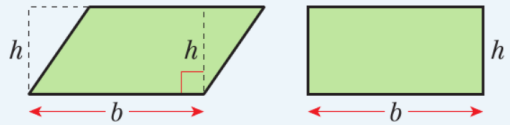
Perimeter, Area, Volume

The **PERIMETER** of a shape is the total length of the outside i.e. add up all the sides.

Perimeter: 4 + 1 + 4 + 1 = 10cm

The **AREA** of a shape is the total amount of space contained inside the sides.

The base of a parallelogram is b and its **perpendicular height** is h.
Cutting a triangle from one end of a parallelogram and putting it on the other end makes a rectangle.



Area of parallelogram = base length × perpendicular height

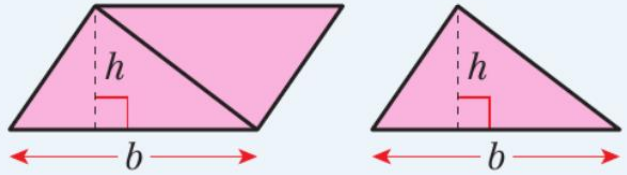
$$A = bh$$

The diagonal splits a parallelogram into two identical triangles.

Area of 2 triangles = $b \times h$

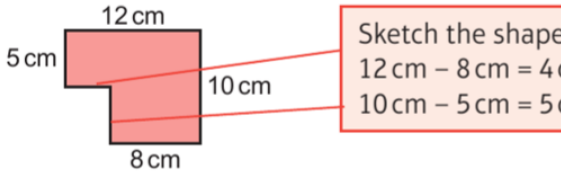
Area of a triangle = $\frac{1}{2} \times b \times h$

Area of a triangle = $\frac{1}{2}bh$



A **compound shape** is made up of simple shapes.
To find the area of a compound shape, split it into simple shapes like rectangles and triangles.
Find the area of each shape and then add them all together.

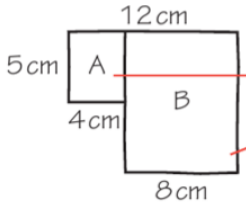
Calculate the perimeter and area of this compound shape.



Sketch the shape. Work out the missing lengths.
12 cm − 8 cm = 4 cm
10 cm − 5 cm = 5 cm

Perimeter = 12 + 10 + 8 + 5 + 4 + 5 = 44 cm²

Add all the lengths around the shape to work out the perimeter.



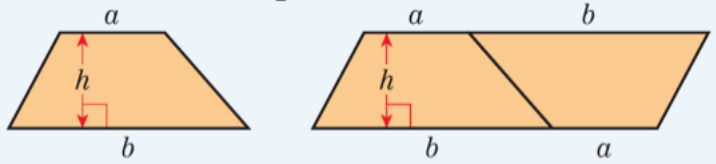
Divide the shape into two rectangles A and B.

Area of A = 5 x 4 = 20 cm²
Area of B = 8 x 10 = 80 cm²
Total area = 100 cm²

Work out the area of each.

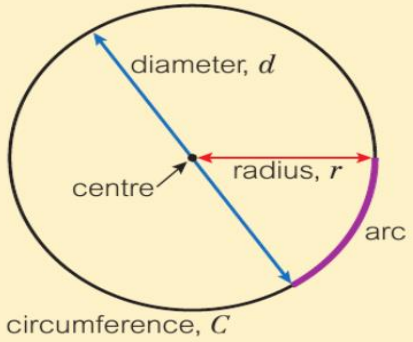
This **trapezium** has parallel sides a and b and perpendicular height h.
Two trapezia put together make a parallelogram, with base $(a + b)$ and perpendicular height h.
Area of 2 trapezia = base × perpendicular height = $(a + b) \times h$

Area of a trapezium = $\frac{1}{2}(a + b)h$



Communication hint
Trapezia is the plural of trapezium.

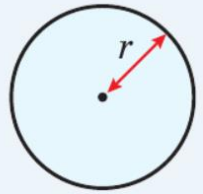
The **circumference** (C) is the perimeter of a circle. The centre of a circle is marked using a dot.
The **radius** (r) is the distance from the centre to the circumference.
The **diameter** (d) is a line from one edge to another through the centre.
An **arc** is part of the circumference.



The Greek letter π (pronounced pi) is the ratio of the circumference of a circle to the diameter. Its decimal value never ends, but starts as 3.141 592 653 589 7…

The formula for the circumference of a circle is $C = \pi d$.

If you know the radius you can use $C = 2\pi r$.

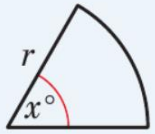


The formula for the area A of a circle with radius r is $A = \pi r^2$.

For a sector of a circle with an angle of $x°$ and radius r:

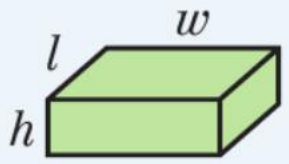
Arc length $= \frac{x}{360} \times 2\pi r$

Area of sector $= \frac{x}{360} \times \pi r^2$



The **VOLUME** of a shape is the total amount of space it takes up in 3 dimensions

Volume of a cuboid = length × width × height = lwh



Volume of a prism = area of cross-section × length