

11

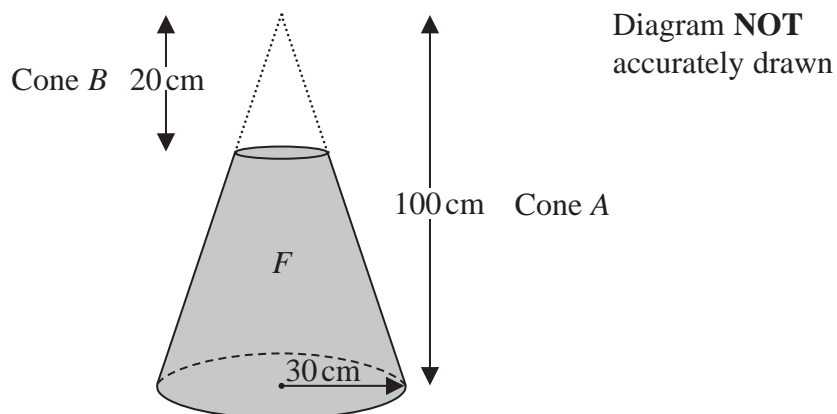


Figure 3

A right circular cone,  $A$ , has height 100 cm and base radius 30 cm.  
The shaded solid,  $F$ , is formed by removing the right circular cone,  $B$ , of height 20 cm from the top of  $A$ , as shown in Figure 3

The volume of  $F$  is  $k\pi \text{ cm}^3$  where  $k$  is an integer.

(a) Find the value of  $k$ .

(3)

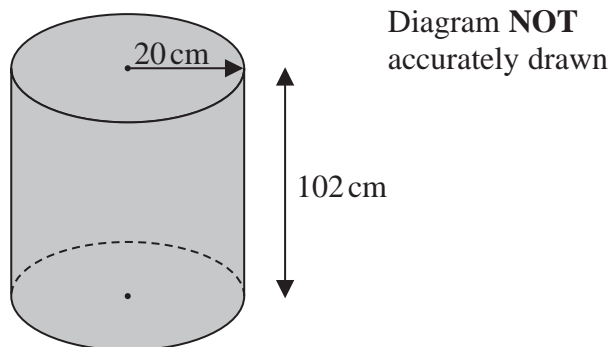


Figure 4

Figure 4 shows a solid circular cylinder.  
The cylinder has a radius of 20 cm, a height of 102 cm and a volume of  $V \text{ cm}^3$

(b) Calculate the value of  $V$ .  
Give your answer in terms of  $\pi$ .

(1)

$$\left[ \begin{array}{l} \text{Volume of a cylinder} = \pi r^2 h \\ \text{Volume of a cone} = \frac{1}{3} \pi r^2 h \end{array} \right]$$



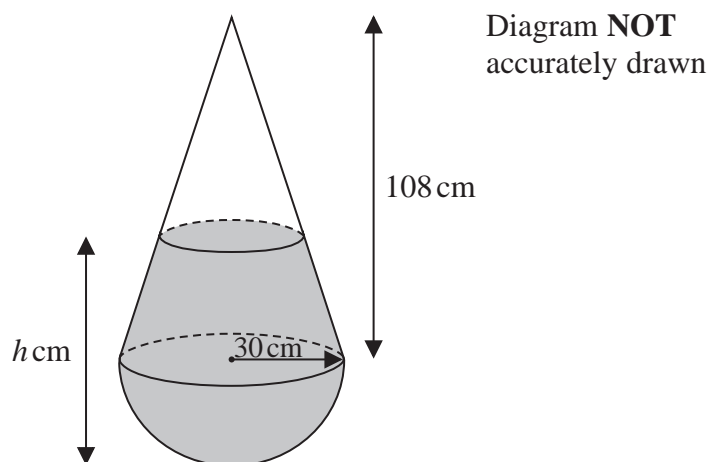
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**Question 11 continues on the next page.**



**Question 11 continued**

Figure 5 below shows a door stop made from a hollow hemisphere and a hollow right circular cone.

**Figure 5**

The radius of the base of the cone and the radius of the hemisphere are both 30 cm.  
 The centre of the base of the cone coincides with the centre of the hemisphere.  
 The height of the cone is 108 cm.

The door stop rests on horizontal ground with the cone on top of the hemisphere and the axis of symmetry of the door stop vertical.

The door stop contains sand to a height of  $h$  cm.

Given that the volume of sand in the door stop is  $V \text{ cm}^3$ , where  $V \text{ cm}^3$  is the volume of the cylinder in Figure 4

(c) calculate the value of  $h$ .

(6)

$$\left[ \text{Volume of a sphere} = \frac{4}{3}\pi r^3 \right]$$



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