

Area and Perimeter

You need to know how to calculate the area and perimeter of the following standard shapes:

Rectangle, Triangle, Trapezium, Circle

as well as shapes that are made up of these – *called composite shapes*.

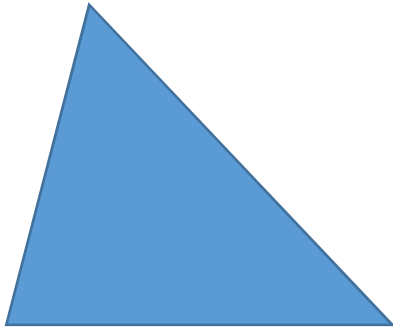
Perimeter measures the total length of the boundary of the shape. Its units are typically mm, cm, m, km.

Area measures how much surface is covered by a shape. Its units are typically mm^2 , cm^2 , m^2 , km^2 .

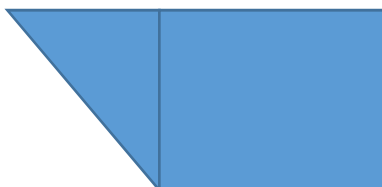
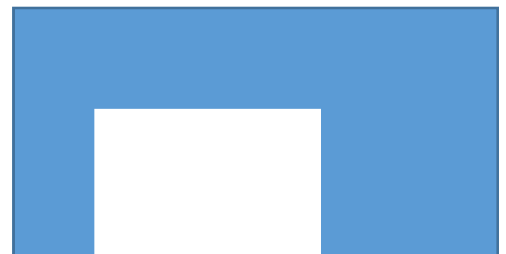
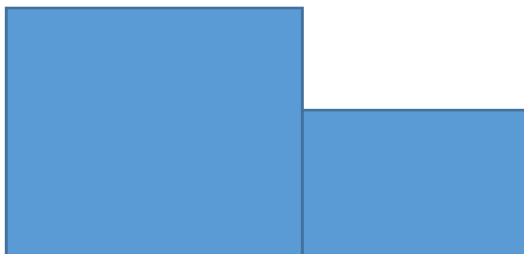
The Rectangle

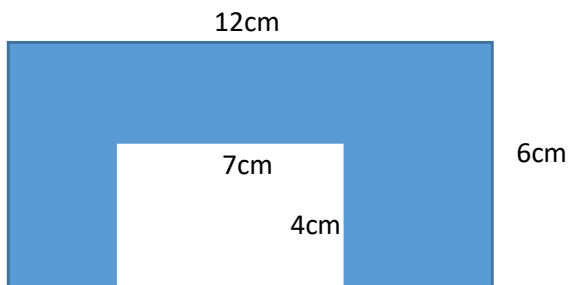
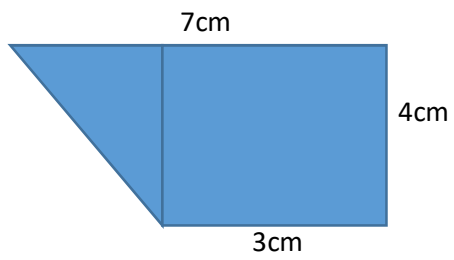
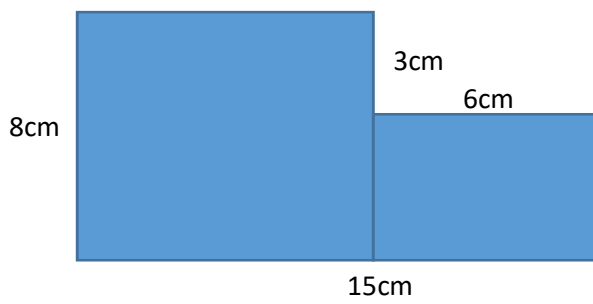
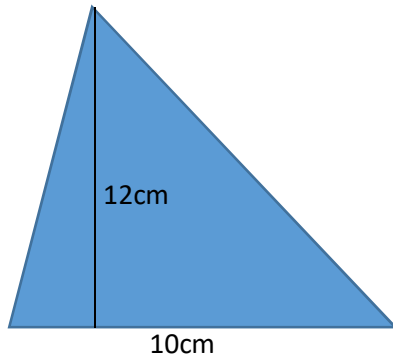
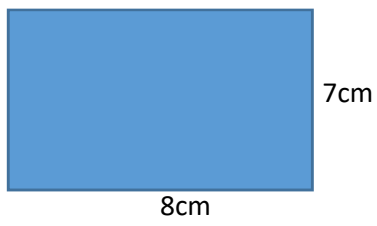


The Triangle



Composites

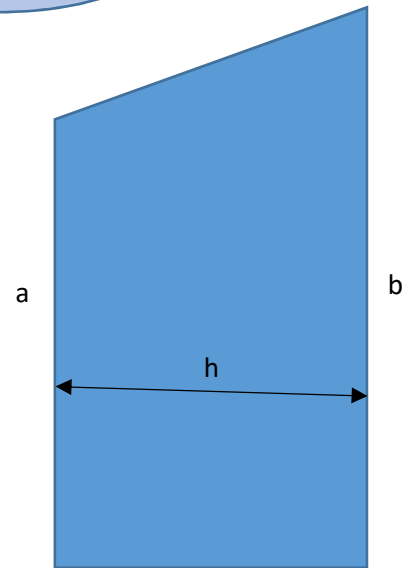
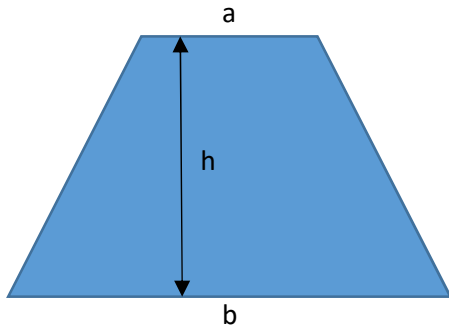


Examples

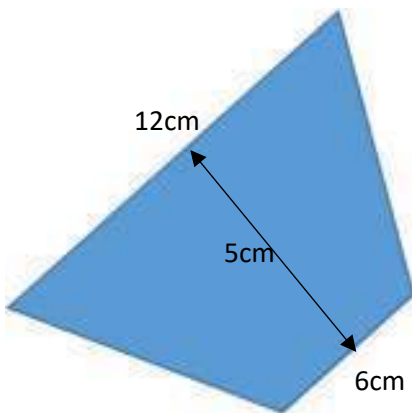
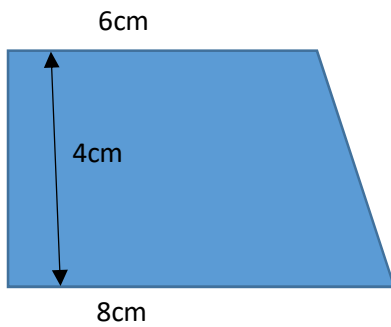
Area and Perimeter (2)

The Trapezium

This is a quadrilateral (4 sided shape) with ONE pair of parallel sides



Examples



Area and Perimeter (3)

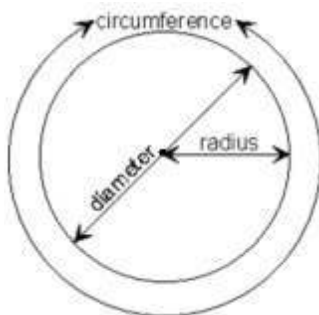
The Circle

In order to calculate the perimeter and area of a circle, we need to know the value of π (pi).

$$\pi = 3.14159265359\dots$$

Pi is an example of an irrational number, it cannot be written as a fraction and has an infinite run of digits following the decimal point.

It is the value you get should you divide the exact perimeter of a circle by its exact diameter (distance across the widest part of the circle).




As you can see, the perimeter of a circle has its own special name, the circumference.

You need to memorize and learn how to use the following two formulas:

For a circle with a radius of r cm,

$$\text{Area} = \pi \times r^2$$

$$\text{Circumference} = \pi \times 2r$$

On a calculator allowed paper, use the π button 

On a non-calculator paper, use 3.14 as the value of π .

Examples

1. A circle has a radius of 4.3cm. Find its area and circumference.

2. A wheel has a diameter of 60cm. How many times will it turn as it travels 1km?

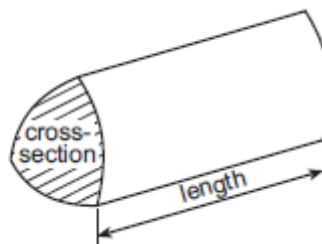
Volume

- Volume is a measure of how much space is occupied by a 3-dimensional object.
- Units of volume are typically cm^3 , m^3
- However, if the volume is a liquid, it tends to be called capacity and the units are ml and litres, where 1 litre = 1000 cm^3

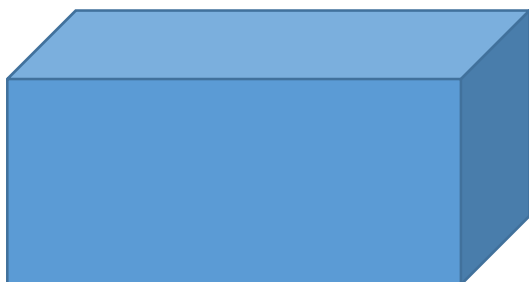
Prisms and Cuboids

A prism is an object with a uniform cross-section, on a GCSE paper you are told:

Volume of prism = area of cross-section \times length



A cuboid is a prism whose cross section is a rectangle:



The cylinder

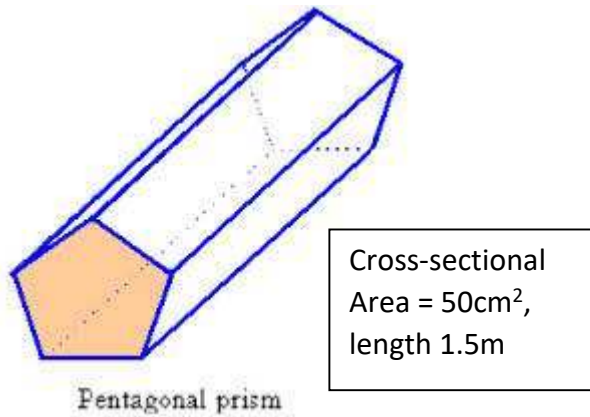
A cylinder is a prism with a circular cross-section.



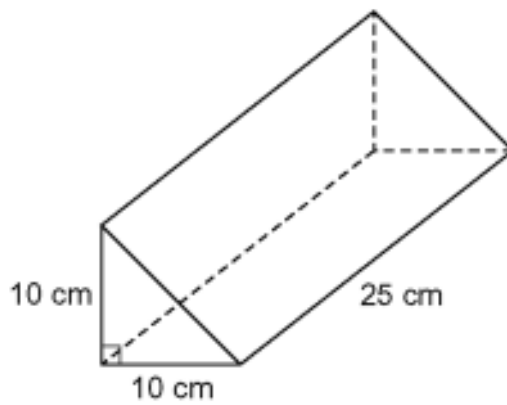
Examples

Calculate the volume of the following:

1.



2.



3. A cylindrical drum has a diameter of 60cm and a height of 1.4 metres. Find the capacity of the drum in litres.

Perimeter, Area & Volume: Reverse Problems

Sometimes you may be given a question where you are given the perimeter, area or volume and asked to find the length(s) of a side(s):

Examples

1. A rectangle has an area of 45cm^2 . If one of the sides is 9cm , find the length of the other side and the perimeter of the shape.
2. A rectangle has a perimeter of 140 cm . If the length of the shorter side is 25cm , find the dimensions of the rectangle and its area.
3. A square has an area of 64cm^2 . What is the length of its sides?
4. A fish tank, in the shape of a cuboid, contains 400 litres of water. If the base of the tank measures 1metre by 80cm , how deep will the water be?