



# Volume and surface area of 3-D shapes

Student name: \_\_\_\_\_ Score: \_\_\_\_\_

1.

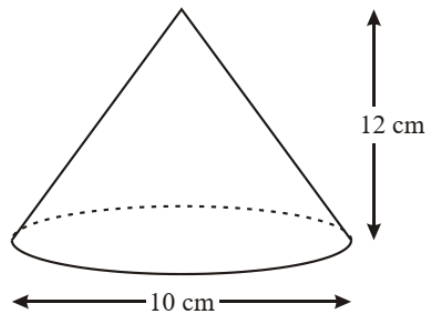


Diagram NOT accurately drawn

The diagram represents a cone.

The height of the cone is 12 cm.

The diameter of the base of the cone is 10 cm.

Calculate the curved surface area of the cone.

Give your answer as a multiple of  $\pi$

.....  $\text{cm}^2$

2.

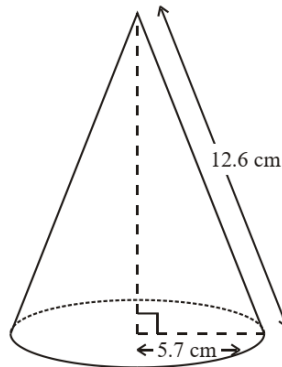


Diagram NOT accurately drawn

The radius of the base of a cone is 5.7 cm.

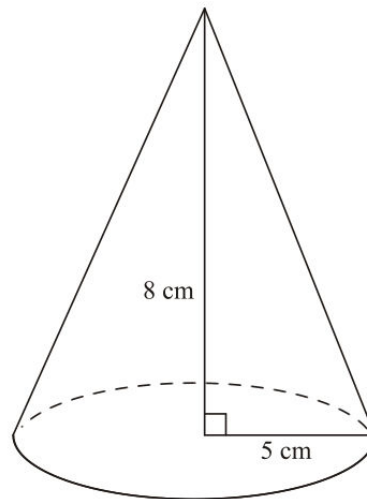
Its slant height is 12.6 cm.

Calculate the volume of the cone.

Give your answer correct to 3 significant figures.

.....  $\text{cm}^3$

3.



A cone has a base radius of 5 cm and a vertical height of 8 cm.  
Calculate the volume of the cone.  
Give your answer correct to 3 significant figures.

.....  $\text{cm}^3$

4. The diagram shows a child's toy.

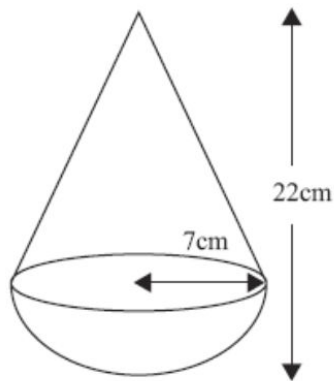


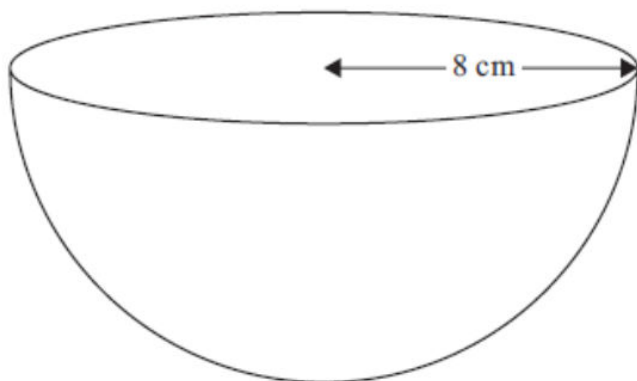
Diagram **NOT**  
accurately drawn

The diagram shows a child's toy made of a cone joined to a hemisphere.  
The cone and the hemisphere each have a radius of 7 cm.  
The total height of the toy is 22 cm.  
Work out the volume of the toy.  
Give the exact answer.

.....  $\text{cm}^3$

5. The diagram shows a solid hemisphere of radius 8 cm.

Diagram NOT  
accurately drawn



Work out the total surface area of the hemisphere.  
Give your answer correct to 3 significant figures.

.....  $\text{cm}^2$

6.

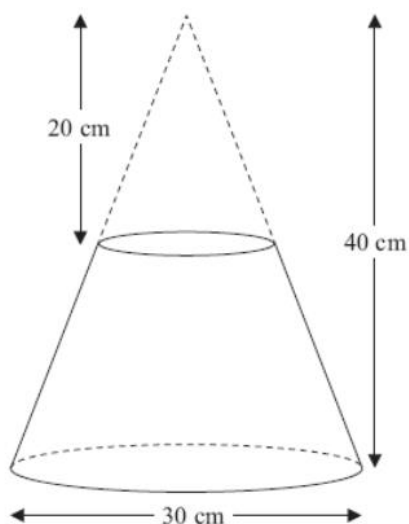


Diagram NOT  
accurately drawn

A frustum is made by removing a small cone from a similar large cone.

The height of the small cone is 20 cm.

The height of the large cone is 40 cm.

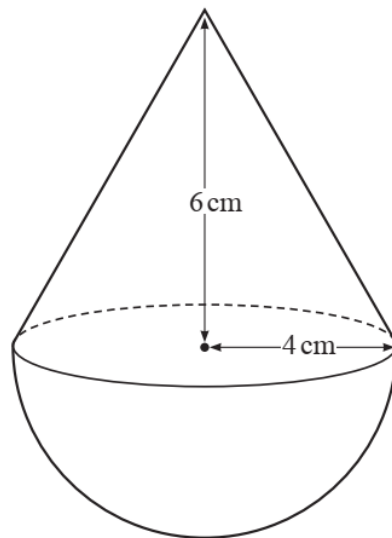
The diameter of the base of the large cone is 30 cm.

Work out the volume of the frustum.

Give your answer correct to 3 significant figures.

.....  $\text{cm}^3$

7.



NOT TO  
SCALE

The diagram shows a child's toy made of a cone joined to a hemisphere.  
The cone and the hemisphere each have a radius of 4 cm.  
The perpendicular height of the cone is 6 cm.

(a) (i) Find the volume of the hemisphere.

.....  $\text{cm}^3$

(ii) Find the volume of the cone.

.....  $\text{cm}^3$

(iii) Each cubic centimetre of the hemisphere has a mass of 7.85 g.

Each cubic centimetre of the cone has a mass of 0.65 g.

Find the total mass of the toy.

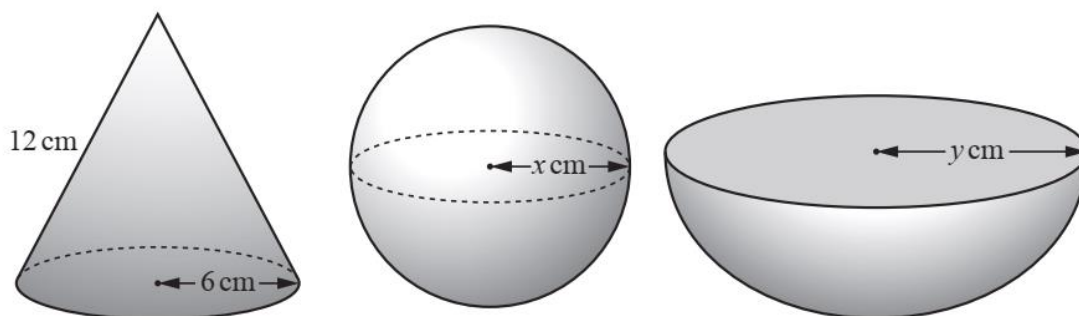
..... g

(b) Find the total surface area of the toy

.....  $\text{cm}^2$

NOT TO  
SCALE

8.



The diagram shows three solids.

The base radius of the cone is 6 cm and the slant height is 12 cm.

The radius of the sphere is  $x$  cm and the radius of the hemisphere is  $y$  cm.

The **total** surface area of each solid is the same.

(i) Show that the total surface area of the cone is  $108\pi \text{ cm}^2$ .

[The curved surface area,  $A$ , of a cone with radius  $r$  and slant height  $l$  is  $A = \pi rl$ .]

(ii) Find the value of  $x$  and the value of  $y$ .

[The surface area,  $A$ , of a sphere with radius  $r$  is  $A = 4\pi r^2$ .]



# Volume and surface area of 3-D shapes

Student name: \_\_\_\_\_ **ANSWERS** Score: \_\_\_\_\_

1.

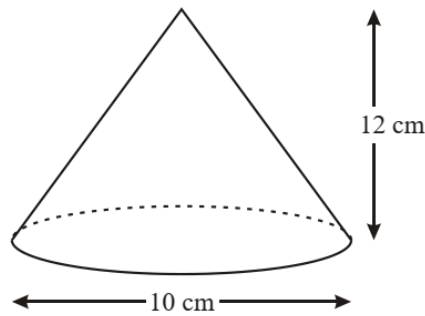


Diagram NOT accurately drawn

The diagram represents a cone.

The height of the cone is 12 cm.

The diameter of the base of the cone is 10 cm.

Calculate the curved surface area of the cone.

Give your answer as a multiple of  $\pi$

**$65\pi$**  .....  $\text{cm}^2$

2.

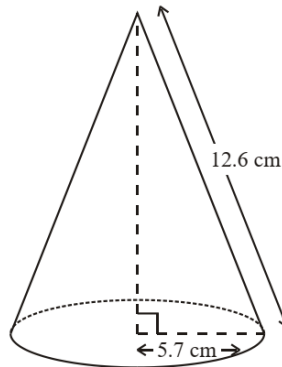


Diagram NOT accurately drawn

The radius of the base of a cone is 5.7 cm.

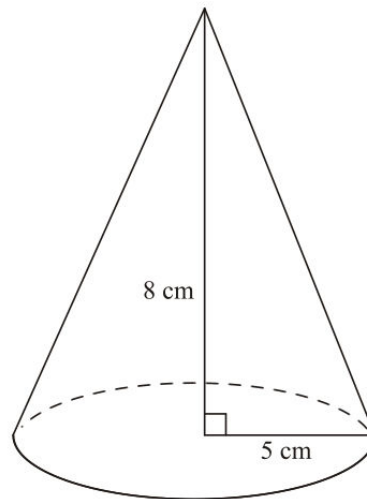
Its slant height is 12.6 cm.

Calculate the volume of the cone.

Give your answer correct to 3 significant figures.

**382** .....  $\text{cm}^3$

3.



A cone has a base radius of 5 cm and a vertical height of 8 cm.  
Calculate the volume of the cone.  
Give your answer correct to 3 significant figures.

.....209..... cm<sup>3</sup>

4. The diagram shows a child's toy.

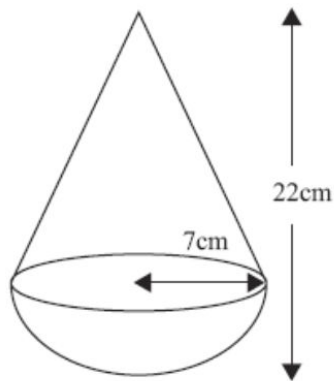


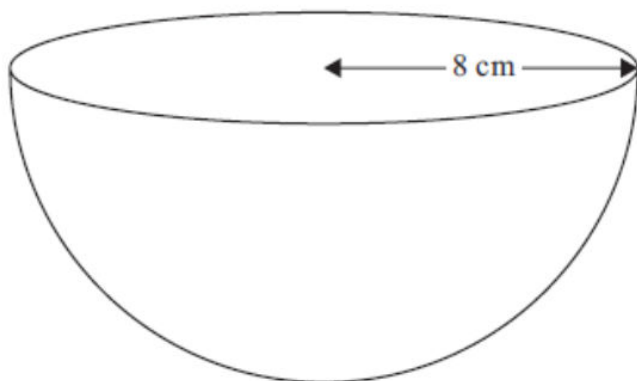
Diagram **NOT**  
accurately drawn

The diagram shows a child's toy made of a cone joined to a hemisphere.  
The cone and the hemisphere each have a radius of 7 cm.  
The total height of the toy is 22 cm.  
Work out the volume of the toy.  
Give your answer correct to 3 significant figures.

.....1490..... cm<sup>3</sup>

5. The diagram shows a solid hemisphere of radius 8 cm.

Diagram NOT  
accurately drawn



Work out the total surface area of the hemisphere.  
Give your answer correct to 3 significant figures.

603 .....  $\text{cm}^2$

6.

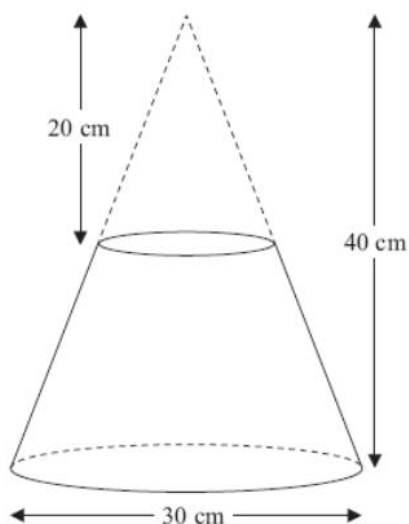
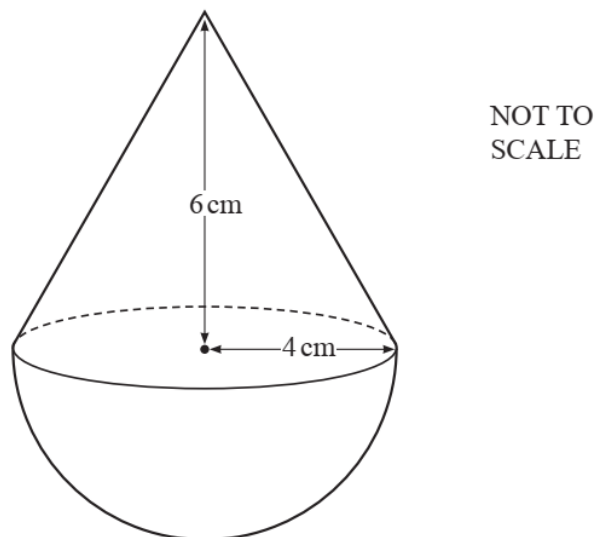


Diagram NOT  
accurately drawn

A frustum is made by removing a small cone from a similar large cone.  
The height of the small cone is 20 cm.  
The height of the large cone is 40 cm.  
The diameter of the base of the large cone is 30 cm.  
Work out the volume of the frustum.  
Give your answer correct to 3 significant figures.

8250 .....  $\text{cm}^3$

7.



The diagram shows a child's toy made of a cone joined to a hemisphere. The cone and the hemisphere each have a radius of 4 cm. The perpendicular height of the cone is 6 cm.

(a) (i) Find the volume of the hemisphere.

..... 134 .....  $\text{cm}^3$

(ii) Find the volume of the cone.

..... 101 .....  $\text{cm}^3$

(iii) Each cubic centimetre of the hemisphere has a mass of 7.85 g.

Each cubic centimetre of the cone has a mass of 0.65 g.

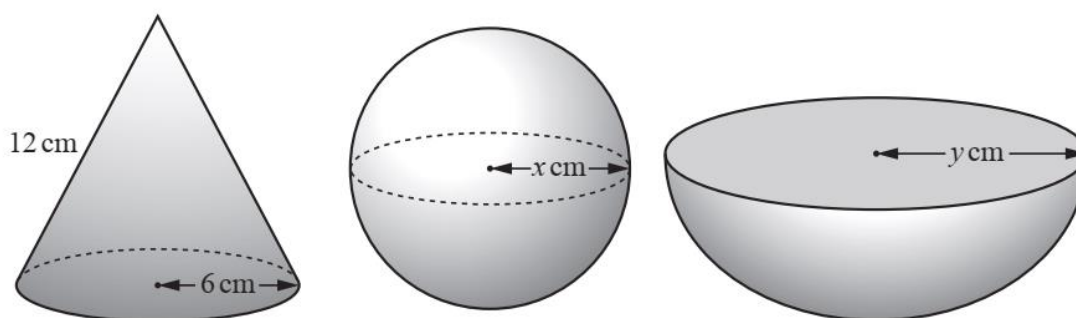
Find the total mass of the toy.

..... 1120 ..... g

(b) Find the total surface area of the toy

..... 191 .....  $\text{cm}^2$   
NOT TO SCALE

8.



The diagram shows three solids.

The base radius of the cone is 6 cm and the slant height is 12 cm.

The radius of the sphere is  $x$  cm and the radius of the hemisphere is  $y$  cm.

The **total** surface area of each solid is the same.

(i) Show that the total surface area of the cone is  $108\pi \text{ cm}^2$ .

$$\pi \times 6 \times 12 + \pi \times 6^2$$

[The curved surface area,  $A$ , of a cone with radius  $r$  and slant height  $l$  is  $A = \pi rl$ .]

(ii) Find the value of  $x$  and the value of  $y$ .

[The surface area,  $A$ , of a sphere with radius  $r$  is  $A = 4\pi r^2$ .]

$$x = 5.2; y = 6$$

