



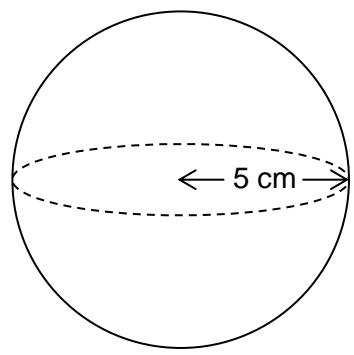
Volume and Surface Area of Spheres



← REVISE THIS TOPIC

1 Here is a sphere with a radius of 5 cm.

Volume of a sphere = $\frac{4}{3}\pi r^3$
Surface area of a sphere = $4\pi r^2$



1 (a) Work out the volume of the sphere.
Give your answer to 1 decimal place. [2 marks]

$\frac{4}{3} \times \pi \times 5^3 = 523.5987756$

Answer 523.6 cm³

1 (b) Work out the surface area of the sphere.
Give your answer to 1 decimal place. [2 marks]

$4 \times \pi \times 5^2 = 314.159265$

Answer 314.2 cm²

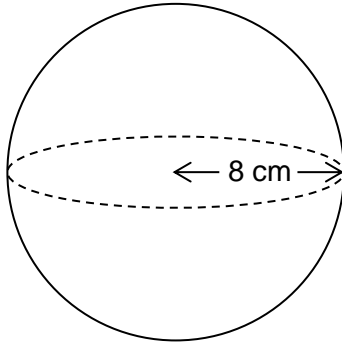




2 Here is a sphere with a radius of 8 cm.

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

$$\text{Surface area of a sphere} = 4\pi r^2$$



2 (a) Work out the volume of the sphere.
Give your answer to 1 decimal place.

[2 marks]

$$\frac{4}{3} \times \pi \times 8^3 = 2144.660585$$

Answer 2144.7 cm³

2 (b) Work out the surface area of the sphere.
Give your answer to 1 decimal place.

[2 marks]

$$4 \times \pi \times 8^2 = 804.2477193$$

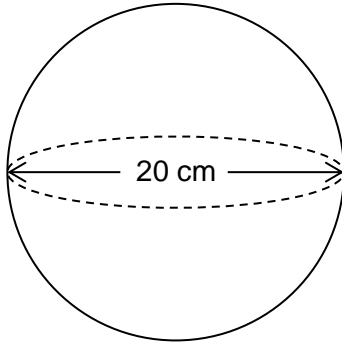
Answer 804.2 cm²





3 Here is a sphere with a diameter of 20 cm.

Volume of a sphere = $\frac{4}{3}\pi r^3$
 Surface area of a sphere = $4\pi r^2$



3 (a) Work out the volume of the sphere. Give your answer to 1 decimal place. [2 marks]

$$\frac{4}{3} \times \pi \times 10^3 = 4188.790205$$

Answer 4188.8 cm³

3 (b) Work out the surface area of the sphere. Give your answer to 1 decimal place. [2 marks]

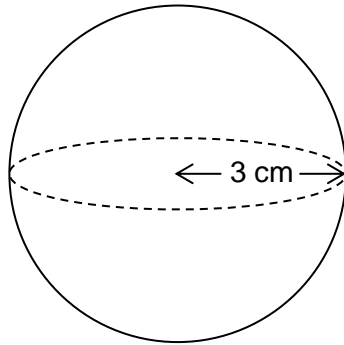
$$4 \times \pi \times 10^2 = 1256.637061$$

Answer 1256.6 cm²





4 Here is a sphere with a radius of 3 cm.



Volume of a sphere = $\frac{4}{3}\pi r^3$
 Surface area of a sphere = $4\pi r^2$



4 (a) Work out the volume of the sphere. Give your answer in terms of π . [3 marks]

$$\begin{aligned} & \frac{4}{3} \times \pi \times 3^3 \\ = & \frac{4}{3} \times \pi \times 27 \\ = & \frac{4}{3} \times 27 \times \pi \\ = & 36 \times \pi \end{aligned}$$

Answer 36π cm³

4 (b) Work out the surface area of the sphere. Give your answer in terms of π . [2 marks]

$$\begin{aligned} & 4 \times \pi \times 3^2 \\ = & 4 \times \pi \times 9 \\ = & 4 \times 9 \times \pi \\ = & 36 \times \pi \end{aligned}$$

Answer 36π cm²

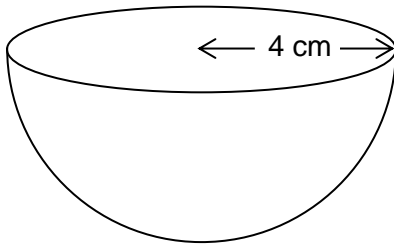




5 Here is a hemisphere with a radius of 4 cm.

Volume of a sphere = $\frac{4}{3}\pi r^3$

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



5 (a) Work out the volume of the hemisphere.
Give your answer to 1 decimal place.

[3 marks]

$\frac{4}{3} \times \pi \times 4^3 = 268.0825731$

$268.08... \div 2 = 134.0412866$

Answer 134.0 cm³

5 (b) Work out the surface area of the sphere.
Give your answer to 1 decimal place.

[3 marks]

$4 \times \pi \times 4^2 = 201.0619298$

$201.06... \div 2 = 100.5309649$

$\pi \times 4^2 = 50.26548246$

$100.53... + 50.26... = 150.7964474$

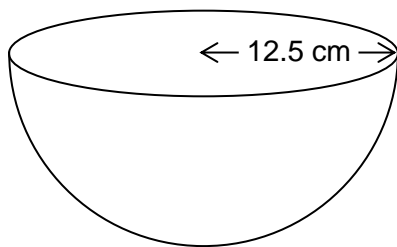
Answer 150.8 cm²



Turn over ►



6 Here is a hemisphere with a radius of 12.5 cm.



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

$$\text{Surface area of a sphere} = 4\pi r^2$$

6 (a) Work out the volume of the hemisphere.
Give your answer to 1 decimal place.

[3 marks]

$$\frac{4}{3} \times \pi \times 12.5^3 = 8181.230869$$

$$8181.23... \div 2 = 4090.615434$$

Answer 4090.6 cm³

6 (b) Work out the surface area of the sphere.
Give your answer to the nearest integer.

[3 marks]

$$4 \times \pi \times 12.5^2 = 1963.495408$$

$$1963.49... \div 2 = 981.7477042$$

$$\pi \times 12.5^2 = 490.8738521$$

$$981.74... + 490.87... = 1472.621556$$

Answer 1473 cm²

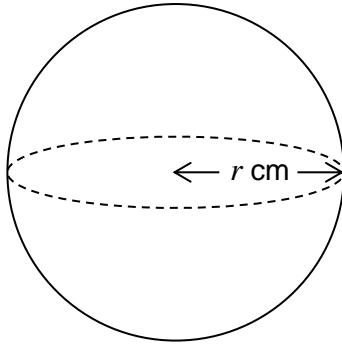




7 Here is a sphere.

Volume of a sphere = $\frac{4}{3}\pi r^3$

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



The volume of the sphere is 10 000 cm³

Work out the value of *r*, the radius of the sphere.

Give your answer to 2 decimal places.

[3 marks]

$\frac{4}{3} \times \pi \times r^3 = 10000$

$\frac{4\pi r^3}{3} = 10000$

$4\pi r^3 = 30000$

$r^3 = \frac{30000}{4\pi}$

$r^3 = 2387.324146$

$r = \sqrt[3]{2387.324146}$

$r = 13.36504618$

13.37

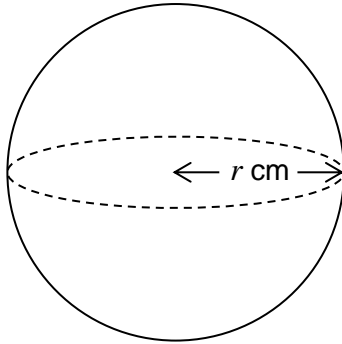
r = _____ cm





8 Here is a sphere.

<p>Volume of a sphere = $\frac{4}{3}\pi r^3$</p> <p>Surface area of a sphere = $4\pi r^2$</p>



The volume of the sphere is 700 cm^3

Work out the surface area of the sphere.
Give your answer to 1 decimal place.

[5 marks]

$$\frac{4\pi r^3}{3} = 700$$

$$4\pi r^3 = 2100$$

$$r^3 = \frac{2100}{4\pi}$$

$$r^3 = 167.1126902$$

$$r = 5.508116834$$

$$4 \times \pi \times 5.508...^2 = 381.2555295$$

Answer 381.3 cm²

5

