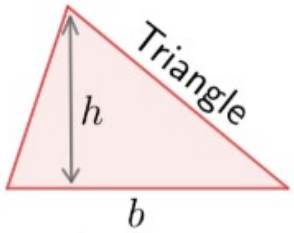
Year 7 higher topic 9

Perimeter, area and volume

What careers would use these skills?

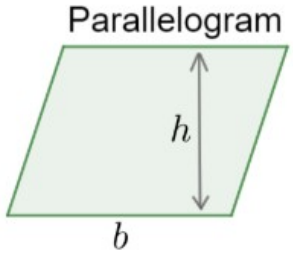
Ecologist, biologist, farmer, marine biologist, landscape gardener, upholster, furniture designer, interior designer, salesman, painter and decorator, astronomer, astrologist, carpet fitter, architect, engineer

Area of triangle:



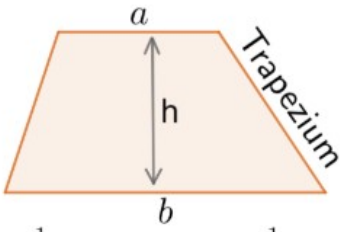
$$\text{Area} = \frac{1}{2} \times \text{base} \times \text{height} = \frac{1}{2}bh$$

Area of parallelogram



$$\text{Area} = \text{base} \times \text{height} = bh$$

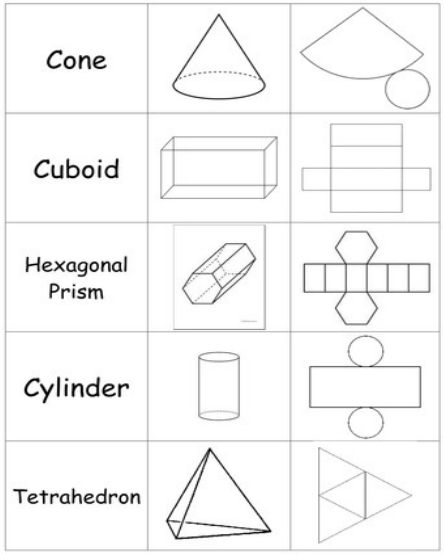
Area of trapezium :



$$\text{Area} = \frac{1}{2}(a+b) \times \text{height} = \frac{1}{2}(a+b)h$$

Nets of 3D solids

A net is a 2D shape that folds to make a solid.



Surface area

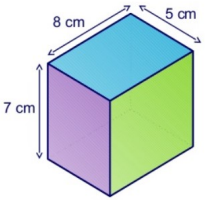
The top and bottom rectangle are the **same**, the two sides are the **same** and the front and back are the **same**.

Sum of 3 faces = 40+35+56 = 131cm^2 so to find the surface area, double this amount

131 x 2 = **262cm^2**

Surface area of a cuboid

To find the **surface area** of a shape, we calculate the total area of all of the faces.



Can you work out the surface area of this cuboid?

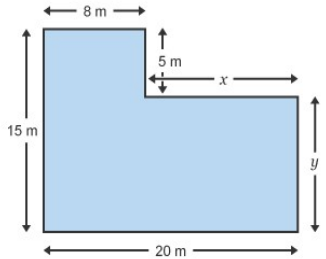
The area of the top = 8 × 5
= 40 cm^2

The area of the front = 7 × 5
= 35 cm^2

The area of the side = 7 × 8
= 56 cm^2

Perimeter of compound shapes

A plan of a play area is shown below:



a) The length of the play area is $20\ m$, so $x = 20 - 8 = 12\ m$.

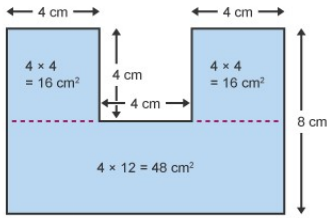
The width of the play area is $15\ m$, so $y = 15 - 5 = 10\ m$.

b) Perimeter = $8 + 5 + 12 + 10 + 20 + 15 = 70\ m$.

Area of compound shapes

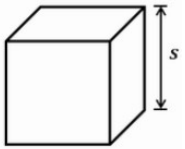
Divide the shape into squares and rectangles, find their individual areas and then add them together.

The length of the larger rectangle is $4 + 4 + 4 = 12\ cm$



$Area = 16 + 16 + 48 = 80\ cm^2$

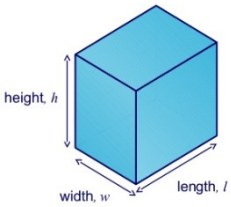
Volume (cubes and cuboids)



$Volume = s^3$

$s = side\ of\ the\ cube$

We can find the volume of a cuboid by multiplying the area of the base by the height.



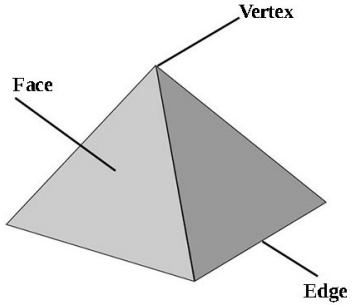
The area of the base
= length × width

So,

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

Properties of 3D solids

3D solid shapes have **faces** (flat or curved surfaces) **edges** (where two faces meet) and **vertices** (corner) One corner is called a **vertex**.



Convert metric measures for area and volume

To convert from:

- cm^3 to mm^3 you multiply by 10^3 or 1000
- mm^3 to cm^3 you divide by 10^3 or 1000
- m^3 to cm^3 you multiply by 100^3 or 1000000
- cm^3 to m^3 you divide by 100^3 or 1000000