

What is perimeter?

Perimeter is the total distance around the outside of a two-dimensional shape.

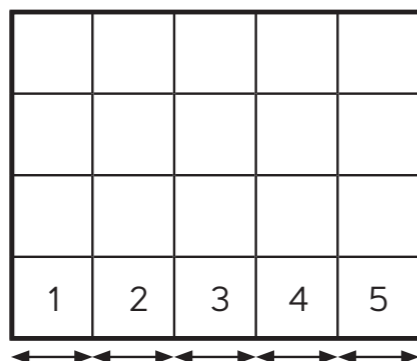
Units of perimeter

Perimeter can be measured in millimetres (mm), centimetres (cm), metres (m) and kilometres (km).

How to calculate perimeter

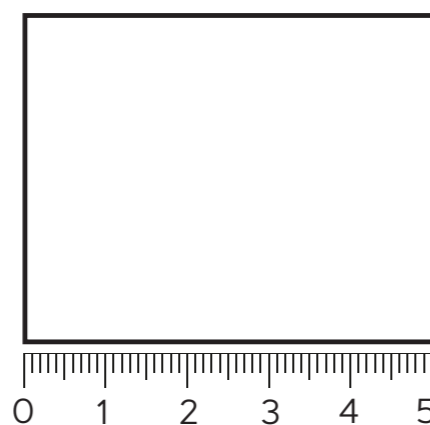
Find the length of each side by:

Counting the squares along each side



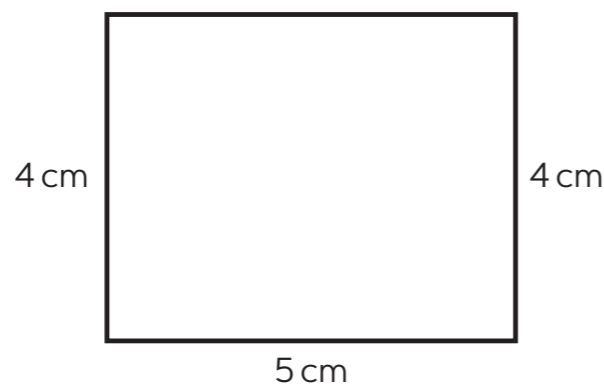
or

Measuring with a ruler



or

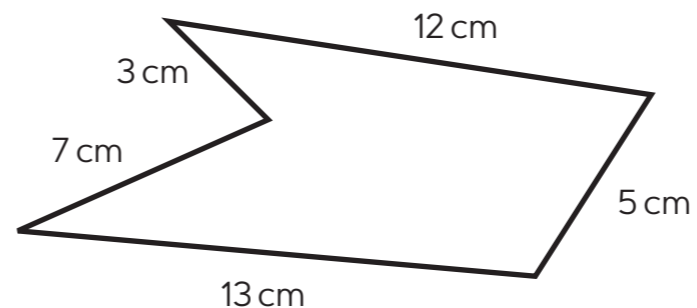
Lengths may be given on the shape



Then add the lengths of all the sides together.

$$\text{Perimeter} = 5 + 4 + 5 + 4 = 18 \text{ cm}$$

For example, calculate the perimeter of this shape:

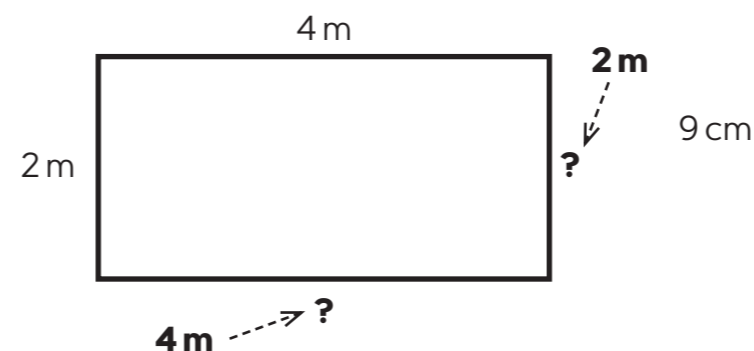


$$\text{Perimeter} = 12 + 5 + 13 + 7 + 3 = 40 \text{ cm}$$

If some lengths are missing:

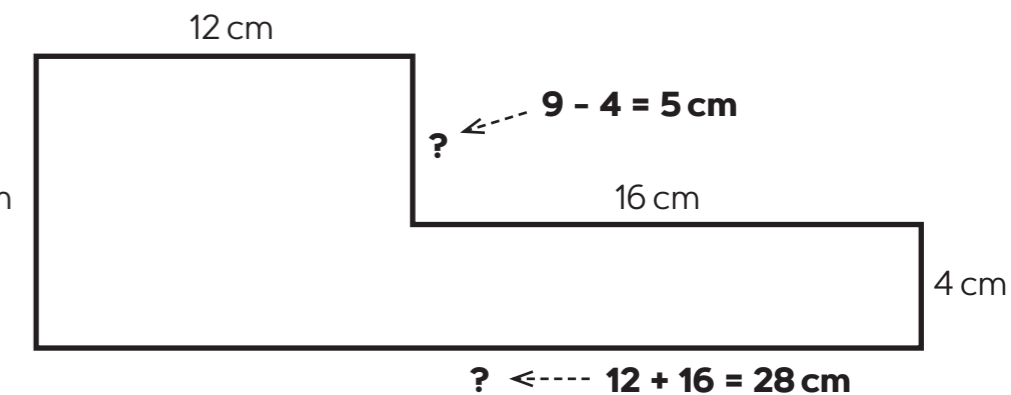
- Calculate the missing lengths
- Add together the lengths of all the sides

Example



$$\text{Perimeter} = 4 + 2 + 4 + 2 = 12 \text{ m}$$

Example



$$\text{Perimeter} = 12 + 5 + 16 + 4 + 28 + 9 = 74 \text{ cm}$$

Level 4

Work out perimeters of simple shapes by adding together the lengths of the sides. The length of the sides may be given, measured or counted.

Level 5

Calculate perimeters of regular and irregular shapes with some missing but attainable measurements.

Level 6

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

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Units of perimeter

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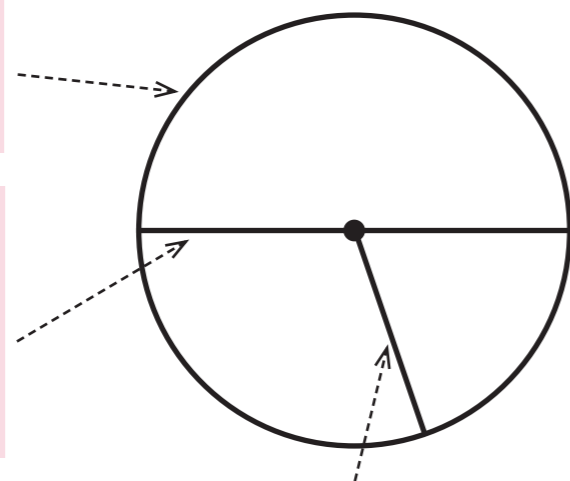
How to calculate the circumference of a circle

The **perimeter** of a **circle** is called the **circumference**.

The **diameter, d**, is the distance between two points on the **circumference** going through the **centre** of the circle.

Pi, π , is the ratio of the circumference of a circle to its diameter. It has a constant value of approximately **3.142**

The **radius, r**, is the distance from the **centre** of the circle to the **circumference** of the circle. It is half the length of the diameter.



To calculate the **circumference** of a **circle**:

- Find the length of the diameter, **d**
- Use the rule **circumference = $\pi \times d$**

Since **d = 2r** the rule can also be written as **circumference = $2\pi \times r$**

Example

Find the length of the circumference of a circle with a diameter of 10 cm.

$$\text{Circumference} = \pi \times 10 = 3.142 \times 10 = 31.42 \text{ cm (2 d.p.)}$$

Or

$$\text{If } d = 10 \text{ cm then } r = 5 \text{ cm}$$

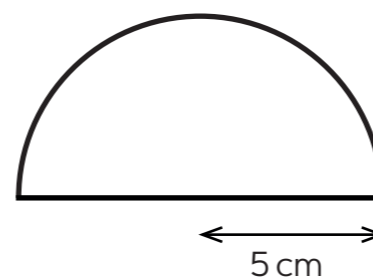
$$\text{Circumference} = 2\pi \times 5 = 2 \times 3.142 \times 5 = 31.42 \text{ cm (2 d.p.)}$$

How to calculate the perimeter of a semi-circle and a composite shape involving a circle

To find the perimeter of a composite shape involving a circle:

- Identify the diameter
- Calculate curved length
- Add together the lengths of all the sides

Example



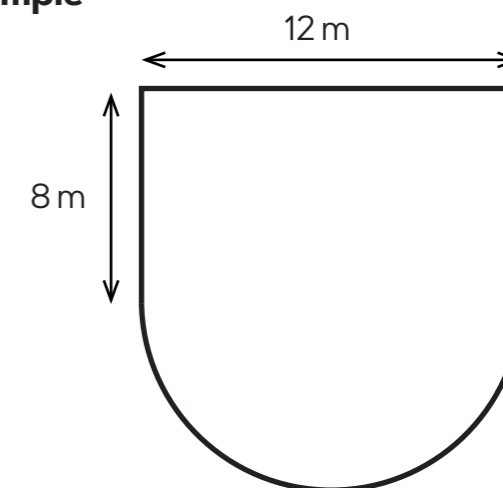
$$\text{Radius} = 5 \text{ cm} \therefore \text{Diameter} = 2 \times 5 = 10 \text{ cm}$$

$$\text{Curved length (semi-circle)} = \frac{10\pi}{2} = 15.71 \text{ cm}$$

$$\text{Straight length (diameter)} = 2 \times 5 = 10 \text{ cm}$$

$$\text{Perimeter} = 15.71 + 10 = 25.71 \text{ cm (2 d.p.)}$$

Example



$$\text{Diameter} = 12 \text{ m}$$

$$\text{Curved length (semi-circle)} = \frac{12\pi}{2} = 18.85 \text{ m}$$

$$\text{Straight lengths} = 8 + 12 + 8 = 28 \text{ m}$$

$$\text{Perimeter} = 18.85 + 28 = 46.85 \text{ m (2 d.p.)}$$

Level 6

Calculate the circumference of circles.

Level 7

Calculate perimeters of composite shapes involving circles.