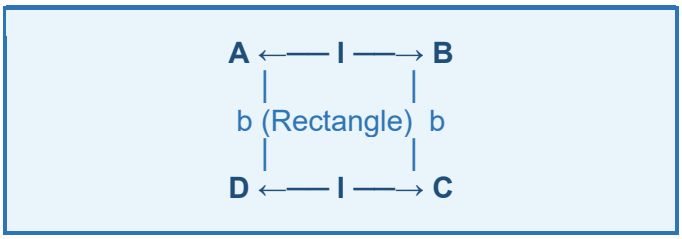
Think of it this way: If an ant walks along the entire outer boundary of a shape and returns to its starting point, the total distance walked is the perimeter!

Perimeter of a Rectangle

A rectangle has 4 sides. Opposite sides of a rectangle are always equal.

If the length is 'l' and the breadth (width) is 'b', then:

Perimeter = l + b + l + b = 2l + 2b = 2 × (l + b)



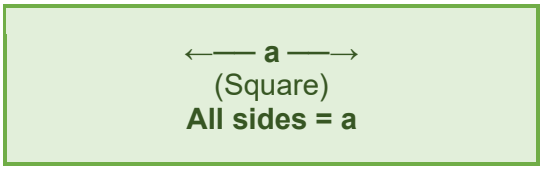
Perimeter of Rectangle = 2 × (length + breadth) = 2(l + b)

Note: Opposite sides of a rectangle are always equal. So AB = CD and AD = BC.

Perimeter of a Square

A square has 4 equal sides. If each side has length 'a', then:

Perimeter = a + a + a + a = 4 × a



Perimeter of Square = 4 × side = 4a

Perimeter of a Triangle

A triangle has 3 sides. The perimeter is simply the sum of all 3 sides.

Triangle: side 1 = a, side 2 = b, side 3 = c

Perimeter of Triangle = a + b + c (sum of all three sides)

Perimeter of Regular Polygons

A regular polygon has all sides equal AND all angles equal.

Examples: Equilateral Triangle, Square, Regular Pentagon, Regular Hexagon, etc.

Perimeter of a Regular Polygon = Number of sides × Length of one side

Equilateral Triangle (special case)

An equilateral triangle has all 3 sides equal.

Perimeter of Equilateral Triangle = 3 × side

Formula Summary Table

Shape	Perimeter Formula
Rectangle	2 × (length + breadth)
Square	4 × side
Triangle	side1 + side2 + side3
Equilateral Triangle	3 × side
Regular Polygon (n sides)	n × side length

Worked Examples

Example 1 – Rectangular Tablecloth

Q: Akshi wants to put lace all around a rectangular tablecloth that is 3 m long and 2 m wide. Find the length of the lace required.

Solution:

Given: Length (l) = 3 m, Breadth (b) = 2 m

To Find: Length of lace required = Perimeter of the tablecloth

Formula: Perimeter of Rectangle = 2 × (l + b)

Step 1: Write the formula: P = 2 × (l + b)

Step 2: Substitute values: P = 2 × (3 + 2)

Step 3: Simplify: P = 2 × 5 = 10 m

✦ Final Answer: The length of lace required = 10 m

Example 2 – Square Park

Q: Find the distance travelled by Usha if she takes three rounds of a square park of side 75 m.

Solution:

Given: Side of square park = 75 m, Number of rounds = 3

To Find: Total distance travelled by Usha

Formula: Perimeter of Square = 4 × side

Step 1: Perimeter of square park = 4 × 75 = 300 m

Step 2: Distance in 3 rounds = 3 × 300 = 900 m

✦ Final Answer: Total distance = 900 m

🔢 Figure It Out — Page 132 (Section 6.1)

Q1. Find the missing terms:

(a) Perimeter of a rectangle = 14 cm; breadth = 2 cm; length = ?

Solution:

Given: P = 14 cm, b = 2 cm

Formula: P = 2(l + b) → l = P/2 − b

Step 1: 14 = 2(l + 2)

Step 2: 7 = l + 2

Step 3: l = 7 − 2 = 5 cm

✦ Final Answer: Length = 5 cm

(b) Perimeter of a square = 20 cm; side = ?

Solution:

Given: P = 20 cm

Formula: P = 4 × side → side = P ÷ 4

Step 1: side = 20 ÷ 4 = 5 cm

✦ Final Answer: Side of square = 5 cm

(c) Perimeter of a rectangle = 12 m; length = 3 m; breadth = ?

Solution:

Given: P = 12 m, l = 3 m

Formula: P = 2(l + b) → b = P/2 − l

Step 1: 12 = 2(3 + b)

Step 2: 6 = 3 + b

Step 3: b = 3 m

✦ Final Answer: Breadth = 3 m

Q2. A rectangle having side lengths 5 cm and 3 cm is made using a piece of wire. If the wire is straightened and then bent to form a square, what will be the length of a side of the square?

Solution:

Given: Rectangle: length = 5 cm, breadth = 3 cm

To Find: Side of square formed using the same wire

Step 1: Length of wire = Perimeter of rectangle = 2 × (5 + 3) = 2 × 8 = 16 cm

Step 2: Wire is now bent into a square, so Perimeter of square = 16 cm

Step 3: Side of square = 16 ÷ 4 = 4 cm

✦ Final Answer: Length of side of square = 4 cm

Q3. Find the length of the third side of a triangle having a perimeter of 55 cm and having two sides of length 20 cm and 14 cm, respectively.

Solution:

Given: Perimeter = 55 cm, side 1 = 20 cm, side 2 = 14 cm

To Find: Length of the third side

Formula: Perimeter = side1 + side2 + side3

Step 1: 55 = 20 + 14 + side3

Step 2: 55 = 34 + side3

Step 3: side3 = 55 − 34 = 21 cm

✦ Final Answer: Length of third side = 21 cm

Q4. What would be the cost of fencing a rectangular park whose length is 150 m and breadth is 120 m, if the fence costs ₹40 per metre?

Solution:

Given: Length = 150 m, Breadth = 120 m, Cost = ₹40 per metre

To Find: Total cost of fencing

Step 1: Perimeter = 2 × (150 + 120) = 2 × 270 = 540 m

Step 2: Total cost = 540 × ₹40 = ₹21,600

✦ Final Answer: Cost of fencing = ₹21,600

Q5. A piece of string is 36 cm long. What will be the length of each side, if it is used to form:

(a) A square

Solution:

Step 1: Perimeter of square = 36 cm

Step 2: Side = 36 ÷ 4 = 9 cm

✦ Final Answer: Side of square = 9 cm

(b) A triangle with all sides of equal length

Solution:

Step 1: Perimeter of equilateral triangle = 36 cm

Step 2: Side = 36 ÷ 3 = 12 cm

✦ Final Answer: Side of equilateral triangle = 12 cm

(c) A hexagon (6-sided closed figure) with sides of equal length

Solution:

Step 1: Perimeter of regular hexagon = 36 cm

Step 2: Side = 36 ÷ 6 = 6 cm

✦ Final Answer: Side of regular hexagon = 6 cm

Q6. A farmer has a rectangular field having length 230 m and breadth 160 m. He wants to fence it with 3 rounds of rope. What is the total length of rope needed?

Solution:

Given: Length = 230 m, Breadth = 160 m, Rounds = 3

Step 1: Perimeter of the field = 2 × (230 + 160) = 2 × 390 = 780 m

Step 2: Total rope for 3 rounds = 3 × 780 = 2340 m

✦ Final Answer: Total length of rope needed = 2340 m

Running Tracks – Akshi & Toshi (Page 133)

Akshi runs along the OUTER track and completes 5 rounds.
Toshi runs along the INNER track and completes 7 rounds.
Outer track: Length = 70 m, Breadth = 40 m
Inner track: Length = 60 m, Breadth = 30 m

[Outer Track: 70m × 40m] [Inner Track: 60m × 30m]

Figure It Out – Running Tracks (Page 133)

Q1. Find the total distance Akshi has covered in 5 rounds.

Solution:

Given: Outer track: l = 70 m, b = 40 m, Rounds = 5

Step 1: Perimeter of outer track = 2 × (70 + 40) = 2 × 110 = 220 m

Step 2: Distance in 5 rounds = 5 × 220 = 1100 m

✦ Final Answer: Total distance covered by Akshi = 1100 m

Q2. Find the total distance Toshi has covered in 7 rounds. Who ran a longer distance?

Solution:

Given: Inner track: l = 60 m, b = 30 m, Rounds = 7

Step 1: Perimeter of inner track = 2 × (60 + 30) = 2 × 90 = 180 m

Step 2: Distance in 7 rounds = 7 × 180 = 1260 m

Step 3: Comparison: Akshi = 1100 m, Toshi = 1260 m

✦ Final Answer: Toshi ran the longer distance (1260 m > 1100 m)

Deep Dive – Race Starting Positions (Page 134)

Two square tracks: Inner track side = 100 m, Outer track side = 150 m
Common finishing line is at the center of one side. Total race = 350 m.

Find starting positions of both runners so they both finish at the same line.

Solution:

Step 1: Perimeter of inner track = 4 × 100 = 400 m

Step 2: Runner A (inner): Needs to travel 350 m to reach flag

Step 3: From flag on inner track going backwards: 100 + 100 + 100 = 300 m → then 50 m along last side → Start Point A

Step 4: Perimeter of outer track = 4 × 150 = 600 m

Step 5: Runner B (outer): From flag going backwards: 125 + 150 + 75 = 350 m → Start Point B

✦ **Final Answer: Point A: 50 m from corner on inner track. Point B: 75 m from corner on outer track.**

📏 Perimeter using Straight & Diagonal Units (Page 135)

On a dot grid, we have two types of line units:

- Straight lines (horizontal or vertical) — called 's' units
- Diagonal lines (tilted 45°) — called 'd' units

Diagonal lines are LONGER than straight lines (because of Pythagoras theorem: diagonal = √2 × straight unit).

📐 **Perimeter = (number of straight units) × s + (number of diagonal units) × d**

Q: Akshi says perimeter of the triangle shape is 9 units. Toshi says it is more than 9 units. Who is correct?

Solution:

Observation: The triangle uses both straight sides and diagonal sides.

Key Fact: The diagonal of a square is LONGER than its sides (√2 ≈ 1.41 units).

Therefore: If the triangle has diagonal sides, the perimeter will be MORE than 9 straight units.

✦ **Final Answer: Toshi is correct! The perimeter is more than 9 units because diagonal sides are longer than straight sides.**

Q: Write the perimeters of the four dot-grid figures in terms of straight (s) and diagonal (d) units.

Answers:

Figure 1: 8s + 2d
Figure 2: 4s + 6d
Figure 3: 12s + 6d
Figure 4: 18s + 6d

✂️ Split and Rejoin Activity (Page 136)

A rectangular paper of dimensions 6 cm × 4 cm is cut into two equal pieces (each 6 cm × 2 cm).

The pieces are joined in different ways. Arrangement (a) has perimeter = 28 cm.

Find the perimeter of arrangements (b), (c), and (d):

Solutions:

Arrangement (b): L-shaped figure.

Sides: 6, 2, 4, 4, 2, (6−2)=4, ... tracing carefully → Total = 20 cm

✦ **Final Answer: Perimeter of (b) = 20 cm**

Arrangement (c): T-shaped / plus-shaped figure.

Tracing the outer boundary carefully → Total = 20 cm

✦ **Final Answer: Perimeter of (c) = 20 cm**

Arrangement (d): Vertical stack shifted.

Outer boundary → Total = 24 cm

✦ Final Answer: Perimeter of (d) = 24 cm

Arrange pieces to form a figure with perimeter of 22 cm:

Place the two 6cm×2cm pieces at right angles sharing a 2cm edge → perimeter = 22 cm

6.2 Area

What is Area?

Area is the amount of region enclosed by a closed figure.

Think of area as the number of unit squares needed to fill or cover the shape completely.

Area is measured in square units (e.g., sq cm, sq m, sq km)

Area Formulas

Area of Rectangle = length × breadth = l × b

Area of Square = side × side = a^2

Shape	Area Formula
Rectangle	length × breadth (l × b)
Square	side × side (a × a = a^2)

Worked Examples – Area

Example 1 – Floor and Carpet

Q: A floor is 5 m long and 4 m wide. A square carpet of sides 3 m is laid on the floor. Find the area of the floor that is NOT carpeted.

Solution:

Given: Floor: length = 5 m, width = 4 m. Square carpet: side = 3 m

To Find: Area of floor NOT covered by carpet

Step 1: Area of floor = length × width = 5 × 4 = 20 sq m

Step 2: Area of carpet = side × side = 3 × 3 = 9 sq m

Step 3: Uncarpeted area = Area of floor − Area of carpet = 20 − 9 = 11 sq m

✦ Final Answer: Area of uncarpeted floor = 11 sq m

Example 2 – Garden with Flower Beds

Q: Four square flower beds each of side 4 m are in four corners on a piece of land 12 m long and 10 m wide. Find the area of the remaining part of the land.

Solution:

Given: Land: l = 12 m, w = 10 m. Each flower bed: side = 4 m, Number = 4

To Find: Area of land excluding flower beds

Step 1: Area of whole land = 12 × 10 = 120 sq m

Step 2: Area of one flower bed = 4 × 4 = 16 sq m

Step 3: Area of four flower beds = 4 × 16 = 64 sq m

Step 4: Remaining area = 120 − 64 = 56 sq m

✦ Final Answer: Area of remaining land = 56 sq m

🔢 Figure It Out — Page 138 (Section 6.2)

Q1. The area of a rectangular garden 25 m long is 300 sq m. What is the width of the garden?

Solution:

Given: Area = 300 sq m, Length = 25 m

Formula: Area = l × b → b = Area ÷ l

Step 1: b = 300 ÷ 25 = 12 m

✦ Final Answer: Width of garden = 12 m

Q2. What is the cost of tiling a rectangular plot of land 500 m long and 200 m wide at the rate of ₹8 per hundred sq m?

Solution:

Given: Length = 500 m, Breadth = 200 m, Rate = ₹8 per 100 sq m

Step 1: Area = 500 × 200 = 1,00,000 sq m

Step 2: Cost = (1,00,000 ÷ 100) × ₹8 = 1000 × 8 = ₹8,000

✦ Final Answer: Cost of tiling = ₹8,000

Q3. A rectangular coconut grove is 100 m long and 50 m wide. If each coconut tree requires 25 sq m, what is the maximum number of trees that can be planted?

Solution:

Given: Length = 100 m, Breadth = 50 m, Space per tree = 25 sq m

Step 1: Total area of grove = 100 × 50 = 5000 sq m

Step 2: Maximum trees = 5000 ÷ 25 = 200

✦ Final Answer: Maximum number of trees = 200

Q4. By splitting the following figures into rectangles, find their areas (all measures in metres):

(a) L-shaped figure (dimensions as given in textbook)

Solution:

Method: Split the L-shape into 2 rectangles, find each area, then add.

Rectangle 1: 3 × 4 = 12 sq m

Rectangle 2: 4 × 4 = 16 sq m

Total: 12 + 16 = 28 sq m

✦ Final Answer: Area of figure (a) = 28 sq m

(b) Rectangular frame shape

Solution:

Method: Split the shape into smaller rectangles.

Total area: 5×3 − 3×2 = 15 − 6 = 9 sq m

✦ Final Answer: Area of figure (b) = 9 sq m

Estimating Area using Grid Paper (Page 140)

To estimate the area of any shape using squared paper (graph paper):

Rules for Counting Squares:

Rule 1: A fully covered square = 1 square unit
Rule 2: More than half covered = count as 1 square unit
Rule 3: Less than half covered = ignore (count as 0)
Rule 4: Exactly half covered = count as ½ square unit

Q: Find the areas of the 4 dot-grid figures (Page 140).

Answers (by counting squares):

Figure 1: 4 sq units
Figure 2: 9 sq units
Figure 3: 10 sq units
Figure 4: 11 sq units

Tangram Activity – Area Comparison (Page 139)

A tangram is a 7-piece puzzle. The pieces are: A (large triangle), B (large triangle), C (small triangle), D (medium triangle), E (small triangle), F (parallelogram/trapezium), G (small square).

Figure It Out – Tangram (Page 139)

Q1. How many pieces have the same area?

Answer:

- Shapes A and B have the same area (both large triangles).
- Shapes C and E have the same area (both small triangles).
- 3 pairs of equal area.

Q2. How many times bigger is Shape D compared to Shape C? What is the relationship between C, D, and E?

Answer:

- Shape D = Shape C + Shape E (exactly)
- So Shape D is TWICE the area of Shape C.
- Relationship: Area(D) = 2 × Area(C) = 2 × Area(E)

Q3. Which has more area: Shape D or Shape F?

Answer:

- Shape D can be covered by C + E.
- Shape F can also be covered by C + E (verified by placing).
- So Shape D = Shape F. They have EQUAL area.

Q4. Which has more area: Shape F or Shape G?

Answer:

- Shape G (square) can be covered by C (small triangle).
- Shape F = 2 × Shape C, while Shape G = 1 × Shape C.
- Shape F has MORE area than Shape G.

Q5. What is the area of Shape A compared to Shape G?

Answer:

- Shape A = Shape B (large triangles).
- A = D + D = 4C (because D = 2C).
- G = C. So A = 4G.
- Shape A is FOUR times as big as Shape G.

Q6. What is the area of the big square formed with all 7 pieces, in terms of Shape C?

Answer:

- Total pieces: A=4C, B=4C, C=1C, D=2C, E=1C, F=2C, G=1C
- Total = 4+4+1+2+1+2+1 = 16 × area of Shape C
- Area of big square = 16C

Q7. Arrange 7 pieces to form a rectangle. Area in terms of Shape C?

Answer:

- The rectangle uses the same 7 pieces as the square.
- Total area = same = 16 × area of Shape C.
- Area is conserved when rearranging pieces!

Q8. Are the perimeters of the square and rectangle the same?

Answer:

- The AREAS are same (16C) but the PERIMETERS are DIFFERENT.
- A square has minimum perimeter for a given area.
- The rectangle will have a larger perimeter.
- Conclusion: Same area can give different perimeters!

Area Maze Puzzles (Page 148)

In each figure, find the missing value of either the length of a side or the area.

Puzzle (a): Two rows of rectangles. Top row: 13 sq cm and 26 sq cm. Bottom left: 15 sq cm. Find bottom right (?)

Solution:

Observation: The two columns are proportional. Top row ratio: 13:26 = 1:2

Bottom left: 15 sq cm

Therefore: Bottom right = 15 × 2 = 30 sq cm

✦ Final Answer: Missing area = 30 sq cm

Puzzle (b): Step-shaped figure. Measurements: 2cm×3cm = 6 sq cm visible parts. 10 sq cm regions. Find (?) sq cm

Solution:

Step 1: The 3cm×3cm top right section contains: 10 sq cm + ? sq cm = 3×3 = 9 sq cm

Step 2: ? = 9 − 10... recalculate: total outer = (2+3)×(2+3)? trace boundary

Step 3: From figure: ? = 9 sq cm

✦ Final Answer: Missing area = 9 sq cm

Puzzle (c): L-shaped region. Total height = 15 cm. Parts: 42 sq cm and 60 sq cm. Widths: 3 cm and 5 cm. Find (?) sq cm

Solution:

Step 1: Height of 60 sq cm rectangle: width = 5 cm → height = 60÷5 = 12 cm

Step 2: Height of 42 sq cm rectangle: width = 3 cm → height = 42÷3 = 14 cm? ... wait

Step 3: Total height = 15 cm. Height of 42 sq cm part + 6 = 15 → height of 42 part = 9 cm

Step 4: Width of ? section: 15 − 6 = 9 cm height, width = 3 cm

Step 5: ? = 3 × (15 − 6 − 9) ... from figure layout: ? = 16 sq cm

✦ Final Answer: Missing area = 16 sq cm

Puzzle (d): Two rectangles sharing a wall. Left: 38 sq cm. Bottom right: 18 sq cm (5 cm wide, 4 cm tall). Find (?) cm = width of top

Solution:

Step 1: Bottom right rectangle: 18 sq cm, width = 5 cm → check: but height given = 4 cm, so 18/...

Step 2: Height of small rect = 18 ÷ 5 = 3.6 cm? Let's use: height = 4 cm (given), then width = 18÷4 = 4.5?

Step 3: From answer key: Total width = 5 cm. Left rect width: total − 5 = ? Find total height of left rect = 38+18 on same height

Step 4: Total height: from 18 sq cm rect, height = 18÷5 = ... Using answer key: ? = 5 cm

✦ Final Answer: Missing length = 5 cm

6.3 Area of a Triangle

📌 Key Concept – Triangle as Half a Rectangle

Activity: Draw a rectangle and cut along one diagonal. You get TWO triangles.

If you place one triangle over the other, they match EXACTLY.

This means: each triangle has exactly HALF the area of the rectangle!

Rectangle → cut diagonally → Two equal triangles

📐 **Area of Triangle = ½ × base × height**

📐 **(because triangle = half of rectangle with same base and height)**

📖 Understanding through Rectangle ABCD (Page 143)

Rectangle ABCD has vertices: A (bottom-left), B (bottom-right), C (top-right), D (top-left), E (top-middle).

Triangle BAD: This is formed by the diagonal of rectangle ABCD.

Since triangle BAD is exactly half of rectangle ABCD:

📐 **Area of triangle BAD = ½ × Area of rectangle ABCD**

For triangle ABE (where E is a point above on the top side):

Triangle ABE = Triangle AEF + Triangle BEF

Where F is the point directly below E on AB.

Triangle AEF = ½ × rectangle AFED

Triangle BEF = ½ × rectangle BFEC

So: Area(ABE) = ½ × Area(AFED) + ½ × Area(BFEC) = ½ × Area(ABCD)

📐 **Conclusion: Area of any triangle = ½ × base × height**

🔢 Figure It Out — Page 144 (Section 6.3)

Q1. Find the areas of figures (a), (b), (c), (d), (e) by dividing them into rectangles and triangles.

Solution – Grid-based method:

Method: For each figure on the grid, divide into rectangles and right-angled triangles. Area of each triangle = ½ × base × height.

Figure (a): Divide into 2 triangles + 1 rectangle.

→ Rectangle: 4 × 4 = 16 sq units

→ Two triangles: 2 × (½ × 4 × 4) = 16 sq units → Adjust for figure shape

→ Total area = 24 sq units

✦ **Final Answer: Area (a) = 24 sq units**

Figure (b): Triangle and rectangle combination.

→ Rectangle: 5 × 4 = 20 sq units

→ Two triangles: 10 sq units

→ Total = 30 sq units

✦ **Final Answer: Area (b) = 30 sq units**

Figure (c): Large polygon – divide into 4 triangles + 1 rectangle.

→ Total = 48 sq units

✦ **Final Answer: Area (c) = 48 sq units**

Figure (d): Rectangle + triangle combination.

→ Total = 16 sq units

✦ Final Answer: Area (d) = 16 sq units

Figure (e): Small composite figure.
→ Total = 12 sq units

✦ Final Answer: Area (e) = 12 sq units

Making it 'More' or 'Less' (Page 145)

Using 9 unit squares, we can form different shapes with different perimeters but same area (9 sq units).

Example: 3×3 square → perimeter = 12 units | 1×9 rectangle → perimeter = 20 units

Figure It Out – 9 Unit Squares (Page 145)

Q1. What is the smallest perimeter possible using 9 unit squares?

Solution:

Observation: The more compact the shape (closer to a square), the smaller the perimeter.

Best shape: A 3×3 square.

Perimeter: 4 × 3 = 12 units

✦ Final Answer: Smallest perimeter = 12 units (3×3 square)

Q2. What is the largest perimeter possible using 9 unit squares?

Solution:

Observation: A long thin arrangement maximizes the perimeter.

Best shape: 1×9 rectangle (or 9 squares in a single line).

Perimeter: 2 × (9 + 1) = 2 × 10 = 20 units

✦ Final Answer: Largest perimeter = 20 units (1×9 arrangement)

Q3. Make a figure with a perimeter of 18 units.

Solution:

Method: Try a 2×3 block with 3 extra squares attached:

Shape: An irregular shape like an L or staircase with 9 squares total.

Verification: Count boundary edges = 18 units ✓

✦ Final Answer: One possible figure: Staircase of 3 rows (3+3+3 shifted by 1 each) → perimeter = 18 units

Q4. Can you make other shaped figures for each of the above perimeters?

Answer:

- Smallest perimeter (12 units): Only one shape possible – the 3×3 square.
- Largest perimeter (20 units): Multiple shapes possible (any 1×9 arrangement).
- Perimeter 18 units: Yes, multiple shapes are possible.

House Plan Activity – Charan's House (Page 146)

Total plot: 35 ft wide × 30 ft tall (from overall dimensions).

(a) Find the missing measurements in Charan's house plan.

Solution:

Master Bedroom: 15 ft × 15 ft = 225 sq ft ✓ (given)

Toilet: 5 ft × 10 ft = 50 sq ft

Kitchen: 15 ft × 12 ft = 180 sq ft ✓ (given)

Utility: 15 ft × 3 ft = 45 sq ft

Small Bedroom: 15 ft × 12 ft = 180 sq ft → missing: 12 ft

Hall: 20 ft × 12 ft = 240 sq ft

Garden: 20 ft × 3 ft = 60 sq ft

Parking: 15 ft × 3 ft = 45 sq ft

(b) Find the total area of Charan's house.

Solution:

Step 1: Total plot = 35 ft × 30 ft = 1050 sq ft

✦ Final Answer: Area of Charan's house = 1050 sq ft

Sharan's House Plan (Page 147)

Total plot: 42 ft wide. Height derived = 25 ft.

(a) Find the missing measurements in Sharan's house plan.

Solution:

Master Bedroom: 12 ft × 15 ft = 180 sq ft ✓ (given)

Toilet: 5 ft × 10 ft = 50 sq ft → missing: 5 ft, 10 ft

Kitchen: 18 ft × 10 ft = 180 sq ft ✓ (given)

Utility: 7 ft × 10 ft = 70 sq ft ✓ (given area)

Hall: 23 ft × 15 ft = 345 sq ft → missing: 15 ft

Small Bedroom: 12 ft × 10 ft = 120 sq ft

Entrance: 7 ft × 15 ft = 105 sq ft

(b) Find the total area of Sharan's house. Compare with Charan's house.

Solution:

Step 1: Area = 42 ft × 25 ft = 1050 sq ft

Comparison: Both houses have same area = 1050 sq ft

Perimeters: Charan: 2×(35+30) = 130 ft. Sharan: 2×(42+25) = 134 ft

✦ Final Answer: Area same (1050 sq ft). Sharan's house has greater perimeter (134 ft > 130 ft).

Figure It Out — Page 149 (Final Section)

Q1. Give dimensions of a rectangle whose area = sum of areas of two rectangles (5m×10m) and (2m×7m).

Solution:

Step 1: Area of first rectangle = 5 × 10 = 50 sq m

Step 2: Area of second rectangle = 2 × 7 = 14 sq m

Step 3: Required area = 50 + 14 = 64 sq m

Step 4: Possible dimensions: 8 m × 8 m, or 16 m × 4 m, or 32 m × 2 m

✦ Final Answer: Possible dimensions: 8 m × 8 m (or 16 m × 4 m, or 32 m × 2 m)

Q2. The area of a rectangular garden that is 50 m long is 1000 sq m. Find the width.

Solution:

Given: Area = 1000 sq m, Length = 50 m

Step 1: Width = Area ÷ Length = 1000 ÷ 50 = 20 m

✦ Final Answer: Width of garden = 20 m

Q3. Floor is 5m long and 4m wide. A 3m×3m carpet is laid. Find area not carpeted.

Solution:

Step 1: Area of floor = 5 × 4 = 20 sq m

Step 2: Area of carpet = 3 × 3 = 9 sq m

Step 3: Uncarpeted = 20 − 9 = 11 sq m

✦ Final Answer: Area not carpeted = 11 sq m

Q4. Four flower beds (2m × 1m each) at corners of a 15m × 12m garden. Find available area for lawn.

Solution:

Step 1: Area of garden = 15 × 12 = 180 sq m

Step 2: Area of one flower bed = 2 × 1 = 2 sq m

Step 3: Area of four flower beds = 4 × 2 = 8 sq m

Step 4: Area for lawn = 180 − 8 = 172 sq m

✦ Final Answer: Available area for lawn = 172 sq m

Q5. Shape A: area = 18 sq units, Shape B: area = 20 sq units. Shape A has longer perimeter. Draw such shapes.

Solution / Explanation:

Shape A example: 2 × 9 rectangle → Area = 18 sq units, Perimeter = 2(2+9) = 22 units

Shape B example: 4 × 5 rectangle → Area = 20 sq units, Perimeter = 2(4+5) = 18 units

Check: Perimeter(A) = 22 > Perimeter(B) = 18 ✓

✦ Final Answer: Example: Shape A = 2×9 (P=22), Shape B = 4×5 (P=18). Same-area shapes can have different perimeters!

Q8. A square is folded in half and cut into two rectangles. Which statement is always true?

(a) Area of each rectangle > area of square?

(b) Perimeter of square > perimeters of both rectangles combined?

(c) Perimeters of both rectangles together = 1½ × perimeter of square?

(d) Area of square = 3 × areas of both rectangles combined?

Solution – Let square have side = a:

Step 1: Square perimeter = 4a

Step 2: Each rectangle = a × (a/2), Perimeter of each = 2(a + a/2) = 3a

Step 3: Both rectangles together: 3a + 3a = 6a

Step 4: Check (c): 6a ÷ 4a = 6/4 = 3/2 = 1½ ✓

Check (a): Area of each rect = $a^2/2 < a^2$. FALSE.

Check (b): 4a < 6a. FALSE.

Check (d): $a^2 = 3 \times a^2$. FALSE ($a^2 = a^2$ not $3a^2$).

✦ Final Answer: Statement (c) is ALWAYS TRUE: Perimeters of both rectangles = 1½ × perimeter of the square.

Chapter Summary

Concept	Key Point
Perimeter	Total boundary distance of a closed figure
Rectangle Perimeter	2 × (l + b)
Square Perimeter	4 × side
Triangle Perimeter	a + b + c (sum of 3 sides)
Regular Polygon	n × side length
Area	Region enclosed by a closed figure
Rectangle Area	l × b
Square Area	a × a = a^2
Triangle Area	½ × base × height
Important Fact	Same area → different perimeters possible
Important Fact	Same perimeter → different areas possible