

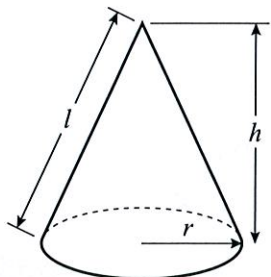


# Surface area

## Cone

The formula for the CURVED SURFACE AREA of a cone is given on the formula sheet.

Curved surface area of cone =  $\pi r l$

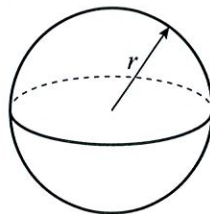


Be careful! This formula uses the slant height,  $l$ , of the cone.

## Sphere

The formula for the surface area of a sphere is given on the formula sheet.

Surface area of sphere =  $4\pi r^2$



For a reminder about areas of circles and surface areas of cylinders have a look at page 57.

To calculate the TOTAL surface area of the cone you need to add the area of the base. Surface area of cone =  $\pi r^2 + \pi r l$

A hemisphere is half a sphere, so the area of the curved surface is  $\frac{1}{2} \times 4\pi r^2$ .

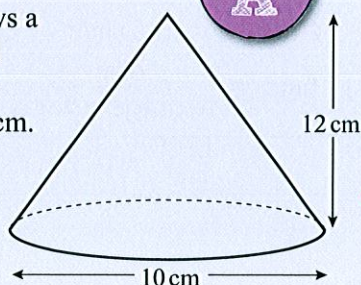
### Worked example



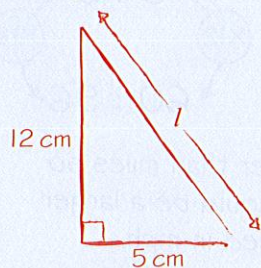
The diagram shows a cone with vertical height 12 cm and base diameter 10 cm.

Calculate the curved surface area of the cone.

Give your answer in terms of  $\pi$ .



$r = 5$



$l^2 = 12^2 + 5^2 = 169$

$l = 13 \text{ cm}$

Curved surface area

=  $\pi r l$

=  $\pi \times 13 \times 5$

=  $65\pi \text{ cm}^2$

To work out the curved surface area you need to know the radius and the slant height. You are given the **diameter** and the **vertical height**.

The radius is half the diameter = 5 cm.

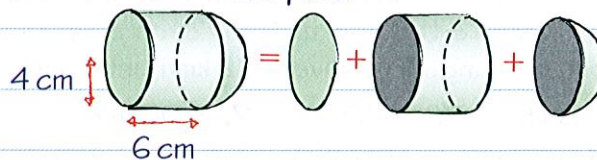
To calculate the slant height you need to use Pythagoras' theorem. Sketch the right-angled triangle containing the missing length.

There is more about Pythagoras' theorem on page 60.

Remember to leave your final answer in terms of  $\pi$ .

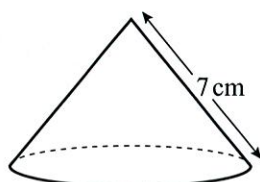
### Compound shapes

You can calculate the surface area of more complicated shapes by adding together the surface area of each part.



Surface area =  $\pi(4)^2 + 2\pi(4)(6) + \frac{1}{2}[4\pi(4)^2]$   
 =  $96\pi \text{ cm}^2$

### Now try this



The curved surface area of this cone is  $35\pi \text{ cm}^2$ .

(a) Write down the radius of the cone. (2 marks)

(b) Work out the area of the base of the cone.

Give your answer correct to 3 significant figures.

(2 marks)

