Class 9 Maths Chapter 6 Measuring Space: Perimeter and Area Notes with Free PDF Download

Class 9 Maths Chapter 6 Measuring Space: Perimeter and Area Notes Free PDF Download is prepared based on the latest CBSE and NCERT syllabus. These notes will help in school exams, board exams, and quick revision. They help students understand the chapter clearly, revise faster, and prepare for exams with confidence.

Introduction to Measuring Space: Perimeter and Area

What Is Perimeter?

Perimeter is the total length of the boundary of a flat shape. In simple words, if you walk along the outer edge of a shape from start to finish and come back to where you started, the total distance you cover is the perimeter.

Think of a football field. If you jog around the entire edge of the field once, the distance you cover is the perimeter of that field. Every flat shape a square, a rectangle, a triangle, a circle has a perimeter.

Perimeter is always measured in units of length such as centimetres, metres, or kilometres.

What Is Area?

Area is the amount of flat surface enclosed within the boundary of a shape. In simple words, it tells you how much space is covered or occupied by a flat shape.

Think of the same football field. The total grass surface inside the boundary the part the players run on is the area of that field. Area tells you how much "filling" a shape has inside it.

Area is always measured in square units such as square centimetres (cm^2), square metres (m^2), or square kilometres (km^2).

Understanding Perimeter

Definition of Perimeter

The perimeter of a shape is the total distance around its outer boundary. It is found by adding together the lengths of all the sides of the shape.

General Rule: Perimeter = sum of all sides

This simple rule works for any shape, regardless of how many sides it has.

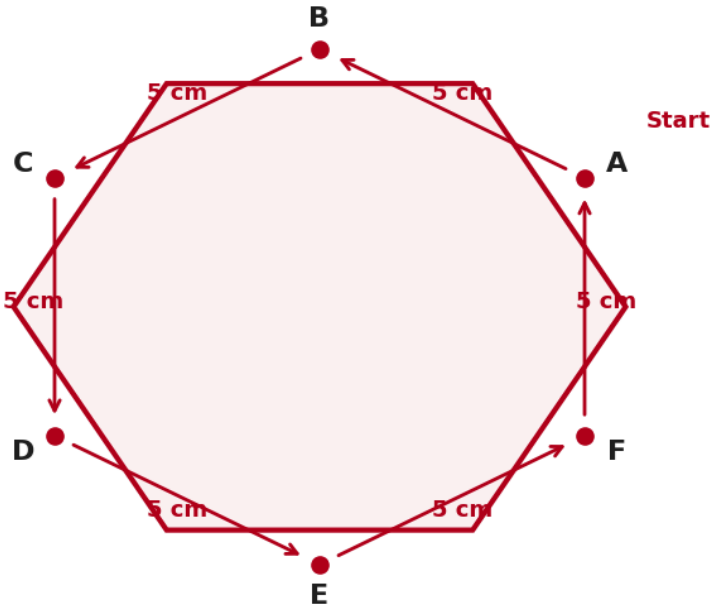
Perimeter of Regular Shapes

A regular shape is one where all sides are equal in length and all angles are equal. Because the sides are all the same, the perimeter formula for a regular shape is simply:

Perimeter of a regular shape = number of sides × length of one side

For example, a regular hexagon (six equal sides, each 5 cm long) has a perimeter of 6 × 5 = 30 cm.

Perimeter of a Regular Hexagon



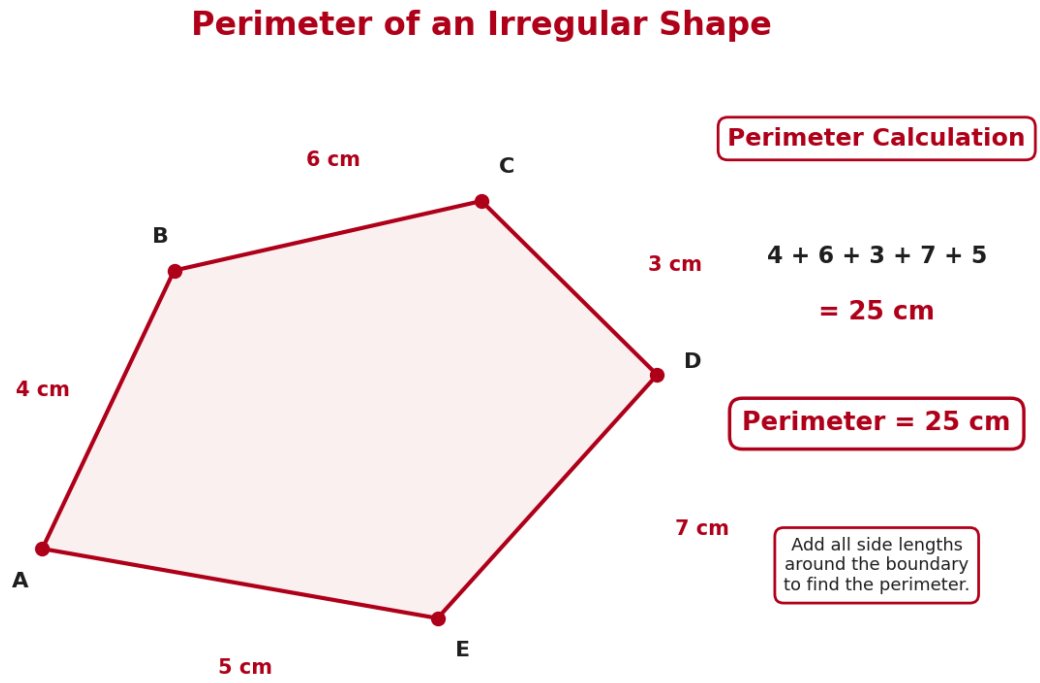
Perimeter = 6 × 5 = 30 cm

Going around the boundary gives the total perimeter.

Perimeter of Irregular Shapes

An irregular shape is one where the sides are different lengths. To find the perimeter, you simply measure each side individually and add all the lengths together.

Perimeter of an irregular shape = side 1 + side 2 + side 3 + ... (all sides)



Understanding Area

Definition of Area

The area of a shape is the measure of the flat surface enclosed within its boundary. It tells you how much space is covered by the shape on a flat surface.

Area is found using specific formulas for each shape. The formula varies depending on whether the shape is a square, rectangle, triangle, circle, or some other form.

Units of Area Measurement

Since area involves two dimensions length and width it is always expressed in square units:

- Square millimetres (mm^2), used for very small objects

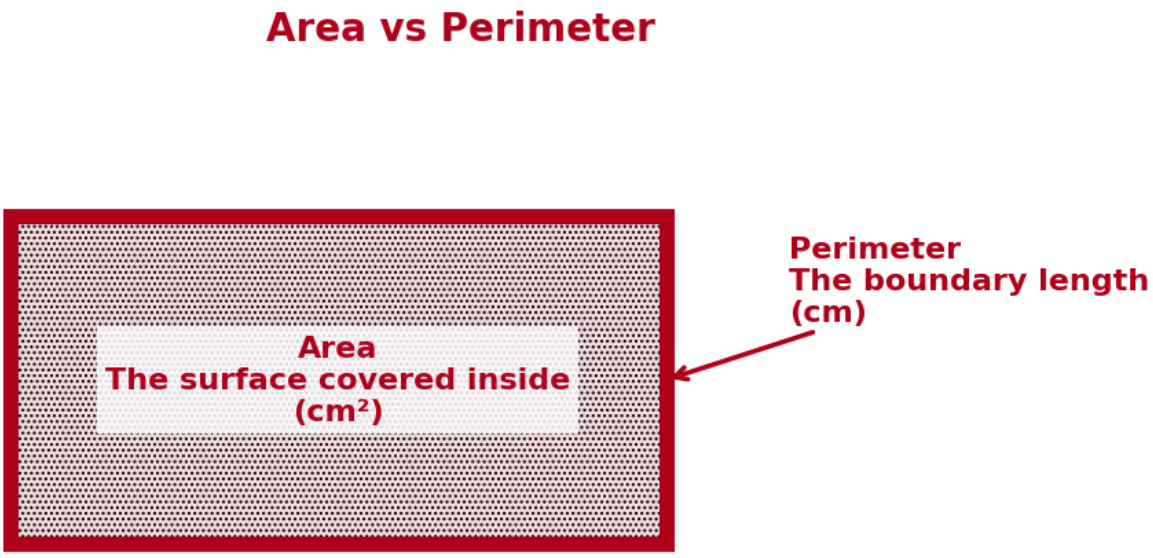
- Square centimetres (cm²), used for objects like books, tiles, or notebooks
- Square metres (m²), used for rooms, floors, and walls
- Square kilometres (km²), used for large land areas like cities or forests
- Hectares (ha), used in agriculture and land measurement; 1 hectare = 10,000 m²

Difference Between Area and Perimeter

This is one of the most important distinctions in the entire chapter. Many students confuse these two measurements:

Perimeter measures the boundary the distance around the outside edge of a shape. It is measured in simple length units (cm, m, km).

Area measures the surface the space covered inside the shape. It is measured in square units (cm², m², km²).



Perimeter and Area of Squares

Formula for the Perimeter of a Square

A square has four sides that are all equal in length. The perimeter is simply four times the side length.

Perimeter of a Square = 4 × side

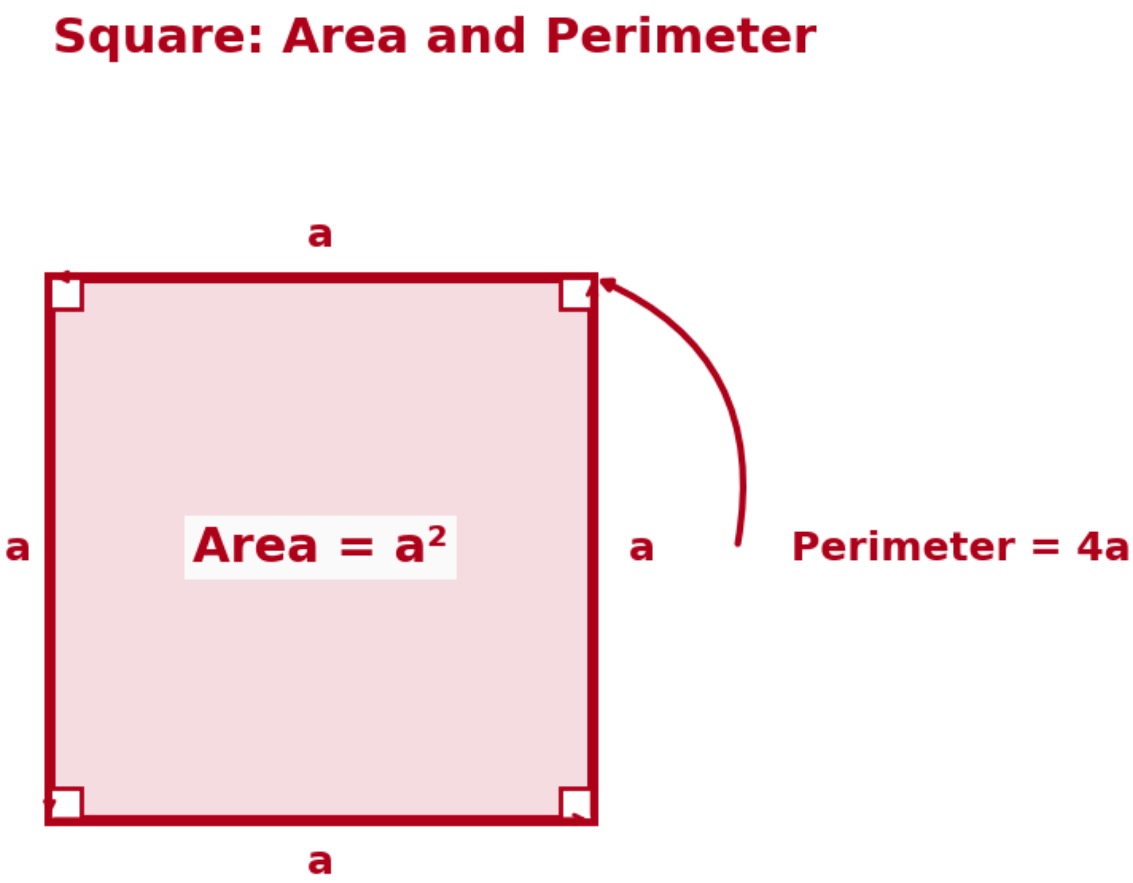
If the side of the square is called "a": P = 4a

Formula for the Area of a Square

The area of a square is the side length multiplied by itself.

Area of a Square = side × side = side²

If the side of the square is called "a": A = a²



Solved Example on Squares

Question: A square garden has a side length of 8 metres. Find its perimeter and area.

Perimeter: P = 4 × side = 4 × 8 = 32 metres

Area: A = side² = 8² = 8 × 8 = 64 m²

The fence needed to go around the garden would be 32 metres long. The amount of grass covering the garden is 64 square metres.

Perimeter and Area of Rectangles

Formula for the Perimeter of a Rectangle

A rectangle has two pairs of equal sides. The longer sides are called the length (l) and the shorter sides are called the width or breadth (b). The perimeter adds all four sides:

Perimeter of a Rectangle = 2 × (length + breadth)

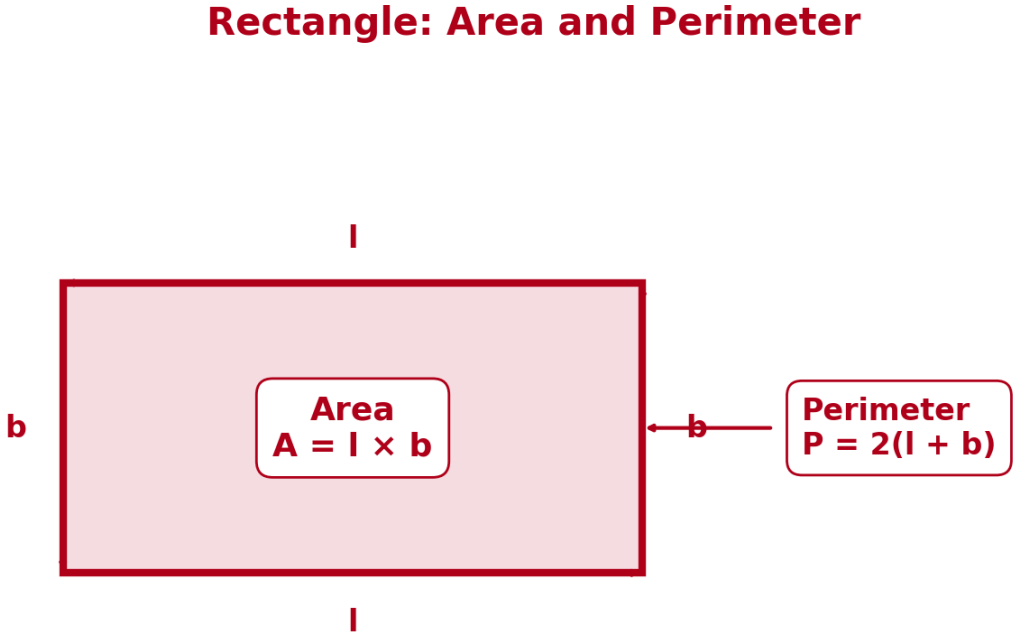
P = 2(l + b)

Formula for the Area of a Rectangle

The area of a rectangle is the length multiplied by the breadth.

Area of a Rectangle = length × breadth

A = l × b



Solved Example on Rectangles

Question: A rectangular room is 12 metres long and 7 metres wide. Find the perimeter and area.

Perimeter: P = 2(l + b) = 2 × (12 + 7) = 2 × 19 = 38 metres

Area: A = l × b = 12 × 7 = 84 m²

Meaning: The total length of the four walls along the floor is 38 metres. The floor space of the room covers 84 square metres.

Perimeter and Area of Triangles

Formula for the Perimeter of a Triangle

A triangle has three sides. The perimeter is the sum of all three sides. If the sides are labelled a, b, and c:

Perimeter of a Triangle = a + b + c

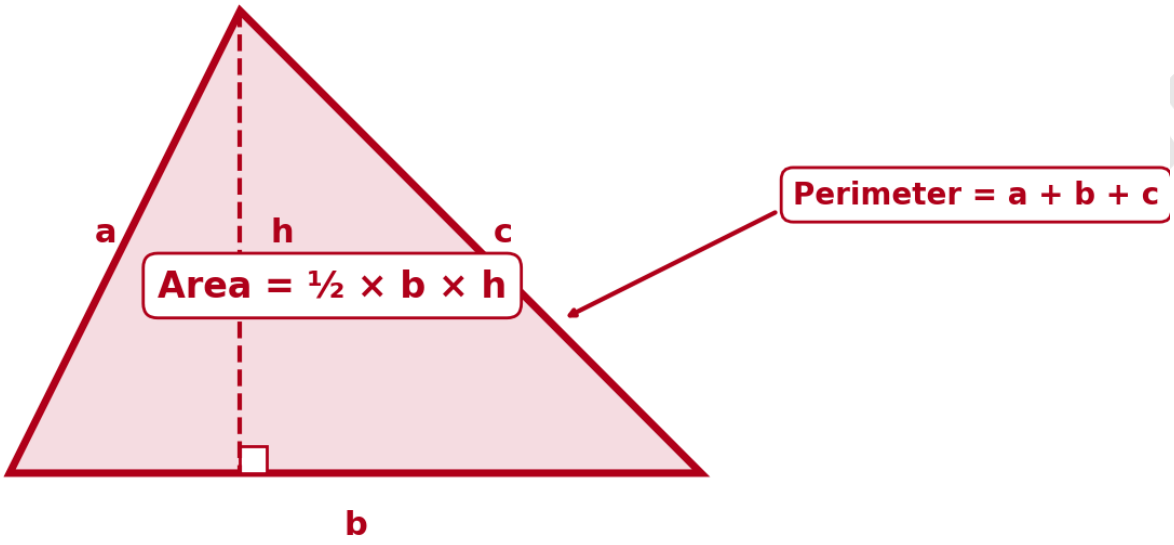
Formula for the Area of a Triangle

The standard formula for the area of a triangle requires the base length and the perpendicular height the vertical distance from the base to the opposite vertex.

Area of a Triangle = (1/2) × base × height

A = (1/2) × b × h

Triangle: Area and Perimeter



Solved Example on Triangles

Question: A triangular plot of land has sides of 9 m, 12 m, and 15 m. The base is 12 m and the height is 7.2 m. Find the perimeter and area.

Perimeter: P = 9 + 12 + 15 = 36 metres

Area: A = (1/2) × 12 × 7.2 = (1/2) × 86.4 = 43.2 m²

Perimeter and Area of Parallelograms

Formula for the Perimeter of a Parallelogram

A parallelogram has two pairs of equal opposite sides. If the two different side lengths are a and b:

Perimeter of a Parallelogram = 2 × (a + b)

P = 2(a + b)

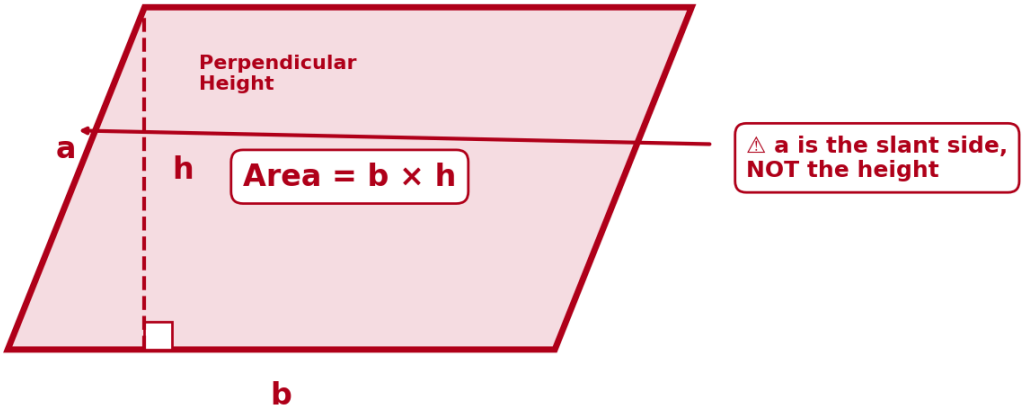
Formula for the Area of a Parallelogram

The area of a parallelogram uses the base and the perpendicular height not the slant side. The height is the straight vertical distance between the two parallel bases.

Area of a Parallelogram = base × height

A = b × h

Parallelogram: Base, Height and Slant Side



Solved Example on Parallelograms

Question: A parallelogram has a base of 10 cm, a slant side of 8 cm, and a perpendicular height of 6 cm. Find the perimeter and area.

Perimeter: P = 2(a + b) = 2 × (8 + 10) = 2 × 18 = 36 cm

Area: A = base × height = 10 × 6 = 60 cm²

The slant side of 8 cm is used for the perimeter but NOT for the area. The perpendicular height of 6 cm is used only for the area.

Perimeter and Area of Circles

Circumference of a Circle

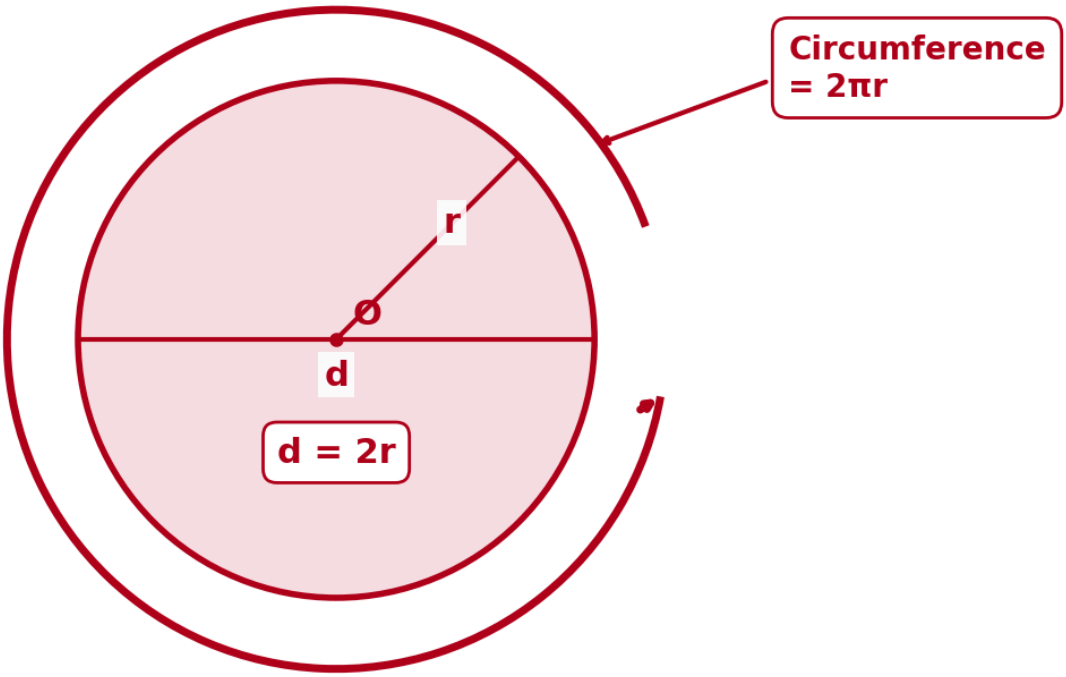
The perimeter of a circle has a special name it is called the circumference. It is the total distance around the curved boundary of the circle.

Circumference = 2 × π × radius

C = 2πr

The value of π (pi) is approximately 3.14159, often rounded to 3.14 or taken as 22/7 in calculations.

Circle with Radius, Diameter and Circumference



Area of a Circle

The area of a circle is the total flat surface enclosed within the circumference.

Area of a Circle = π × radius²

A = πr²

Relationship Between Radius and Diameter

The radius of a circle is the distance from the centre to any point on the circle's edge. The diameter is the distance across the full width of the circle passing through the centre. These two measurements are related by:

Diameter = 2 × radius $d = 2r$ or equivalently: Radius = diameter ÷ 2 $r = d/2$

Solved Example on Circles

Question: A circular park has a radius of 14 metres. Find its circumference and area. (Use $\pi = 22/7$)

Circumference: $C = 2\pi r = 2 \times (22/7) \times 14 = 2 \times 22 \times 2 = 88$ metres

Area: $A = \pi r^2$

$= (22/7) \times 14 \times 14$

$= (22/7) \times 196$

$= 22 \times 28 = 616\ m^2$

Composite Figures and Their Areas

What Are Composite Figures?

Composite figures are shapes that are made up of two or more simpler shapes joined together. In real life, most spaces and objects are not perfect squares or circles they are combinations of several shapes. A composite figure could be a shape that is partly a rectangle and partly a semicircle, or a shape that is made of a square with a triangle on top.

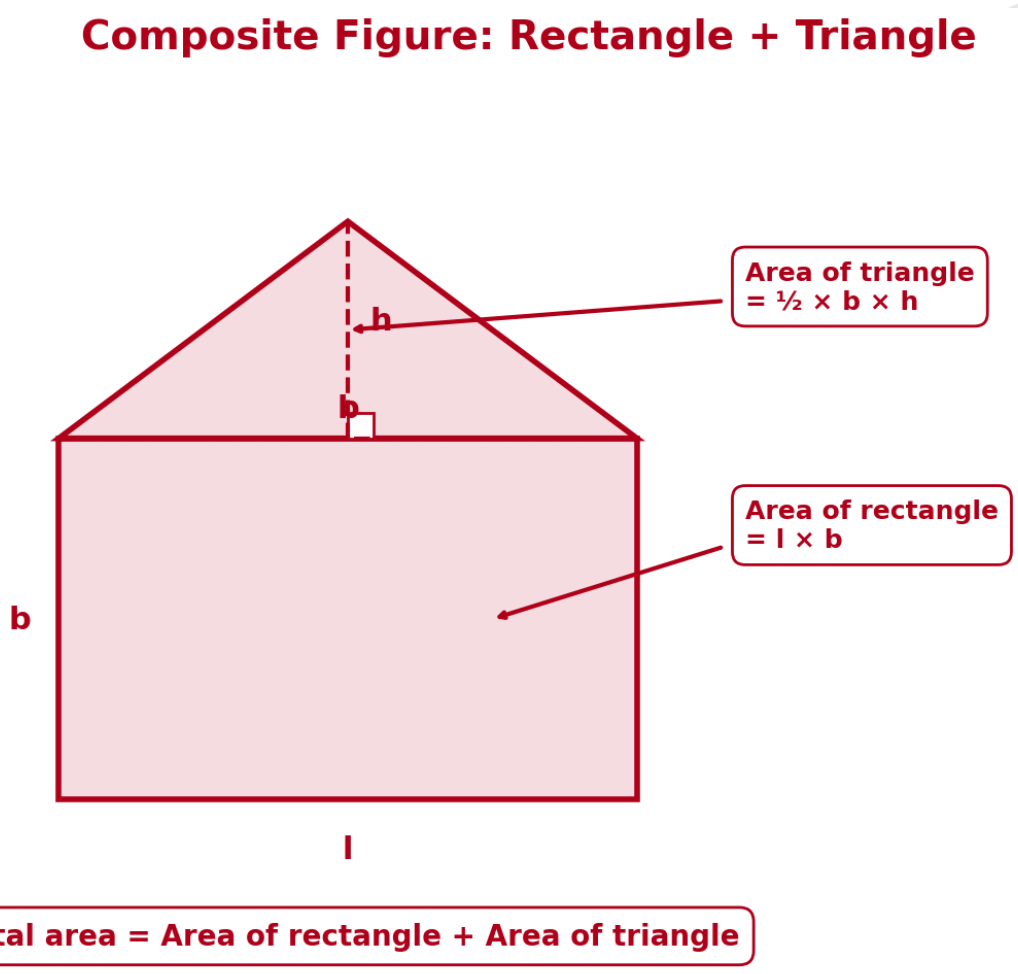
Breaking Complex Shapes into Simpler Shapes

The key strategy for finding the area of a composite figure is to divide it into recognisable shapes whose area formulas you already know. Once divided, calculate the area of each simpler part separately.

Steps to solve composite figure problems:

First, look at the overall shape and identify the simpler shapes within it. Second, draw dotted dividing lines inside the shape to separate the individual parts. Third, find the dimensions of each part from the information given. Fourth, calculate the area of each

part using its own formula. Fifth, add all the individual areas together to get the total area of the composite figure.



Finding the Total Area of Composite Figures

Solved Example:

Question: A shape consists of a rectangle 8 m long and 5 m wide, with a triangle on top having the same base (8 m) and a height of 3 m. Find the total area.

Area of rectangle: $A_1 = l \times b = 8 \times 5 = 40\ m^2$

Area of triangle: $A_2 = (1/2) \times \text{base} \times \text{height} = (1/2) \times 8 \times 3 = 12\ m^2$

Total Area: Total = $A_1 + A_2 = 40 + 12 = 52\ m^2$

Applications of Perimeter and Area in Real Life

Measuring Land and Property

When buying or selling land, the area of the plot is one of the most important pieces of information. Land is measured in square metres or hectares. Perimeter is used to find out how much fencing or boundary wall material is needed around the plot.

Construction and Architecture

Architects and civil engineers use area calculations to estimate the amount of materials needed — concrete for a floor, plaster for walls, and roofing material for a roof. Perimeter calculations are used to plan boundary walls, skirting boards, and frames.

Interior Design and Flooring

When laying tiles or carpet on a floor, the area of the floor tells you exactly how many tiles or how much carpet to buy. If the tiles come in standard sizes (such as 30 cm × 30 cm), dividing the floor area by the tile area tells you the number of tiles needed.

Sports Fields and Parks

The dimensions of sports fields are based on both perimeter and area. The area of a cricket pitch, football field, or running track is used to plan turf coverage. The perimeter of a running track determines the distance athletes cover in each lap.

Important Formulas from Measuring Space: Perimeter and Area

Formula Chart for Perimeter

- Square: $P = 4a$ (where a = side)
- Rectangle: $P = 2(l + b)$ (where l = length, b = breadth)
- Triangle: $P = a + b + c$ (where a, b, c are the three sides)
- Parallelogram: $P = 2(a + b)$ (where a and b are the two different side lengths)
- Circle (Circumference): $C = 2\pi r$ (where r = radius)

Formula Chart for Area

- Square: $A = a^2$
- Rectangle: $A = l \times b$
- Triangle: $A = (1/2) \times \text{base} \times \text{height}$

- Parallelogram: A = base × height
- Circle: A = πr²

Quick Revision Table

Shape	Perimeter Formula	Area Formula
Square	4a	a^2
Rectangle	2(l + b)	l × b
Triangle	a + b + c	(1/2) × b × h
Parallelogram	2(a + b)	b × h
Circle	2πr	πr^2

Key Concepts to Remember

Perimeter Measures Boundary Length

Perimeter always refers to the outer boundary of a shape the edge, the border, the fence line. It is a one-dimensional measurement expressed in simple length units: cm, m, or km. To find the perimeter of any shape, trace around the outside edge and add up the lengths of all the sides (or use the circumference formula for a circle).

Area Measures Surface Coverage

Area always refers to the interior surface of a shape the space covered or filled inside the boundary. It is a two-dimensional measurement expressed in square units: cm^2, m^2, or km^2. Each shape has its own area formula, and it is essential to use the correct formula for the correct shape.

Choosing the Correct Formula

Before solving any problem, always identify the shape first is it a square, rectangle, triangle, parallelogram, or circle. Then select the matching formula. A very common

error is applying a rectangle formula to a parallelogram or using the slant side of a shape instead of the perpendicular height.

Solved Examples for Quick Revision

Example on Perimeter

Question: A rectangular swimming pool is 25 m long and 10 m wide. What is the total length of fencing needed to surround it?

Since fencing goes around the boundary, we need the perimeter.

$P = 2(l + b) = 2 \times (25 + 10) = 2 \times 35 = 70$ metres

A total of 70 metres of fencing is required.

Example on Area

Question: A square tile has a side of 30 cm. How many such tiles are needed to cover a floor of area 27 m^2?

Step 1: Convert everything to the same unit. 30 cm = 0.3 m.

Step 2: Area of one tile = $0.3 \times 0.3 = 0.09$ m^2

Step 3: Number of tiles = Total floor area ÷ Area of one tile

Number of tiles = $27 \div 0.09 = 300$ tiles

Example on Composite Figures

Question: A shape is formed by a semicircle placed on top of a rectangle. The rectangle is 14 m wide and 10 m tall. The semicircle has the same width as the rectangle (14 m), making its diameter 14 m and its radius 7 m. Find the total area. (Use $\pi = 22/7$)

Area of rectangle: $A_1 = 14 \times 10 = 140$ m^2

Area of semicircle: $A_2 = (1/2) \times \pi r^2 = (1/2) \times (22/7) \times 7 \times 7 = (1/2) \times (22/7) \times 49 = (1/2) \times 154 = 77$ m^2

Total Area: Total = 140 + 77 = 217 m^2