

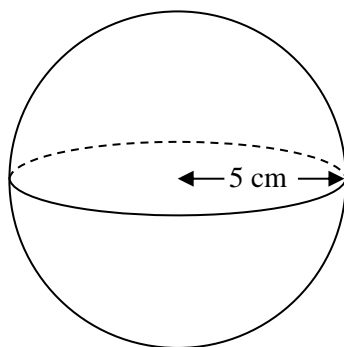


Volume and Surface Area of Spheres



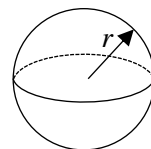
REVISE THIS
TOPIC

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



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

$$\text{Surface Area of a Sphere} = 4\pi r^2$$



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

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

$$\underline{523.6} \text{ cm}^3$$

(2)

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

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

$$\underline{314.2} \text{ cm}^2$$

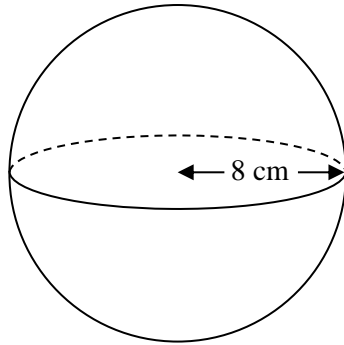
(2)

(Total for Question 1 is 4 marks)



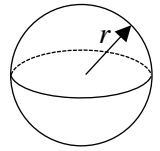


- 2 Here is a sphere with a radius of 8 cm.



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

$$\text{Surface Area of a Sphere} = 4\pi r^2$$



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

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

$$\underline{2144.7} \text{ cm}^3$$

(2)

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

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

$$\underline{804.2} \text{ cm}^2$$

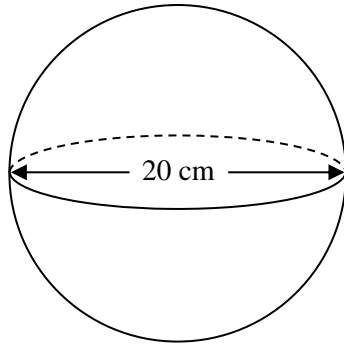
(2)

(Total for Question 2 is 4 marks)



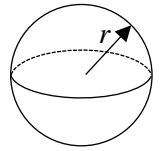


3 Here is a sphere with a diameter of 20 cm.



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

$$\text{Surface Area of a Sphere} = 4\pi r^2$$



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

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

$$\underline{4188.8} \text{ cm}^3$$

(2)

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

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

$$\underline{1256.6} \text{ cm}^2$$

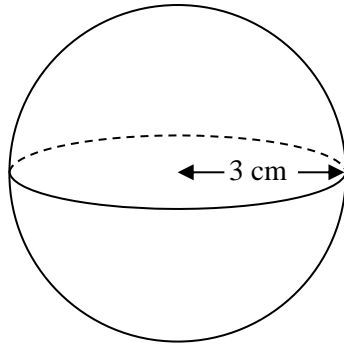
(2)

(Total for Question 3 is 4 marks)



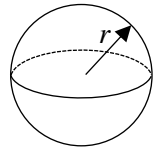


- 4 Here is a sphere with a radius of 3 cm.



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

$$\text{Surface Area of a Sphere} = 4\pi r^2$$



- (a) Work out the volume of the sphere.
Give your answer in terms of π .

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

$$\underline{36\pi} \text{ cm}^3$$

(2)

- (b) Work out the surface area of the sphere.
Give your answer in terms of π .

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

$$\underline{36\pi} \text{ cm}^2$$

(2)

(Total for Question 4 is 5 marks)

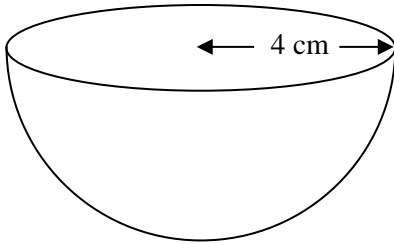
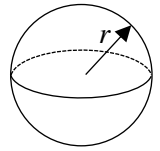




5 Here is a hemisphere with a radius of 4 cm.

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

$$\text{Surface Area of a Sphere} = 4\pi r^2$$



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

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

$$268.08 \dots \div 2 = 134.0412866$$

$$\underline{134.0} \text{ cm}^3$$

(3)

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

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

$$201.06 \dots \div 2 = 100.5309649$$

$$\pi \times 4^2 = 50.26548246$$

$$100.53 \dots + 50.26 \dots = 150.7964474$$

$$\underline{150.8} \text{ cm}^2$$

(3)

(Total for Question 5 is 6 marks)

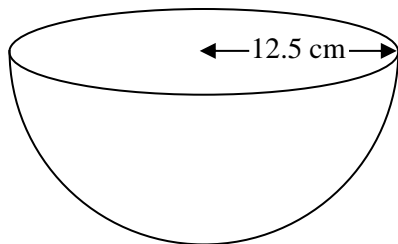
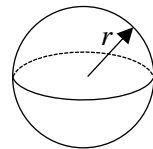




6 Here is a hemisphere with a radius of 12.5 cm.

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

$$\text{Surface Area of a Sphere} = 4\pi r^2$$



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

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

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

$$\underline{4090.6} \text{ cm}^3$$

(3)

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

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

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

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

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

$$\underline{1473} \text{ cm}^2$$

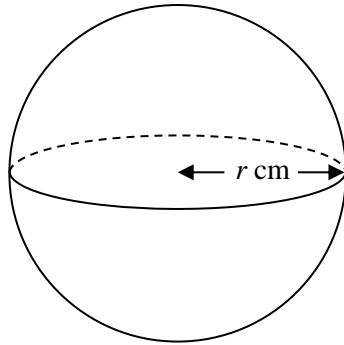
(3)

(Total for Question 6 is 6 marks)



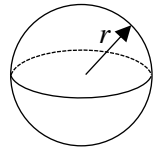


7 Here is a sphere.



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

$$\text{Surface Area of a Sphere} = 4\pi r^2$$



The volume of the sphere is $10\,000 \text{ cm}^3$

Work out the value of r , the radius of the sphere.
Give your answer to 2 decimal places.

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

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

$$4\pi r^3 = 30000$$

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

$$r^3 = 2387.324146$$

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

$$r = 13.36504618$$

13.37

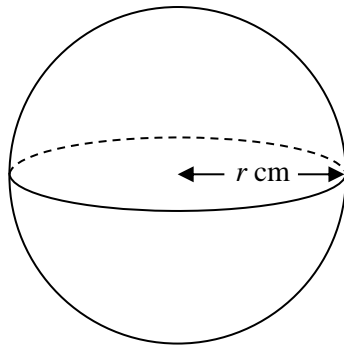
.....cm

(Total for Question 7 is 3 marks)



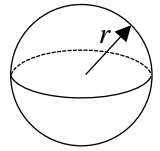


8 Here is a sphere.



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

$$\text{Surface Area of a Sphere} = 4\pi r^2$$



The volume of the sphere is 700 cm^3

Work out the surface area of the sphere.

Give your answer to 1 decimal place.

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

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

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

$$r^3 = 167.1126902$$

$$r = 5.508116834$$

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

381.3

..... cm^2

(Total for Question 8 is 5 marks)

