DEVELOPING GEOMETRY...
Area of trapezia and Circles

@whisto_maths

What do I need to be able to do?

By the end of this unit you should be able to:
- Recall area of basic 2D shapes
- Find the area of a trapezium
- Find the area of a circle
- Find the area of compound shapes
- Find the perimeter of compound shapes

Keywords

Congruent: The same
Area: Space inside a 2D object
Perimeter: Length around the outside of a 2D object
Pi (π): The ratio of a circle's circumference to its diameter.
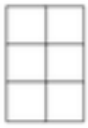**Perpendicular**: At an angle of 90° to a given surface
Formula: A mathematical relationship/ rule given in symbols. E.g. b x h = area of rectangle/ square
**Infinity (∞)**: A number without a given ending (too great to count to the end of the number) – never ends
Sector: A part of the circle enclosed by two radii and an arc.
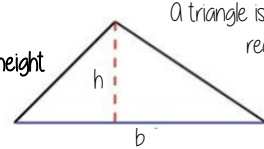
Area – rectangles, triangles, parallelograms

R

Rectangle
Base x Height

Parallelogram/ Rhombus
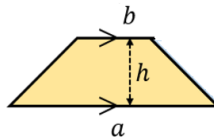Base x Perpendicular height

Triangle
½ x Base x Perpendicular height

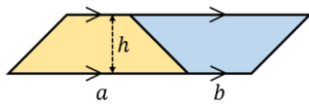A triangle is half the size of the rectangle it would fit in
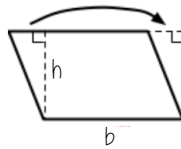
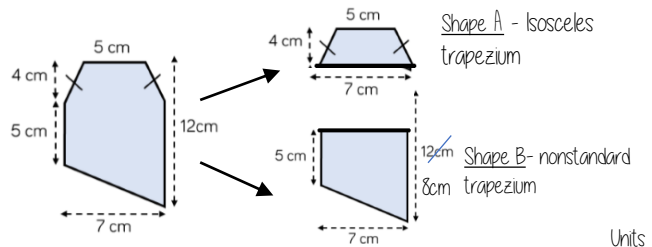## Area of a trapezium

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

Why?

- Two congruent trapeziums make a parallelogram
- New length (a + b) x height
- Divide by 2 to find area of one

Compound shapes

To find the area compound shapes often need splitting into more manageable shapes first. Identify the shapes and missing sides etc. first.

5 cm
4 cm
5 cm
12cm
7 cm

Shape A - Isosceles trapezium
5 cm
4 cm
7 cm

Shape B- nonstandard trapezium
5 cm
12cm
8cm
7 cm

Units

Shape A + Shape B = total area
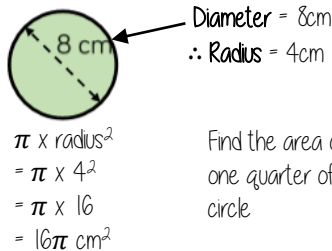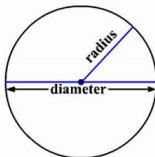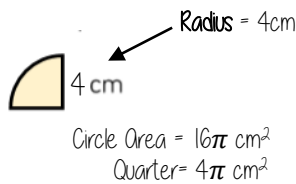$$\frac{(5+7) \times 4}{2} + \frac{(5+8) \times 7}{2} = 24 + 45.5 = 69.5cm^2$$

Area of a circle (Non-Calculator)

Read the question – leave in terms of π or if $\pi \approx 3$ (provides an estimate for answers)

Area of a circle
π x radius^2

Diameter = 8cm
∴ Radius = 4cm

8 cm

Radius = 4cm

π x radius^2
= π x 4^2
= π x 16
= 16π cm^2

Find the area of one quarter of the circle

4 cm

Circle Area = 16π cm^2
Quarter= 4π cm^2

Compound shapes including circles

Circumference
π x diameter

Compound shapes are not always area questions. For Perimeter you will need to use the circumference

Spotting diameters and radii

64 m
150 m

This dimension is also the diameter of the semi circles.

Arc lengths = π x 64
= 64 π

Don't need to halve this because there are 2 ends which make the whole circle

Arc lengths + Straight lengths = total perimeter

= 64 π + 150 + 150
= (300 + 64 π) m
OR = 501.1 m

Area of a circle (Calculator)

SHIFT ×10^x

Area of a circle
π x radius^2
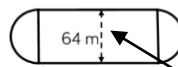
How to get π symbol on the calculator
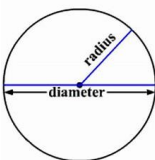
It is important to round your answer suitably – to significant figures or decimal places. This will give you a decimal solution that will go on forever!

Still remember to split up the compound shape into smaller more manageable individual shapes first