

Y8 Area of Trapezia and Circles

What do I need to be able to do?

By the end of this unit you should be able to:

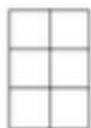
- Recall area of basic 2D shapes
- Find the area of a trapezium
- Find the area of a circle
- Find the area of compound shapes
- Find the perimeter of compound shapes

Keywords

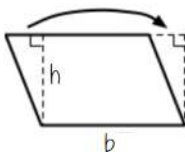
- Congruent:** The same
- Area:** Space inside a 2D object
- Perimeter:** Length around the outside of a 2D object
- Pi (π):** The ratio of a circle's circumference to its diameter.
- Perpendicular:** At an angle of 90° to a given surface
- Formula:** A mathematical relationship/ rule given in symbols Eg $b \times h = \text{area of rectangle/ square}$
- 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

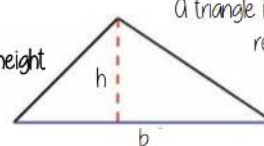
Rectangle
Base x Height



Parallelogram/ Rhombus
Base x Perpendicular height



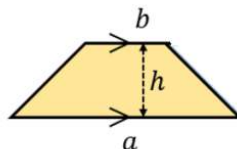
Triangle
 $\frac{1}{2} \times \text{Base} \times \text{Perpendicular height}$



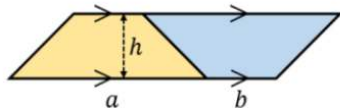
A triangle is half the size of the rectangle it would fit in

Area of a trapezium

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



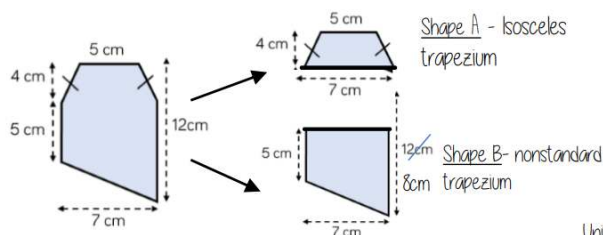
Why?



- Two congruent trapeziums make a parallelogram
- New length $(a + b) \times \text{height}$
- 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.



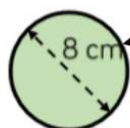
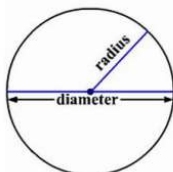
$$\text{Shape A} + \text{Shape B} = \text{total area}$$

$$\frac{(5+7) \times 4}{2} + \frac{(5+8) \times 7}{2} = 24 + 45.5 = 69.5 \text{ cm}^2$$

Area of a circle (Non-Calculator)

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

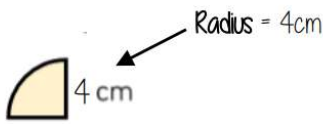
Area of a circle
 $\pi \times \text{radius}^2$



Diameter = 8 cm
 \therefore Radius = 4 cm

$$\begin{aligned} \pi \times \text{radius}^2 \\ = \pi \times 4^2 \\ = \pi \times 16 \\ = 16\pi \text{ cm}^2 \end{aligned}$$

Find the area of one quarter of the circle



$$\begin{aligned} \text{Circle Area} &= 16\pi \text{ cm}^2 \\ \text{Quarter} &= 4\pi \text{ cm}^2 \end{aligned}$$

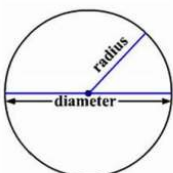
Area of a circle (Calculator)



SHIFT $\times 10^x$

How to get π symbol on the calculator

Area of a circle
 $\pi \times \text{radius}^2$

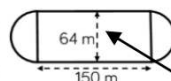


Compound shapes including circles

Circumference
 $\pi \times \text{diameter}$

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

Spotting diameters and radii



This dimension is also the diameter of the semi circles

$$\begin{aligned} \text{Arc lengths} &= \pi \times 64 \\ &= 64\pi \end{aligned}$$

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

Arc lengths + Straight lengths = total perimeter

$$\begin{aligned} &= 64\pi + 150 + 150 \\ &= (300 + 64\pi) \text{ m} \\ \text{OR} &= 501.1 \text{ m} \end{aligned}$$

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

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!