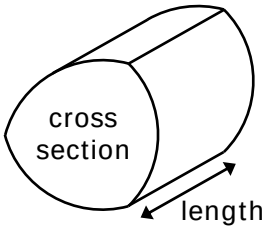
Volume (V) – the space inside a 3D shape.

Measured in 'cubed units' – cm^3, m^3, etc

Surface area (SA) – the total area of all the faces of a 3D shape.

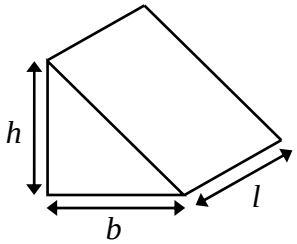
Measured in 'squared units' – cm^2, m^2, etc.



Volume = area of cross section × length

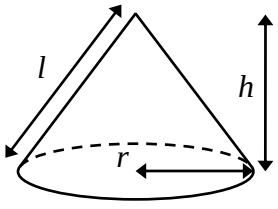
(given on formula sheet)

Triangular prism



$V = {}^1/_2 \times b \times h \times l$

Cone



$V = {}^1/_3\pi r^2 h$

Curved SA = πrl

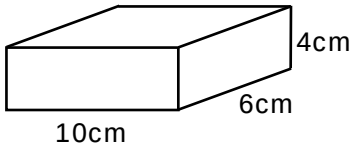
(i.e. SA without the base)

Given on formula sheet

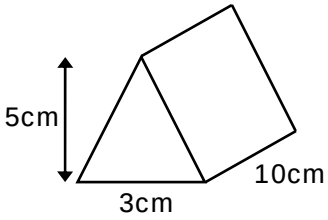
Remember to give workings for your answers!

1. Calculate the volume and surface area of a cube with sides of 4cm.

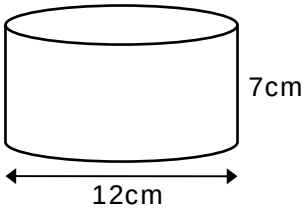
2. Calculate the volume and surface area of the cuboid below.



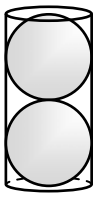
3. Calculate the volume of the triangular prism below.



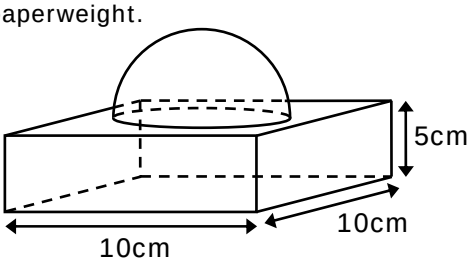
4. Calculate the volume and surface area of the cylinder below.



5. Two spheres with radius 5cm fit just inside a tube. How many litres of water will fill the space not taken up by the spheres?



6. A marble paperweight consists of a cuboid and a hemisphere as shown in the diagram. The hemisphere has a radius of 4cm. Calculate the volume of the paperweight.



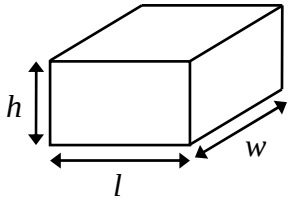
7. A hemisphere of radius 6cm has the same volume as a cone with a perpendicular height of 27cm. Calculate the base radius, r, of the cone.

1 millilitre = $1cm^3$

1 litre = $1000cm^3$

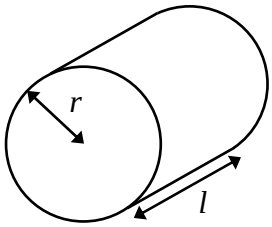
Prism – a solid object with two identical flat ends, and a constant **cross section** along its entire length. The shape of the cross section gives the prism its name, e.g. 'triangular prism'.

Cuboid



$V = l \times w \times h$

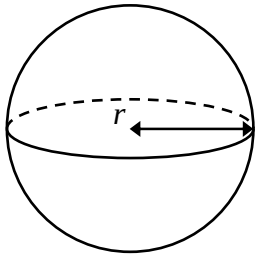
Cylinder



$V = \pi r^2 l$

$SA = 2\pi r^2 + 2\pi rl$

Sphere



$V = {}^4/_3\pi r^3$

$SA = 4\pi r^2$

Given on formula sheet

Teaching notes

This resource contains a selection of questions accompanied by revision notes. The notes are colour coded to give students an indication of the GCSE grade they are working towards, useful in self or peer assessment:

- blue: grades G – E
- green: grades D/C
- red: grades B – A*

You can choose whether to reveal the grades before or after students complete the questions.

Suggested uses

- Use as an individual revision sheet, homework, cover work, open book test, etc.
- Photocopy onto A3 and use as a poster during revision season.
- Laminate and tape to the desk for small group revision. You could create 'revision stations' with other Desktop revision resources on www.teachitmaths.co.uk (quick search: 'desktop').

Answers

1. $V = 4 \times 4 \times 4 = \mathbf{64cm^3}$ $SA = 6(4 \times 4) = \mathbf{96cm^2}$

2. $V = 10 \times 6 \times 4 = \mathbf{240cm^3}$ $SA = 2(10 \times 4) + 2(10 \times 6) + 2(4 \times 6) = \mathbf{248cm^2}$

3. $V = {}^{1}/_{2} \times 3 \times 5 \times 10 = \mathbf{75cm^3}$

4. $V = \pi \times 6^2 \times 7 = \mathbf{791.7cm^3}$ $SA = 2\pi \times 6^2 + 2\pi \times 6 \times 7 = \mathbf{490.1cm^2}$

5. $V_{cylinder} = \pi \times 5^2 \times 20 = 500\pi$

   $V_{spheres} = 2 \times {}^{4}/_{3}\pi \times 5^3 = {}^{1000}/_{3}\pi$

   $V_{space} = 500\pi - {}^{1000}/_{3}\pi = 523.6cm^3 = \mathbf{0.524}\boldsymbol{l}$

6. $V_{cuboid} = 10 \times 10 \times 5 = 500$

   $V_{hemisphere} = {}^{1}/_{2} \times {}^{4}/_{3}\pi \times 4^3 = {}^{128}/_{3}\pi$

   $V_{total} = 500 + {}^{128}/_{3}\pi = \mathbf{634.0cm^3}$

7. $V_{hemisphere} = {}^{1}/_{2} \times {}^{4}/_{3}\pi \times 6^3 = 144\pi$

   $V_{cone} = 144\pi = {}^{1}/_{3}\pi r^2 \times 27$

   $r = \mathbf{4cm}$