

Topic 17 Area and volume (Pre-TT) [38]

Surface area

$$\text{Sphere} = 4\pi r^2$$

where r is the radius

$$\text{Cone} = \pi r^2 + \pi r l$$

where l is the **slant** height and r is the base radius

Volume

$$\text{Sphere} = \frac{4}{3}\pi r^3$$

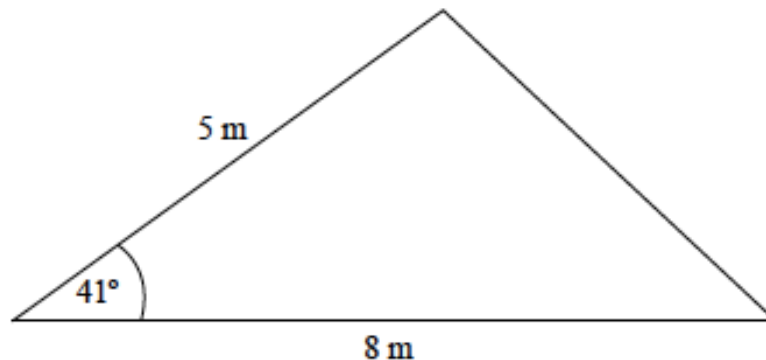
where r is the radius

$$\text{Pyramid} = \frac{1}{3} \times \text{area of base} \times \text{perpendicular height}$$

$$\text{Cone} = \frac{1}{3}\pi r^2 h$$

where h is the **perpendicular** height and r is the base radius

1.



Work out the area of the triangle.

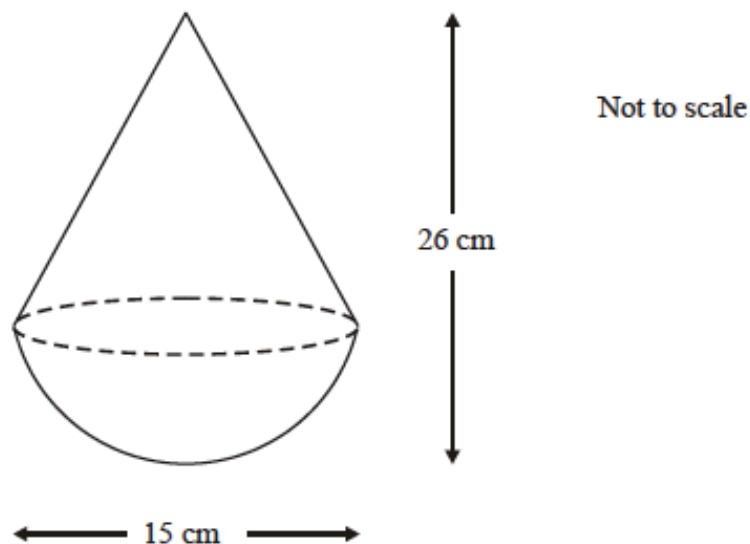
Give your answer to 3 significant figures.

(Total 2 marks)

2.

A child's toy is in the shape of a cone on top of a hemisphere.

The diameter of the hemisphere is 15 cm and the overall height of the toy is 26 cm.

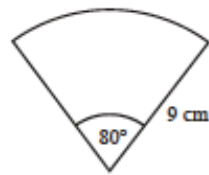


Calculate the volume of this toy.

(Total 5 marks)

3.

- (a) The diagram shows a sector of a circle of radius 9 centimetres.

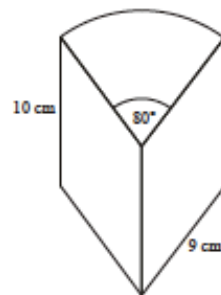


Not drawn accurately

Find the perimeter of the sector. Give your answer in terms of π .

(3)

- (b) The cross-section of a prism is a sector of a circle, of radius 9 centimetres, as shown. The height of the prism is 10 centimetres.



Not drawn accurately

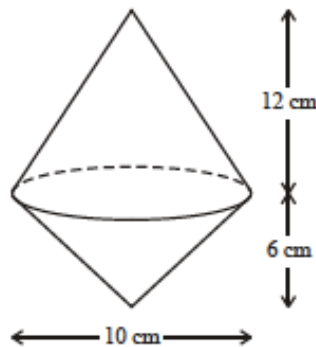
Calculate the volume of the prism. Give your answer in terms of π .

(4)

(Total 7 marks)

4.

The diagram shows a float made from two cones with dimensions as shown.



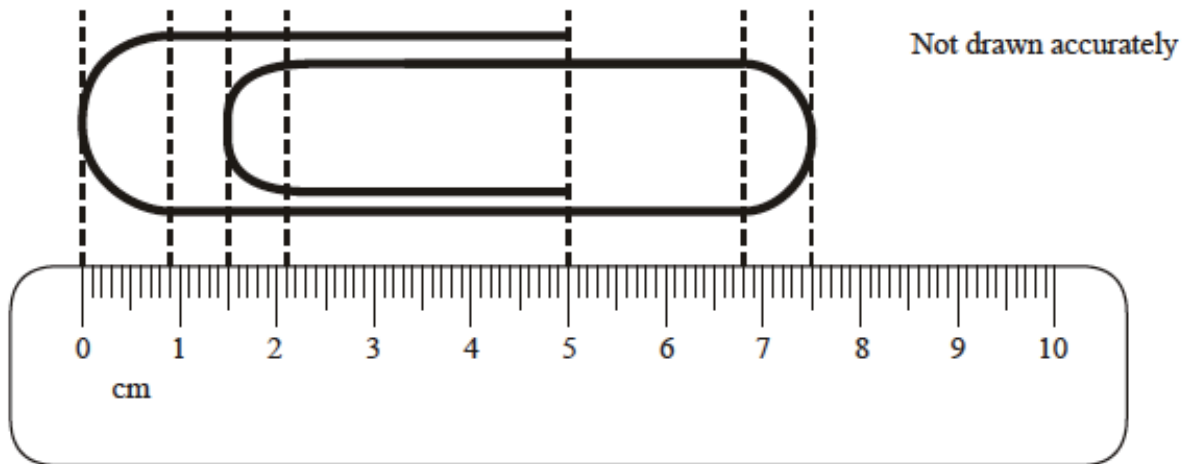
Not to scale

Calculate the total surface area of the float.

(Total 5 marks)

5.

A giant paper clip is placed alongside a centimetre ruler.
The curved ends are semicircles.

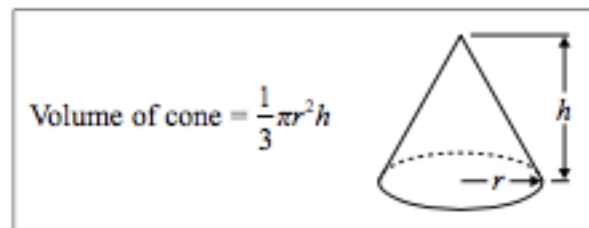
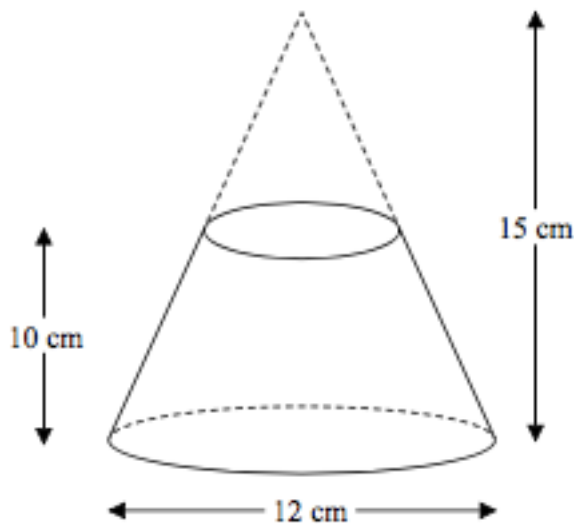


Calculate the length of wire used to make the clip.

(Total 5 marks)

6.

A frustum is made by removing a small cone from a large cone as shown in the diagram.

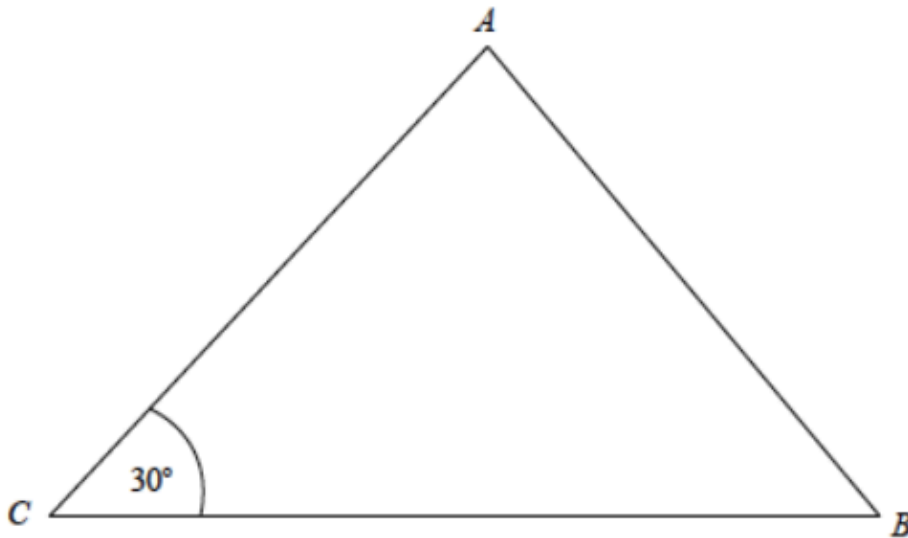


The frustum is made from glass.
The glass has a density of 2.5 g/cm^3

Work out the mass of the frustum.
Give your answer to an appropriate degree of accuracy.

(Total 5 marks)

7.
Non-calculator



The ratio of the length BC to the length AC is $2:1$
The area of the triangle is 50cm^2

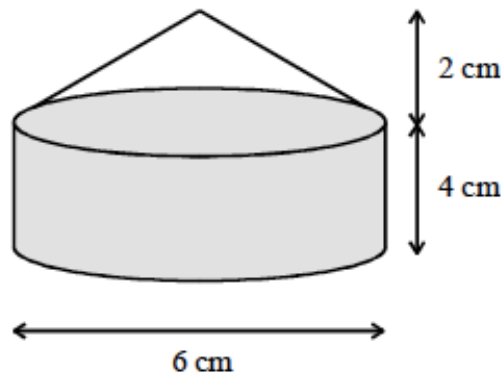
Calculate the length of AC .

(Total 4 marks)

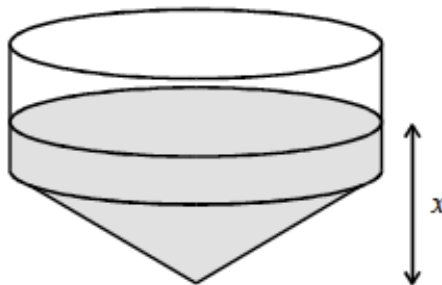
8.

A thin-walled glass paperweight consists of a hollow cylinder with a hollow cone on top as shown.

The paperweight contains just enough sand to fill the cylinder.



The paperweight is now turned upside down.



Calculate the depth of the sand, (marked x in the diagram).

(Total 5 marks)