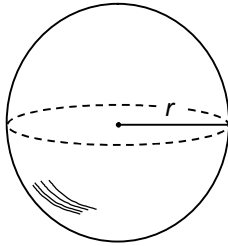


### 3.3 WORKING with the VOLUME of a SOLID SPHERE, CONE, PYRAMID

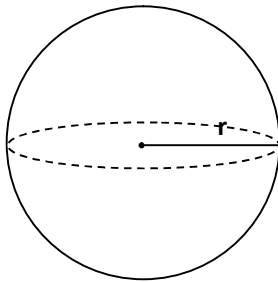
1. Calculate the volume of each sphere described below, rounding your answer to 1 decimal place.



- (a)  $r = 6\text{cm}$
- (b)  $r = 2\text{m}$
- (c)  $r = 9\text{mm}$
- (d)  $r = 3\text{cm}$

2. Find the volume of a sphere for the following values of  $r$  and  $d$ .

(give your answers correct to 3 significant figures)



- |                        |                       |
|------------------------|-----------------------|
| (a) $r = 10\text{cm}$  | (f) $d = 18\text{cm}$ |
| (b) $r = 25\text{cm}$  | (g) $r = 80\text{mm}$ |
| (c) $d = 2\text{m}$    | (h) $d = 55\text{cm}$ |
| (d) $r = 200\text{mm}$ | (i) $r = 3.5\text{m}$ |
| (e) $d = 11\text{cm}$  | (j) $d = 48\text{cm}$ |

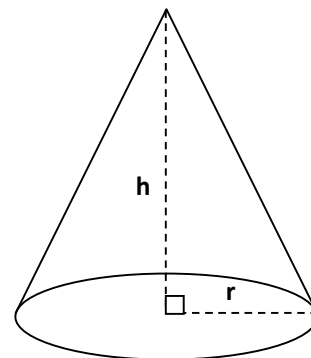
3. A sphere has a diameter of 8cm.

Calculate its volume giving your answer correct to 3 significant figures.

4. Find the volume of a cone for the following values of  $r$  and  $h$ .

(give your answers correct to 3 significant figures)

- |                       |                   |
|-----------------------|-------------------|
| (a) $r = 5\text{cm}$  | $h = 14\text{cm}$ |
| (b) $r = 7\text{cm}$  | $h = 25\text{cm}$ |
| (c) $r = 3\text{cm}$  | $h = 22\text{cm}$ |
| (d) $r = 12\text{cm}$ | $h = 7\text{cm}$  |

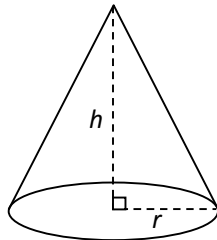


5. Find the volume of a cone for the following values of  $d$  and  $h$ .

(give your answers correct to 3 significant figures)

- (a)  $d = 15\text{cm}$                        $h = 40\text{cm}$   
(b)  $d = 11\text{cm}$                        $h = 37\text{cm}$   
(c)  $d = 22\text{cm}$                        $h = 125\text{cm}$   
(d)  $d = 8.8\text{cm}$                        $h = 30\text{cm}$

6. Calculate the volume of each cone described below, rounding your answers to 1 decimal place.

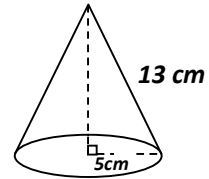


- (a)  $r = 3\text{cm}$  and  $h = 6\text{cm}$   
(b)  $r = 8\text{mm}$  and  $h = 12\text{mm}$   
(c)  $r = 3\text{cm}$  and  $h = 5\text{cm}$   
(d)  $r = 2\text{m}$  and  $h = 6\text{m}$

7. A cone has a base diameter of 8cm and a height of 5cm. Calculate the volume of this cone.

8. A cone has a base diameter of 10cm and a **slant height** of 13cm.

Calculate the volume of the cone.



9. A cone has a base radius of 9cm and a **slant height** of 15cm.

Calculate the volume of the cone.

10. A pyramid has a square base of side 4cm and a vertical height of 7cm.

Calculate the volume of the pyramid correct to 2 significant figures.

11. A pyramid has a rectangular base measuring 16mm by 12mm and a vertical height of 10mm.

Calculate the volume of the pyramid.

## WORKING with the VOLUME of a SOLID SPHERE, CONE, PYRAMID

### EXAM QUESTIONS

1. The Stockholm Globe Arena is the largest hemispherical building in the world.

The radius of the building is 110 m.

Calculate the volume of the building in cubic metres, giving your answer in scientific notation correct to 3 significant figures.



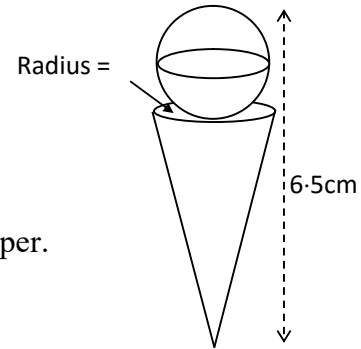
2. A metal bottle stopper is made up from a cone topped with a sphere.

The sphere has diameter 1.5cm.

The cone has radius 0.9cm.

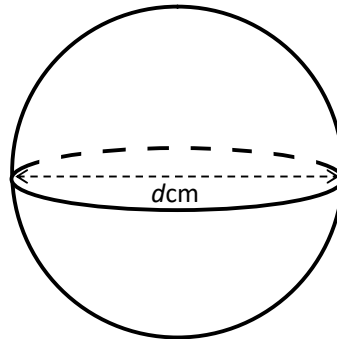
The overall length of the stopper is 6.5cm.

Calculate the volume of metal required to make the stopper. Give your answer correct to 3 significant figures.



3. The volume of this sphere is  $524\text{cm}^3$ .

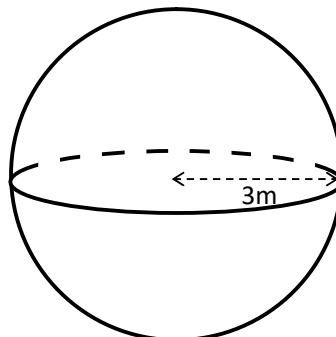
Calculate the diameter,  $d$  cm.



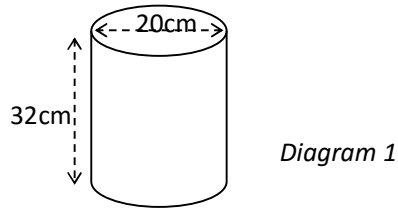
4. **Non Calculator!**

Calculate the volume of this sphere which has radius 3m.

[Take  $\pi = 3.14$ ]



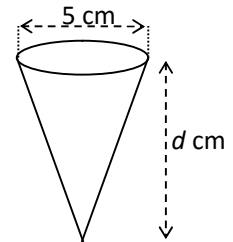
5. Sherbet in a sweet shop is stored in a cylindrical container like the one shown in *diagram 1*.



The volume of the cylinder, correct to the nearest  $1000\text{cm}^3$ , is  $10\,000\text{cm}^3$ .

The sherbet is sold in conical containers with diameter 5 cm as shown in *diagram 2*.

250 of these cones can be filled from the contents of the cylinder.



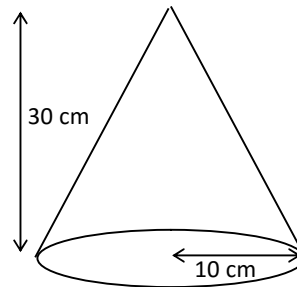
Calculate the depth,  $d$  cm, of a sherbet cone.

Diagram 2

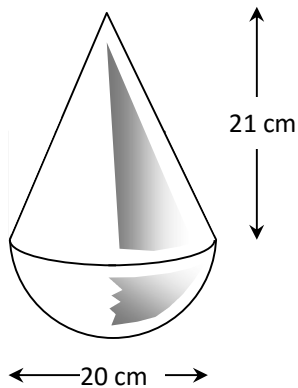
6. **Non Calculator!**

The diagram shows a cone with radius 10 centimetres and height 30 centimetres.

Taking  $\pi = 3.14$ , calculate the volume of the cone.



- 7.

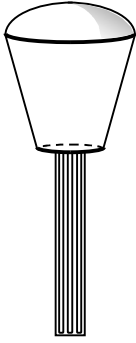


A children's wobbly toy is made from a cone, 21 cm high, on top of a hemispherical base of diameter 20 cm.

The toy has to be filled with liquid foam.

Calculate the volume of foam which will be required.

8.

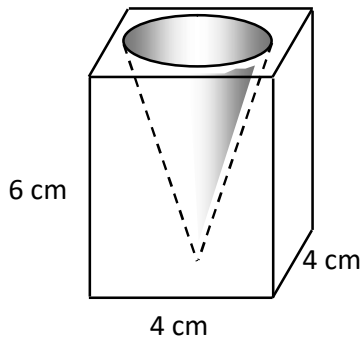


The lamp cover in a street lamp is in the shape of a cone with the bottom cut off.

The height of the cone is 50cm and its radius is 25cm. The height of the lamp is 30cm and the base of the lamp has a radius of 18cm

Calculate the volume of the lamp cover. [Answer to 3 significant figures.]

9.



A glass candle holder is in the shape of a cuboid with a cone removed. The cuboid measures 4cm by 4cm by 6cm.

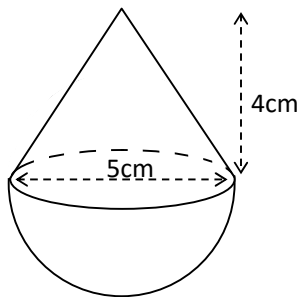
The cone has a diameter of 3cm and a height of 5cm.

Calculate the volume of glass in the candle holder.

10. For the Christmas market a confectioner has created a chocolate Santa.

It consists of a solid hemisphere topped by a solid cone.

Both have diameter 5cm and the height of the cone is 4cm as shown in the diagram.



Calculate the volume of chocolate required to make one chocolate Santa, giving your answer correct to 3 significant figures.

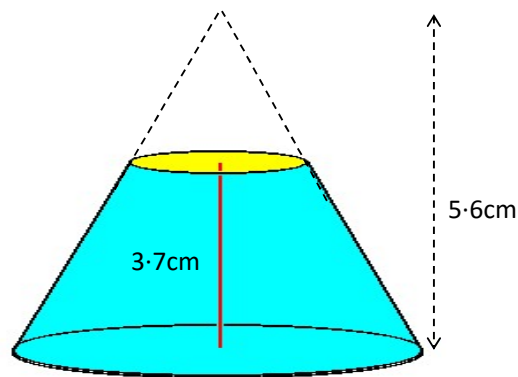
11. The diameter of an ordinary snooker ball is 5.25cm.

Calculate the volume of a snooker ball giving your answer correct to 3 significant figures.

12. A dessert is in the shape of a truncated cone [a cone with a 'slice' taken from the top].

The radius of the base is 4.1cm and is 1.6 cm at the top.

The other dimensions are shown in the diagram.



Calculate the volume of the dessert.

13. A young child was given a slab of moulding clay. It was a cuboid and measured 15.2cm by 4.8cm by 3.4cm.

(a) Calculate the volume of the cuboid rounding your answer to 2 significant figures.

The clay was made into 25 identical spheres.

(b) Using your answer from part (a), calculate the radius of one of the spheres.