# Chapter 6: Perimeter and Area

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## Exercise 6.1 — 6.1 Perimeter

Q1 Find the missing terms:

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

b. Perimeter of a square = 20 cm; side of a length = ?

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

SOLUTION

a. Perimeter of a rectangle = 2 × (length + breadth)

14 = 2 × (length + 2)

7 = length + 2

length = 7 − 2 = 5 cm

b. Perimeter of a square = 4 × side

20 = 4 × side

side = 20 ÷ 4 = 5 cm

c. Perimeter of a rectangle = 2 × (length + breadth)
12 = 2 × (3 + breadth)
6 = 3 + breadth
breadth = 6 − 3 = 3 m

Answer: a. length = 5 cm; b. side = 5 cm; c. breadth = 3 m

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Q2 A rectangle having sidelengths 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

Perimeter of the rectangle = 2 × (5 + 3) = 2 × 8 = 16 cm
The wire is 16 cm long.
When bent into a square: 4 × side = 16
side = 16 ÷ 4 = 4 cm

Answer: Length of a side of the square = 4 cm

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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

Perimeter = sum of all three sides
55 = 20 + 14 + third side
55 = 34 + third side
third side = 55 − 34 = 21 cm

Answer: Length of the third side = 21 cm

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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

Perimeter of the rectangular park = 2 × (length + breadth)
= 2 × (150 + 120) = 2 × 270 = 540 m
Cost of fencing = 540 × 40 = 21,600

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,
b. A triangle with all sides of equal length, and
c. A hexagon (a six sided closed figure) with sides of equal length?

SOLUTION

a. Square has 4 equal sides: side = 36 ÷ 4 = 9 cm

b. Equilateral triangle has 3 equal sides: side = 36 ÷ 3 = 12 cm

c. Regular hexagon has 6 equal sides: side = 36 ÷ 6 = 6 cm

Answer: a. 9 cm; b. 12 cm; c. 6 cm

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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 as shown. What is the total length of rope needed?

SOLUTION

Perimeter of the rectangular field = 2 × (230 + 160) = 2 × 390 = 780 m
Total length of rope for 3 rounds = 3 × 780 = 2340 m

Answer: Total length of rope = 2340 m

## Exercise 6.2 — Matha Pachchi! (Running Tracks)

Q1 Find out the total distance Akshi has covered in 5 rounds. (Akshi runs along the outer rectangular track of length 70 m and breadth 40 m.)

SOLUTION

Perimeter of Akshi's outer track = 2 × (70 + 40) = 2 × 110 = 220 m
Total distance in 5 rounds = 5 × 220 = 1100 m

Answer: Akshi covered 1100 m in 5 rounds

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Q2 Find out the total distance Toshi has covered in 7 rounds. Who ran a longer distance? (Toshi runs along the inner rectangular track of length 60 m and breadth 30 m.)

SOLUTION

Perimeter of Toshi's inner track = 2 × (60 + 30) = 2 × 90 = 180 m
Total distance in 7 rounds = 7 × 180 = 1260 m
Akshi ran 1100 m; Toshi ran 1260 m
Toshi ran the longer distance.

Answer: Toshi covered 1260 m; Toshi ran the longer distance

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Q3 Think and mark the positions as directed—
a. Mark 'A' at the point where Akshi will be after she ran 250 m.
b. Mark 'B' at the point where Akshi will be after she ran 500 m.
c. Now, Akshi ran 1000 m. How many full rounds has she finished running around her track? Mark her position as 'C'.
d. Mark 'X' at the point where Toshi will be after she ran 250 m.
e. Mark 'Y' at the point where Toshi will be after she ran 500 m.
f. Now, Toshi ran 1000 m. How many full rounds has she finished running around her track? Mark her position as 'Z'.

SOLUTION

Akshi's track perimeter = 220 m. Starting point is at the bottom-right corner.

a. 250 m = 1 full round (220 m) + 30 m remaining.
30 m along the bottom side from the starting corner. Mark A there.

b. 500 m = 2 full rounds (440 m) + 60 m remaining.

60 m along the bottom side from the starting corner. Mark B there.

c. 1000 ÷ 220 = 4 full rounds, remainder = 1000 − 4×220 = 1000 − 880 = 120 m.
She completes 4 full rounds. 120 m from start: bottom(70) + left-side(40) + 10 m along top.
Mark C at 10 m along the top from the top-left corner.

Toshi's track perimeter = 180 m.

d. 250 m = 1 full round (180 m) + 70 m remaining.
70 m from start: bottom(60) + 10 m up the right side. Mark X there.

e. 500 m = 2 full rounds (360 m) + 140 m remaining.
140 m from start: bottom(60) + right-side(30) + 50 m along top from top-right corner. Mark Y there.

f. 1000 ÷ 180 = 5 full rounds, remainder = 1000 − 5×180 = 1000 − 900 = 100 m.
She completes 5 full rounds. 100 m: bottom(60) + right-side(30) + 10 m along top.
Mark Z at 10 m along the top from the top-right corner.

Answer: c. 4 full rounds, position C is 10 m along top from top-left corner; f. 5 full rounds, position Z is 10 m along top from top-right corner

## Exercise 6.3 — 6.1 Perimeter — Straight and Diagonal Units

Q1 Write the perimeters of the four figures shown on the dot grid in terms of straight (s) and diagonal (d) units. (The figures spell out letters using horizontal/vertical red lines and diagonal blue lines on a dot grid.)

SOLUTION

Count straight (horizontal/vertical) segments and diagonal segments for each figure.

Figure 1 (first letter): 8 straight + 2 diagonal = 8s + 2d

Figure 2 (second letter): 4 straight + 6 diagonal = 4s + 6d

Figure 3 (third letter): 12 straight + 6 diagonal = 12s + 6d

Figure 4 (fourth letter): 18 straight + 6 diagonal = 18s + 6d

Answer: 8s + 2d; 4s + 6d; 12s + 6d; 18s + 6d

## Exercise 6.4 — 6.1 Perimeter — Split and Rejoin

Q1 A rectangular paper chit of dimension 6 cm × 4 cm is cut into two equal pieces (each 6 cm × 2 cm). Arrangement (a) has a perimeter of 28 cm. Find out the perimeter of each of the other arrangements (b), (c), and (d).

SOLUTION

Each piece is 6 cm × 2 cm.

Arrangement a: Two pieces placed end-to-end horizontally → 12 cm × 2 cm rectangle.
Perimeter = 2 × (12 + 2) = 28 cm ✓ (given)

Arrangement b: Z/staircase shape — one piece on bottom-left, one shifted 2 cm to the right on top.
The combined shape has 8 segments: 6+2+2+2+6+2+2+2
Perimeter = 24 cm

Arrangement c: A T-shape — one piece laid flat as the base (6 cm × 2 cm), the other stood vertically as the stem (2 cm × 6 cm) centred on top, leaving a 2 cm overhang on each side.
Trace the boundary: 6 (base bottom) + 2 (base right) + 2 (right overhang top) + 6 (stem right) + 2 (stem top) + 6 (stem left) + 2 (left overhang top) + 2 (base left)
Perimeter = 6+2+2+6+2+6+2+2 = 28 cm

Arrangement d: Two pieces (2 cm × 6 cm vertical) placed side by side with the right one shifted 3 cm lower.
The combined step-shape has segments: 6+2+3+2+6+2+3+2
Perimeter = 26 cm

Answer: b = 24 cm; c = 28 cm; d = 26 cm

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Q2 Arrange the two pieces (each 6 cm × 2 cm) to form a figure with a perimeter of 22 cm.

SOLUTION

Place the two 6 cm × 2 cm pieces in a staircase/Z-shape with a 1 cm horizontal offset.
Piece 1: 6 cm wide × 2 cm tall at the bottom.
Piece 2: 6 cm wide × 2 cm tall placed on top, shifted 1 cm to the right.
The combined shape has 8 segments: 6+2+1+2+6+2+1+2

Perimeter = 6+2+1+2+6+2+1+2 = 22 cm ✓

Answer: Place the two pieces in a Z-shape with 1 cm offset along their 6 cm sides to get perimeter = 22 cm

## Exercise 6.5 — 6.2 Area

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

SOLUTION

Area of rectangle = length × width
300 = 25 × width
width = 300 ÷ 25 = 12 m

Answer: Width of the 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

Area of the plot = 500 × 200 = 1,00,000 sq m
Cost = (1,00,000 ÷ 100) × 8 = 1000 × 8 = 8,000

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 in this grove?

SOLUTION

Area of the coconut grove = 100 × 50 = 5000 sq m
Each tree requires 25 sq m.
Maximum number of trees = 5000 ÷ 25 = 200

Answer: Maximum 200 trees can be planted

Q4 By splitting the following figures into rectangles, find their areas (all measures are given in metres).
a. A staircase-shaped figure (with dimensions 3, 1, 2, 2, 4, 4, 3 labelled).
b. A frame-shaped figure (with dimensions 5, 3, 3, 2, 1, 1 labelled).

SOLUTION

a. Split the staircase shape into three rectangles:
Bottom rectangle: 3 m × 4 m = 12 sq m

Middle rectangle: 4 m × 2 m = 8 sq m

Top rectangle: 4 m × 2 m = 8 sq m

Total area = 12 + 8 + 8 = 28 sq m

b. Split the frame/U-shape into three rectangles:

Left vertical strip: 1 m × 3 m = 3 sq m

Right vertical strip: 1 m × 3 m = 3 sq m

Bottom horizontal strip: 3 m × 1 m = 3 sq m

Total area = 3 + 3 + 3 = 9 sq m

Answer: a. 28 sq m; b. 9 sq m

## Exercise 6.6 — 6.2 Area — Tangram

Q1 Cut out the tangram pieces (A, B, C, D, E, F, G). Explore and figure out how many pieces have the same area.

SOLUTION

By placing the pieces over each other, we find:
Shapes A and B have the same area (both are large triangles).
Shapes C and E have the same area (both are small triangles).
Shape D (medium triangle) has twice the area of Shape C or E.
Shape F (square) has the same area as Shape D (medium triangle).
Shape G (parallelogram) has the same area as Shape D (medium triangle).
So: A = B; C = E; D = F = G = 2C

Answer: A = B; C = E; D = F = G (same area among pairs); 3 pairs of equal-area shapes

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

SOLUTION

Shape D can be exactly covered using Shapes C and E together.
So area of D = area of C + area of E.
Since C and E have equal areas: area of D = 2 × area of C.
Shape D is twice as big as Shape C.

Answer: D is 2 times bigger than C; D = C + E (area of D equals area of C and E combined)

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Q3 Which shape has more area: Shape D or F? Give reasons for your answer.

SOLUTION

Shape D (medium triangle) and Shape F (square) can both be seen to have equal area.
By placing Shape F over Shape D (or decomposing), they cover the same region.
Area of D = Area of F.

Answer: Shape D and Shape F have the same area

Q4 Which shape has more area: Shape F or G? Give reasons for your answer.

SOLUTION

Shape F (square) and Shape G (parallelogram) are each equal in area to Shape D (medium triangle).

So Area of F = Area of G.

They have the same area.

Answer: Shape F and Shape G have the same area

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Q5 What is the area of Shape A as compared to Shape G? Is it twice as big? Four times as big?

SOLUTION

From the hint: D = 2C, and D = F = G.

So G = 2C.

Shape A is a large triangle. A = B, and both A and B together make up half the total square.

Total square area = A + B + C + D + E + F + G = 2A + 2C + 2C + 2C = 2A + 6C

Also: each large triangle A = 4C (since A = 4 × area of C).

Verification: 2(4C) + 2C + 2C + 2C = 8C+6C = 14C? Let us use the direct approach.

A = B = 4 × (area of C). G = 2C. So A = 2 × G.

Shape A is twice as big as Shape G.

Answer: Shape A is twice as big as Shape G

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Q6 Can you now figure out the area of the big square formed with all seven pieces in terms of the area of Shape C?

SOLUTION

From the relationships: A = B = 4C; D = E+C = 2C; F = G = 2C

Total area = A + B + C + D + E + F + G

= 4C + 4C + C + 2C + C + 2C + 2C

= 16C

Answer: The area of the big square = 16 × area of Shape C

Q7 Arrange these 7 pieces to form a rectangle. What will be the area of this rectangle in terms of the area of Shape C now? Give reasons for your answer.

SOLUTION

The same 7 pieces are rearranged to form a rectangle.
Since rearranging pieces does not change their total area,
the area of the rectangle = total area of all 7 pieces = 16 × area of Shape C.
Area of rectangle = area of the big square = 16C.

Answer: Area of the rectangle = 16 × area of Shape C (same total area as the square)

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Q8 Are the perimeters of the square and the rectangle formed from these 7 pieces different or the same? Give an explanation for your answer.

SOLUTION

The square and the rectangle have the same area (16C) but different shapes.
A square with area 16C has all sides equal; a rectangle has different length and width.
Since their dimensions are different, their perimeters are different.
Two figures with the same area can have different perimeters.
Therefore, the perimeters of the square and the rectangle are different.

Answer: The perimeters are different — same area does not mean same perimeter

## Exercise 6.7 — 6.2 Area — Grid Area Estimation

Q1 Find the area of the four figures shown on the dot grid using the conventions: full square = 1 sq unit, more than half = 1 sq unit, exactly half = 1/2 sq unit, less than half = ignore.

SOLUTION

Apply the grid counting conventions to each figure:

Figure 1 (first letter shape): Count full squares and half-squares → area = 4 sq units

Figure 2 (second letter shape): Count full squares and half-squares → area = 9 sq units

Figure 3 (third letter shape): Count full squares and half-squares → area = 10 sq units

Figure 4 (fourth letter shape): Count full squares and half-squares → area = 11 sq units

Answer: 4 sq units; 9 sq units; 10 sq units; 11 sq units

## Exercise 6.8 — 6.3 Area of a Triangle — Grid Figures

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

SOLUTION

Using the grid (each small square = 1 sq unit), divide each figure into rectangles and right triangles.

Figure a: Decompose into rectangles and triangles.
Bounding rectangle − triangles removed = 24 sq units

Figure b: Decompose into rectangles and triangles.
Area = 30 sq units

Figure c: Decompose into rectangles and triangles.
Area = 48 sq units

Figure d: Decompose into rectangles and triangles.
Area = 16 sq units

Figure e: Decompose into rectangles and triangles.
Area = 12 sq units

Answer: a = 24 sq units; b = 30 sq units; c = 48 sq units; d = 16 sq units; e = 12 sq units

## Exercise 6.9 — Making it 'More' or 'Less' — 9 Unit Squares

Q1 Using 9 unit squares (arranged so each square shares at least one full side with another), what is the smallest perimeter possible?

SOLUTION

To minimise perimeter, arrange the squares as compactly as possible.
A 3 × 3 square (all 9 unit squares in a 3×3 grid) gives the smallest perimeter.
Perimeter = 4 × 3 = 12 units

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

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Q2 Using 9 unit squares, what is the largest perimeter possible?

SOLUTION

To maximise perimeter, arrange the squares in a single row (1 × 9 strip).
Perimeter = 2 × (1 + 9) = 2 × 10 = 20 units

Answer: Largest perimeter = 20 units (a 1 × 9 strip)

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Q3 Make a figure with 9 unit squares having a perimeter of 18 units.

SOLUTION

One example: Arrange 5 squares in a horizontal row (1 × 5) and 4 more squares in a vertical column attached to the left end (1 × 4, above the row's left square).
This L-shape has:
Bottom arm: 5 squares (5 wide × 1 tall)
Left arm: 4 more squares (1 wide × 4 tall above the bottom-left square)
Total = 5 + 4 = 9 squares.
Perimeter segments: 5+1+4+3+1+4 = 18 units ✓

Answer: An L-shaped arrangement of 9 unit squares (e.g., 5 in a row + 4 in a column attached at one end) gives perimeter = 18 units

Q4 Can you make other shaped figures for each of the above three perimeters, or is there only one shape with that perimeter? What is your reasoning?

SOLUTION

Smallest perimeter (12 units): Only the 3 × 3 square achieves this. It is the unique most compact shape.

Largest perimeter (20 units): Only the 1 × 9 strip achieves this (or its rotation, 9 × 1). There is essentially one shape.

Perimeter of 18 units: Multiple different shapes can give P = 18. For example, various L-shapes and staircase shapes of 9 squares all give P = 18. So there is more than one shape.

In general, intermediate perimeter values can be achieved by many different arrangements.

Answer: Smallest (12) and largest (20) each have essentially one arrangement; perimeter 18 can be achieved by multiple different shapes

## Exercise 6.10 — Making it 'More' or 'Less' — House Plans

Q1 Below is the house plan of Charan in a rectangular plot (total dimensions 35 ft × 30 ft). Some measurements are given: Master Bedroom (15 ft × 15 ft, Area = 225 sq ft), Toilet (5 ft × 10 ft), Kitchen (15 ft × 12 ft, Area = 180 sq ft), Small Bedroom (15 ft × ___ ft, Area = 180 sq ft).
a. Find the missing measurements.
b. Find out the area of his house.

SOLUTION

a. Finding missing dimensions:
Small Bedroom: 15 × breadth = 180 → breadth = 180 ÷ 15 = 12 ft
Small Bedroom: 15 ft × 12 ft

The house is 35 ft wide × 30 ft tall.
Left column (15 ft wide): Master BR (15 ft tall) + Small BR (12 ft tall) + Garden strip (3 ft tall) = 30 ft ✓
Right column (20 ft wide): Kitchen (15 ft wide × 12 ft tall) + Utility (15 ft × 3 ft, Area = 45 sq ft)
Hall (20 ft wide × 12 ft tall, Area = 240 sq ft)
Garden (20 ft × 3 ft, Area = 60 sq ft)
Parking (15 ft × 3 ft, Area = 45 sq ft)

Missing measurements:
Small Bedroom: 15 ft × 12 ft
Utility: 15 ft × 3 ft, Area = 45 sq ft
Hall: 20 ft × 12 ft, Area = 240 sq ft
Garden: 20 ft × 3 ft, Area = 60 sq ft
Parking: 15 ft × 3 ft, Area = 45 sq ft

b. Area of Charan's house = 35 ft × 30 ft = 1050 sq ft

Answer: a. Small BR: 15×12 ft; Utility: 15×3 ft (45 sq ft); Hall: 20×12 ft (240 sq ft); Garden: 20×3 ft (60 sq ft); Parking: 15×3 ft (45 sq ft). b. Total area = 1050 sq ft

Q2 Find the missing dimensions and area of Sharan's home. The plan width is 42 ft. Given: Master Bedroom (12 ft × 15 ft, Area = 180 sq ft), Kitchen (18 ft × 10 ft, Area = 180 sq ft), Small Bedroom (12 ft × 10 ft), Utility (Area = 70 sq ft).
a. Find the missing measurements.
b. Find out the area of his house. Compare the areas and perimeters of Sharan's house and Charan's house.

SOLUTION

a. Total width = 42 ft.
Top row height = 10 ft (same as Kitchen height).
Bottom row height = 15 ft (same as Master BR height).
Total height = 10 + 15 = 25 ft.

Width layout: Master/Small BR (12 ft) + Toilet (5 ft) + Kitchen (18 ft) + Utility (7 ft) = 42 ft ✓
Check: 12 + 5 + 18 + 7 = 42 ✓

Toilet: 5 ft × 10 ft, Area = 50 sq ft
Utility: 7 ft × 10 ft, Area = 70 sq ft ✓
Small Bedroom: 12 ft × 10 ft, Area = 120 sq ft
Hall: 23 ft × 15 ft, Area = 345 sq ft
Entrance: 7 ft × 15 ft, Area = 105 sq ft

b. Area of Sharan's house = 42 ft × 25 ft = 1050 sq ft

Comparison:
Area of Charan's house = 35 × 30 = 1050 sq ft = Area of Sharan's house (both equal)
Perimeter of Charan's house = 2 × (35 + 30) = 130 ft
Perimeter of Sharan's house = 2 × (42 + 25) = 134 ft
Sharan's house has a larger perimeter despite the same area.

Answer: a. Toilet: 5×10 ft; Utility: 7×10 ft (70 sq ft); Small BR: 12×10 ft (120 sq ft); Hall: 23×15 ft (345 sq ft); Entrance: 7×15 ft (105 sq ft). b. Area = 1050 sq ft; Sharan's perimeter (134 ft) > Charan's perimeter (130 ft)

## Exercise 6.11 — Area Maze Puzzles

Q1 In each figure, find the missing value of either the length of a side or the area of a region.
a. A 2×2 grid of rectangles: top-left = 13 sq cm, top-right = 26 sq cm, bottom-left = 15 sq cm, bottom-right = ? sq cm.
b. An L-shaped compound figure with two regions each labelled 10 sq cm and a top-right region = ? sq cm (with labels 3 cm and 2 cm).
c. Three stacked rectangles (total left height 15 cm): bottom = 60 sq cm (5 cm tall), middle = 42 sq cm (6 cm tall), top = ? sq cm (3 cm from right edge).
d. Two rectangular regions side by side: left = 38 sq cm, right-top = 4 cm tall, right-bottom = 18 sq cm (5 cm wide); ? cm is the missing dimension at the top.

SOLUTION

a. In a 2×2 grid of rectangles sharing the same horizontal and vertical dividers:
Let left-column width = w1, right-column width = w2.
top-left: w1 × h1 = 13; top-right: w2 × h1 = 26 → w2 = 2 × w1
bottom-right = w2 × h2 = 2 × (w1 × h2) = 2 × bottom-left = 2 × 15 = 30 sq cm

b. Left-tall region: area = 10 sq cm. Bottom region: 2 cm high × 5 cm wide = 10 sq cm.
Top-right region: 3 cm wide × 3 cm tall = 9 sq cm.

c. Bottom rectangle: 5 cm tall, 60 sq cm → width = 60 ÷ 5 = 12 cm.
Middle rectangle: 6 cm tall, 42 sq cm → width = 42 ÷ 6 = 7 cm.
Top rectangle: height = 15 − 6 − 5 = 4 cm; width = 7 − 3 = 4 cm (3 cm label is the right overhang).
Area of top = 4 × 4 = 16 sq cm.

d. The figure has two columns. By analysing the given dimensions and areas, the missing dimension ? = 5 cm.

Answer: a. 30 sq cm; b. 9 sq cm; c. 16 sq cm; d. 5 cm

## Exercise 6.12 — 6.3 Area of a Triangle

Q1 Give the dimensions of a rectangle whose area is the sum of the areas of these two rectangles having measurements: 5 m × 10 m and 2 m × 7 m.

SOLUTION

Area of first rectangle = 5 × 10 = 50 sq m
Area of second rectangle = 2 × 7 = 14 sq m
Total area required = 50 + 14 = 64 sq m
Possible dimensions of a rectangle with area 64 sq m:
8 m × 8 m = 64 ✓ (a square is also a rectangle)
16 m × 4 m = 64 ✓
32 m × 2 m = 64 ✓

Answer: Total area = 64 sq m; possible dimensions: 8 m × 8 m, or 16 m × 4 m, or 32 m × 2 m (among others)

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

SOLUTION

Area = length × width
1000 = 50 × width
width = 1000 ÷ 50 = 20 m

Answer: Width of the garden = 20 m

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Q3 The floor of a room is 5 m long and 4 m wide. A square carpet whose sides are 3 m in length is laid on the floor. Find the area that is not carpeted.

SOLUTION

Area of the floor = 5 × 4 = 20 sq m
Area of the square carpet = 3 × 3 = 9 sq m
Area not carpeted = 20 − 9 = 11 sq m

Answer: Area not carpeted = 11 sq m

Q4 Four flower beds having sides 2 m long and 1 m wide are dug at the four corners of a garden that is 15 m long and 12 m wide. How much area is now available for laying down a lawn?

SOLUTION

Area of the garden = 15 × 12 = 180 sq m
Area of one flower bed = 2 × 1 = 2 sq m
Total area of four flower beds = 4 × 2 = 8 sq m
Area available for lawn = 180 − 8 = 172 sq m

Answer: Area available for lawn = 172 sq m

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Q5 Shape A has an area of 18 square units and Shape B has an area of 20 square units. Shape A has a longer perimeter than Shape B. Draw two such shapes satisfying the given conditions.

SOLUTION

Shape A: area = 18 sq units. Choose dimensions 2 m × 9 m → perimeter = 2(2+9) = 22 units.
Shape B: area = 20 sq units. Choose dimensions 4 m × 5 m → perimeter = 2(4+5) = 18 units.
Perimeter of A (22 units) > Perimeter of B (18 units) ✓
Area of A (18) < Area of B (20) ✓
Draw rectangle 2×9 for Shape A and rectangle 4×5 for Shape B.

Answer: Example: Shape A = 2×9 rectangle (area 18, perimeter 22); Shape B = 4×5 rectangle (area 20, perimeter 18); perimeter of A > perimeter of B ✓

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Q6 On a page in your book, draw a rectangular border that is 1 cm from the top and bottom and 1.5 cm from the left and right sides. What is the perimeter of the border?

SOLUTION

Let the page dimensions be L cm (length) × B cm (breadth).
The border rectangle has:
Length = L − 2 × 1 = (L − 2) cm
Breadth = B − 2 × 1.5 = (B − 3) cm
Perimeter of the border = 2 × [(L − 2) + (B − 3)] = 2(L + B) − 10 cm

For a typical textbook page of about 24 cm × 18 cm:

Border length = 24 − 2 = 22 cm; border breadth = 18 − 3 = 15 cm

Perimeter = 2 × (22 + 15) = 2 × 37 = 74 cm

Answer: Perimeter = 2(L + B − 5) cm, where L and B are the page dimensions; for a 24 cm × 18 cm page, perimeter = 74 cm

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Q7 Draw a rectangle of size 12 units × 8 units. Draw another rectangle inside it, without touching the outer rectangle, that occupies exactly half the area.

SOLUTION

Area of outer rectangle = 12 × 8 = 96 sq units.

Area of inner rectangle = 96 ÷ 2 = 48 sq units.

Choose inner rectangle dimensions: 8 × 6 = 48 sq units.

Draw the 8 × 6 rectangle centred inside the 12 × 8 rectangle, ensuring it does not touch the outer boundary.

Answer: Inner rectangle area = 48 sq units; example dimensions: 8 units × 6 units (placed centrally inside the 12 × 8 rectangle)

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Q8 A square piece of paper is folded in half. The square is then cut into two rectangles along the fold. Regardless of the size of the square, one of the following statements is always true. Which statement is true?

a. The area of each rectangle is larger than the area of the square.

b. The perimeter of the square is greater than the perimeters of both the rectangles added together.

c. The perimeters of both the rectangles added together is always 1½ times the perimeter of the square.

d. The area of the square is always three times as large as the areas of both rectangles added together.

SOLUTION

Let the square have side s.

Each rectangle after folding: dimensions s × (s/2).

Check a: Area of each rectangle = s × s/2 = $s^2/2$. Area of square = $s^2$. Each rectangle is SMALLER, not larger. ✗

Check b: Perimeter of square = 4s. Sum of both rectangle perimeters = 2 × 2(s +

s/2) = 2 × 3s = 6s. 4s < 6s, so square's perimeter is NOT greater. ✗

Check c: Sum of both rectangles' perimeters = 6s. Square's perimeter = 4s. Ratio = 6s ÷ 4s = 3/2 = 1½. ✓

Check d: Total area of both rectangles = 2 × s²/2 = s². Area of square = s². Square is NOT three times as large. ✗

Answer: Statement c is always true: the combined perimeters of both rectangles is always 1½ times the perimeter of the square