What is area?

Area is the amount of space taken up by a two-dimensional shape or flat surface.

Units of area
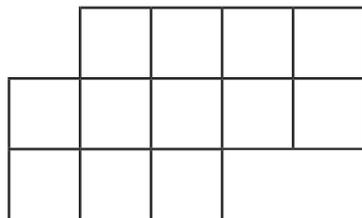
Area is measured in unit squares, for example square millimetres (mm^2), square centimetres (cm^2), square metres (m^2) or square kilometres (km^2).

cea Rewarding Learning

How to find area

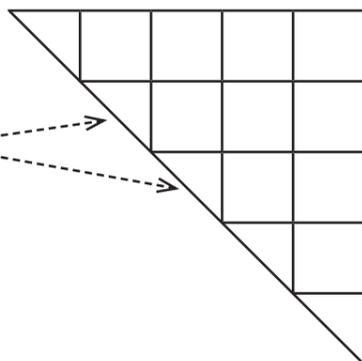Find **area** by **counting squares**

Example
The area of this shape is **12 squares**

If the shape has some half squares:
- Count the whole squares
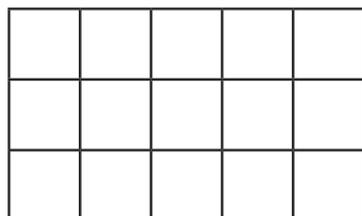- Count two half squares as one whole
- Add them together

Example
Area = 10 + 2 + ½ = 12½ squares

This rectangle has 3 rows each with 5 squares
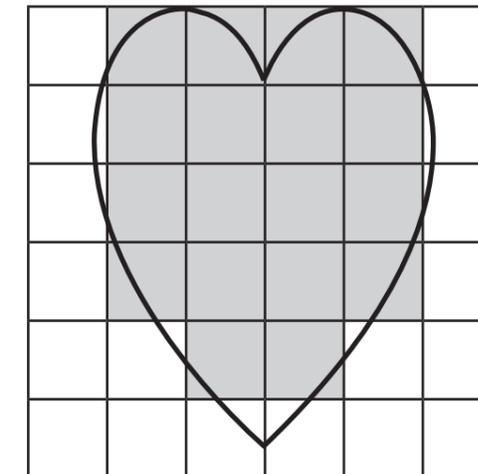**The area is 3 × 5 = 15 squares**

How to estimate area

The area of some shapes can be estimated.

To **estimate** area:
- Draw around the shape on squared paper or place a squared grid over it
- **Shade squares** that are **more than or equal to half a square** inside the shape **as a whole square**
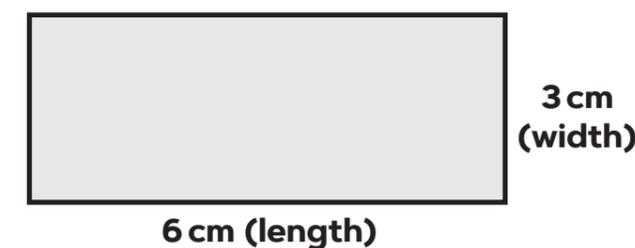
For example, counting all the shaded squares, the **area of this heart is about 18 squares**.

How to calculate area

To calculate the area of a rectangle or square:
- Find the length of the sides
- Use the rule **area = length × width**
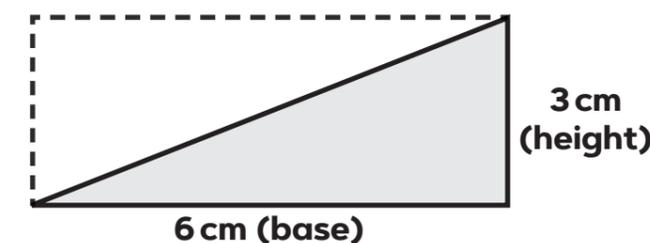
3 cm (width)
6 cm (length)
For example, **area = 6 × 3 = 18 cm²**

A rectangle can be split into two identical right-angled triangles.

To calculate the **area** of a **right-angled triangle:**
- Find the length of the base and the height
- Use the rule **area of a triangle =** $\dfrac{\text{base} \times \text{height}}{2}$

(Since the triangle is half of the rectangle)

3 cm (height)
6 cm (base)

For example, **area =** $\dfrac{6 \times 3}{2} = \dfrac{18}{2} = 9\,cm^2$

Level 3	**Level 4**	**Level 5**
Find the area by counting whole and half squares.	Estimate area by counting more than half a square as a whole square.	Calculate areas of squares, rectangles and right-angled triangles.

What is area?

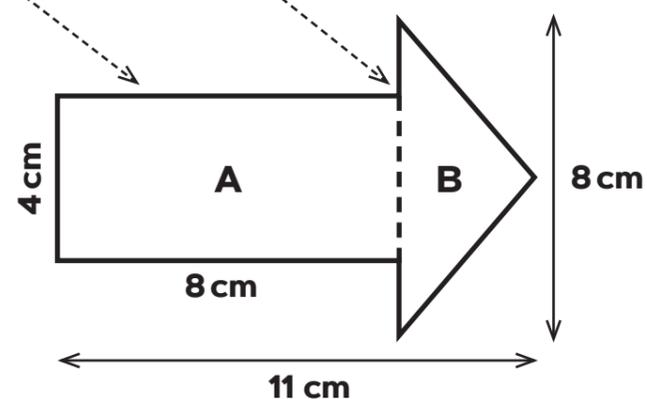Area is the amount of space taken up by a two-dimensional shape or flat surface.

Units of area

Area is measured in unit squares, for example square millimetres (mm^2), square centimetres (cm^2), square metres (m^2) or square kilometres (km^2).

How to calculate area of a composite shape

To calculate the **area** of a **composite shape:**

- **Split** the shape into two or more shapes
- Calculate any missing lengths
- Calculate the area of each part
- Find the **total** by **adding** the areas

For example, split this shape into a rectangle (A) and a triangle (B)

4 cm
8 cm
8 cm
A
B
11 cm

Area of A = 4 × 8 = 32 cm^2 Area of B = $\frac{8 \times 3}{2}$ = 12 cm^2

Total area = 32 + 12 = 44 cm^2

Level 6

Calculate areas of composite shapes involving squares, rectangles and triangles.

Calculate surface area of cubes and cuboids and calculate area of circles.

Level 7

Calculate areas of composite shapes including those involving a circle, and solve complex problems involving surface area.
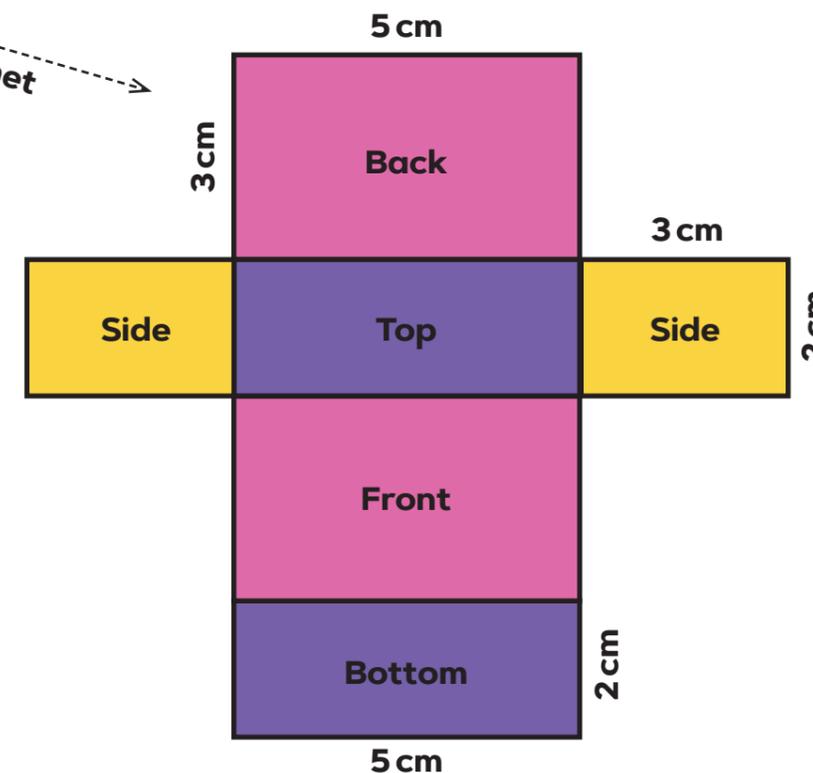
How to calculate surface area

To calculate the **surface area** of a **cuboid:**

- Calculate the area of each rectangular face
- Find the **total surface area** by **adding** the areas

2 cm
3 cm
5 cm
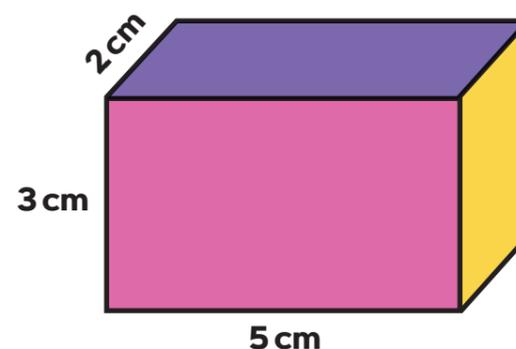
To calculate the area of each face it can be helpful to sketch the **net** of the cuboid first.

net

5 cm
3 cm
Back
3 cm
Side   Top   Side
2 cm
Front
Bottom
2 cm
5 cm

For example, this cuboid has:

Back and **Front** face: areas = 3 × 5 = 15 cm^2

Side faces: areas = 2 × 3 = 6 cm^2

Top and **Bottom** face: areas = 5 × 2 = 10 cm^2

Total surface area = (2 × 15) + (2 × 6) + (2 × 10) = 62 cm^2

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How to calculate area of a circle

The **radius, r,** is the distance from the **centre** of the circle to the **circumference** of the circle.

Pi, **π,** is the ratio of the circumference of a circle to double its radius. It has a constant value of approximately **3.142**
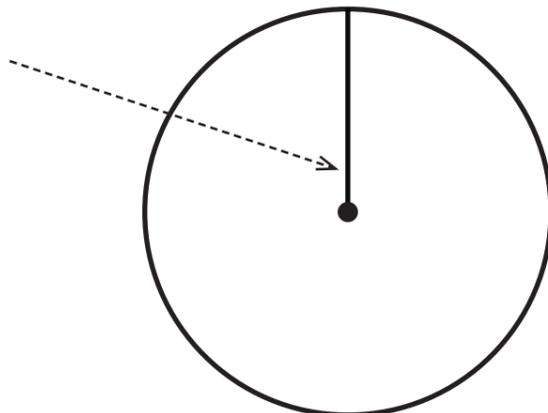
To calculate the **area** of a **circle:**
- Find the length of the radius, **r**
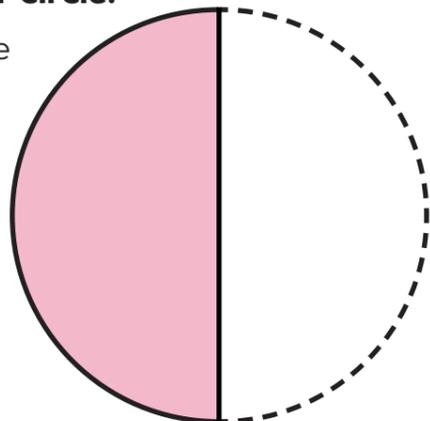- Use the rule **area = π × r²**

For example:
r = 5 cm
area = π × 5² = 25π = 25 × 3.142 = 78.54 cm² (2 d.p.)

To calculate the **area** of a **semi-circle:**
- Find the area of the full circle
- Divide by two (half a circle)

Example
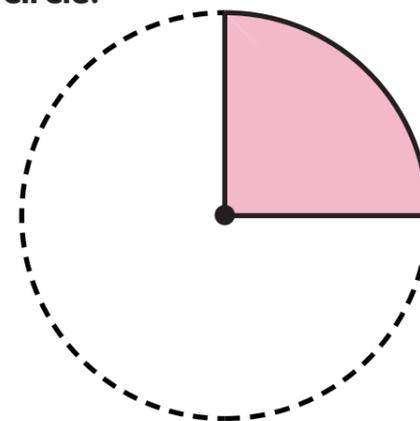Area of circle = 78.54 cm²

Area of semi-circle = 78.54 ÷ 2 = 39.27 cm² (2 d.p.)

To calculate the **area** of a **quarter circle:**
- Find the area of the full circle
- Divide by four (a quarter circle)

Example
Area of circle = 78.54 cm²

Area of quarter circle = 78.54 ÷ 4 = 19.64 cm² (2 d.p.)
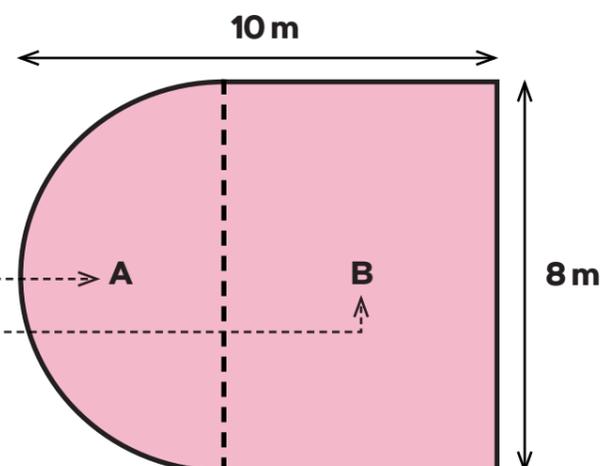
How to calculate area of a composite shape involving a circle

To calculate the **area** of a **composite shape:**
- **Split** the shape into two or more shapes
- Calculate any missing lengths
- Calculate the area of each part
- Find the **total** by **adding** the areas

10 m

A   B   8 m

For example, split this shape into a semi-circle (**A**) and a rectangle (**B**)
- Identify the length of the radius, r = 8 ÷ 2 = 4 m
- Area of semi-circle A = π × 4² ÷ 2 = 8π = 25.13 m²
- Area of rectangle B = 8 × 6 = 48 m²

Total area = 25.13 + 48 = 73.13 m² (2.d.p.)

Level 6

Calculate areas of composite shapes involving squares, rectangles and triangles, calculate surface area of cubes and cuboids and calculate area of circles.

Level 7

Calculate areas of composite shapes including those involving a circle, and solve complex problems involving surface area.