

Area and Volume

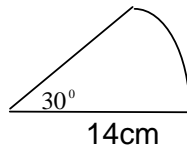
Class 1

Example 1 A rectangle of area 60cm has a length of 18cm find its width.

Example 2 Find the area and circumference of a circle of diameter 4m when $\pi = 3.14$

Example 3 A circle has an area of 200.96 m² find its radius.

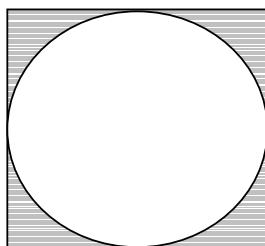
Example 4 Find the area and perimeter of the sector below when $\pi = \frac{22}{7}$ to 1 decimal place.



Class 2

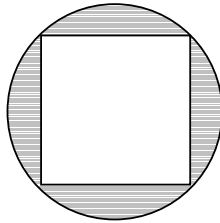
Most shapes are made up of parts of circles and rectangles so take your time and try to use the correct formula.

Example 1 Find the shaded region if the radius of the circle is 12m when $\pi = 3.14$



Example 2 Find the shaded region if the radius of the circle is 7m when

$$\pi = \frac{22}{7}$$



Example 3 If a rectangular box, with an open top has a length of 12cm and height 8cm has an area of 980 cm^2 find its breath.

Example 4 The mass of a rectangular sheet of metal is 45,000 grammes.
The mass of 1 cm^3 of this metal is 7.2 grammes.

The thickness of the sheet of metal is h cm and its length and width are 100 cm and 50 cm, respectively, as in the diagram.
Calculate the value of h .



Example 5 A solid cylinder has a radius of 7cm and height 5cm find its volume and total area when $\pi = \frac{22}{7}$.

Example 6 A solid cylinder has a volume of $4500\pi \text{ m}^3$ if the height is 5m find the radius.

Example 7 A solid cylinder has an area of $54\pi \text{ m}^2$ and a radius of 2 m find it's height.

Class 3

Example 1 Find the volume of sphere of radius 4.5 in terms of π .

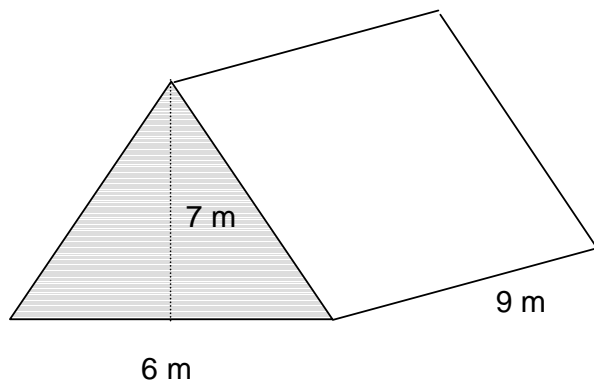
$$r = 4.5 \text{ find } V$$

Example 2 If a solid hemisphere has a volume of $18\pi \text{ m}^3$ find it's radius.

$$V = 18\pi \text{ find } r$$

Example 3 A solid cone has an area of $24\pi \text{ m}^2$ and a radius of 3m find it's volume in terms of π .

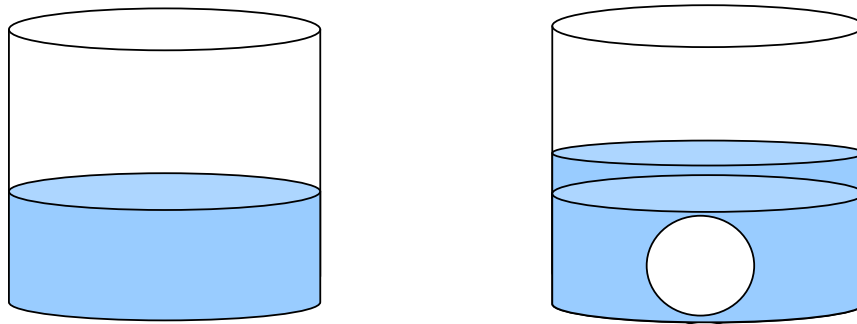
Example 4 Find the volume of the triangular wedge as shown.



Class 4

Example 1 A solid cylinder of radius 6cm and height 9cm is melted down and recast as a cone of radius 12cm find the height of the cone.

Example 2 A cylinder is partially filled with water. The cylinder has a radius of 6cm. A solid sphere of radius 3cm is dropped into the cylinder and sinks to the bottom. By how much does the water in the cylinder rise.

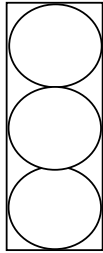


Example 3 Water flows through a cylindrical pipe of internal diameter 1 cm at a speed of 2 cm per second.

Verify that the rate of flow is $\frac{11}{7}$ cm³ per second, taking $\pi = \frac{22}{7}$.

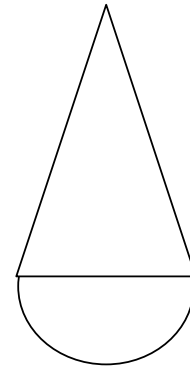
Class 5

Example 1



3 spheres of radius 6cm are placed in the smallest possible cylinder. Find the percentage of empty space.

Example 2 A toy is made of a cone, which fits exactly on top of a hemisphere, as shown in the diagram. The radius length of the hemisphere is 6 cm and the total toy height is 21cm.



- (i) Write down the height of the cone and hence find the volume of the cone in terms of π .
- (ii) Find the volume of the hemisphere in terms of π .
- (iii) Express the volume of the cone as a percentage of the volume of the total toy, to one decimal place.

Example 3 Wax in the shape of a cylinder with radius length 4 cm and height 36 cm is melted down. The resultant wax is formed into cone shaped candles. Each candle has a height 6 cm and a base radius length of 2 cm.

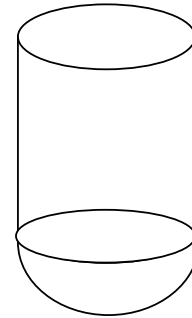
Calculate the number of candles that can be made, assuming that no wax is lost.

The candles are placed, base down and in rows of three, in the smallest possible rectangular box. Calculate, in cm^3 , the volume of the box. What percentage of the volume of the box is empty?

Example 4 A container is in the shape of a cylinder on top of a hemisphere as shown.
The cylinder has a radius of length 3 cm and the container has a total height of 15cm.

Calculate the volume of the container in terms of π .

If half the volume of the container is filled with liquid, calculate the height, h , of the liquid in the container.



Example 5 A grain- silo consists of a cylinder and an inverted cone, (as in diagram).
The height of the cylindrical part is 10 m and the radius is 2 m.
The slant height of the cone is 2.5 m.
Find the volume of the silo in terms of π .
When the volume of grain in the silo is $22\pi \text{ m}^3$, calculate the depth of grain measured from the apex (point) of the cone.

