



OLYMPIAD · EVERYDAY MATHEMATICS · OLYMPIAD PREPARATION · SHORT NOTES

Chapter 17: Area, Perimeter and Volume in Real Situations

Topic-wise short notes with solved examples

Fencing, tiling, painting, paths and tanks: using area, perimeter and volume formulas for everyday problems.

1 Which formula to use

Shape	Perimeter	Area
Rectangle, length l and breadth b	$2(l + b)$	$l \times b$
Square of side a	$4a$	a^2
Triangle	sum of sides	$\frac{1}{2} \times \text{base} \times \text{height}$
Circle of radius r	$2\pi r$	πr^2
Trapezium	sum of sides	$\frac{1}{2}(a + b) \times h$

- **Perimeter** is a length. Use it for **fencing**, a border, a rope or a wire.
- **Area** is the surface. Use it for **tiling**, carpets, painting, grass and a path.
- **Volume** is the space inside. Use it for tanks, boxes and filling with water.
- Take $\pi = \frac{22}{7}$ when the radius is a multiple of 7.
- Change all lengths to one unit first. Remember $1 \text{ m} = 100 \text{ cm}$.

Example 1.1 A rectangular field is 40 m long and 25 m wide. Find the cost of fencing it at Rs 12 per metre.

SOLUTION

$$\text{Perimeter} = 2(40 + 25) = 130 \text{ m.}$$

$$\text{Cost} = 130 \times 12.$$

Rs 1560



Example 1.2 A circular park has radius 14 m. Find its circumference and its area.

SOLUTION

$$\text{Circumference} = 2 \times \frac{22}{7} \times 14 = 88 \text{ m.}$$

$$\text{Area} = \frac{22}{7} \times 14 \times 14 = 616 \text{ square metres.}$$

88 m and 616 square metres

2 Tiles, carpets and walls

- Number of tiles = $\frac{\text{area of the floor}}{\text{area of one tile}}$. Use the same units for both.
- Cost = area $\times$ rate per unit area.
- The four walls of a room of length l , breadth b and height h have area $2h(l + b)$. Subtract doors and windows when they are not painted.

Example 2.1 A room 6 m by 4 m is covered with square tiles of side 50 cm. How many tiles are needed?

SOLUTION

$$\text{Floor} = 6 \times 4 = 24 \text{ square metres. Tile} = 0.5 \times 0.5 = 0.25 \text{ square metres.}$$

$$\text{Tiles} = \frac{24}{0.25}.$$

96 tiles

Example 2.2 A room is 5 m long, 4 m wide and 3 m high. Find the area of the four walls.

SOLUTION

$$2 \times 3 \times (5 + 4) = 54.$$

54 square metres

3 Paths and tanks

- To find the area of a **path** of width w around a rectangle, find the area of the bigger rectangle (outside) and subtract the area of the smaller one.
- The volume of a **cuboid** is $l \times b \times h$. A cube of side a has volume a^3 .
- $1 \text{ m}^3 = 1000 \text{ litres}$ and $1000 \text{ cm}^3 = 1 \text{ litre}$.



Example 3.1 A path 2 m wide runs around the outside of a garden 20 m by 15 m. Find the area of the path.

SOLUTION

$$\text{Outer rectangle} = (20 + 4) \times (15 + 4) = 24 \times 19 = 456.$$

$$\text{Garden} = 20 \times 15 = 300.$$

156 square metres

Example 3.2 A tank is 2 m long, 1.5 m wide and 1 m deep. How many litres of water can it hold?

SOLUTION

$$\text{Volume} = 2 \times 1.5 \times 1 = 3 \text{ cubic metres.}$$

3000 litres

REMEMBER

Draw the shape and write the lengths on it. The most common mistake is to use area when the question needs perimeter, or the other way round.