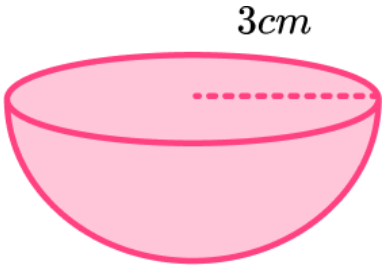
Volume and Surface Area of a Hemisphere - Worksheet

Skill

Group A - Volume of a hemisphere

Calculate the volume of the hemispheres below. Give your answer to 3 significant figures:

1)



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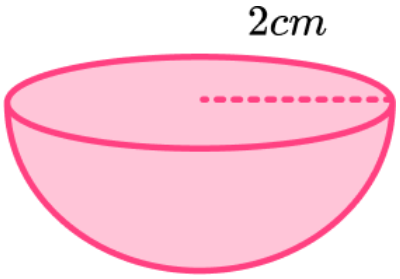

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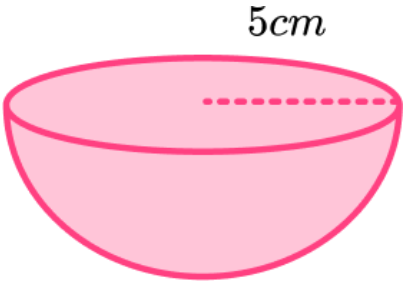
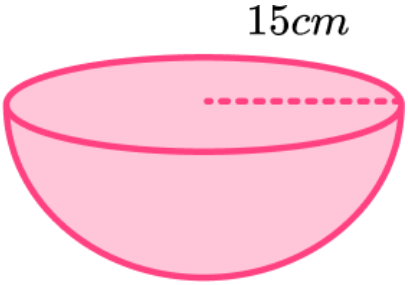


4)



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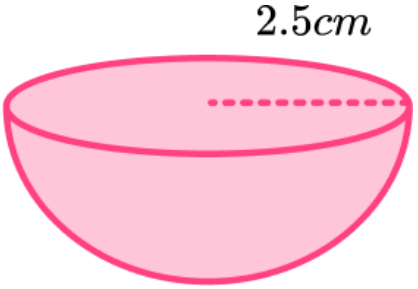

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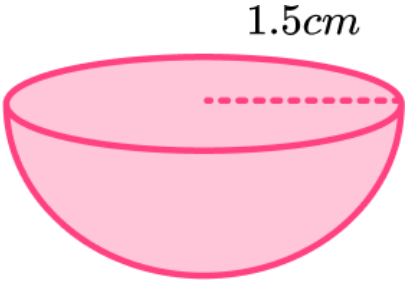

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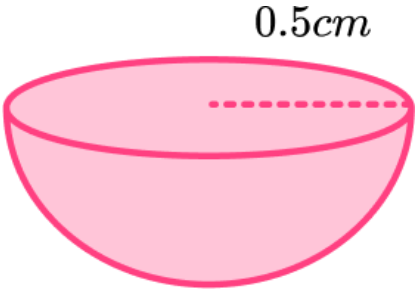

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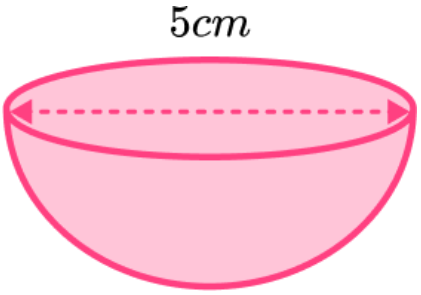

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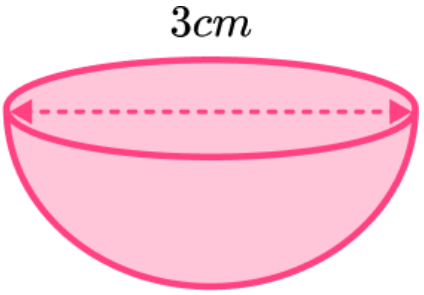

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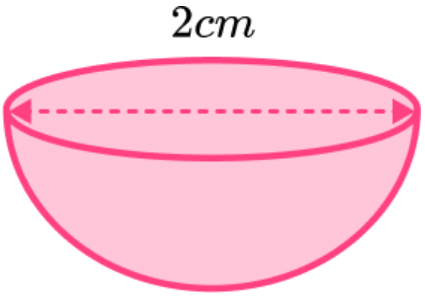

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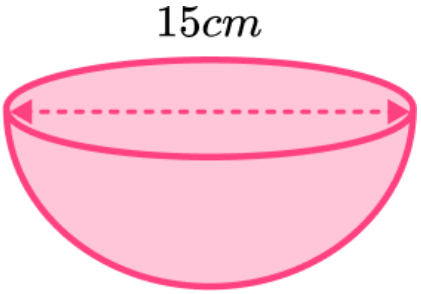

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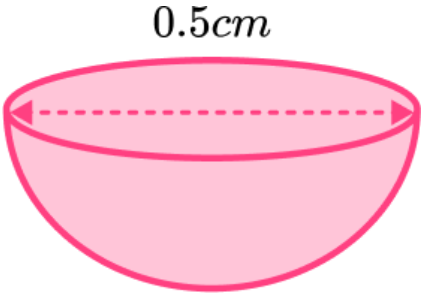
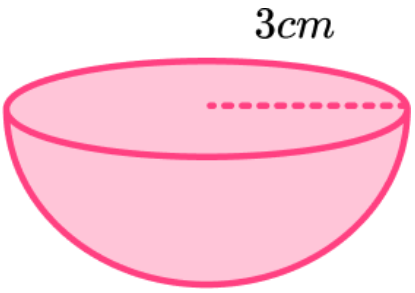


Volume and Surface Area of a Hemisphere - Worksheet

Group B - Total surface area of a hemisphere

Calculate the total surface area of the hemispheres below:

1)



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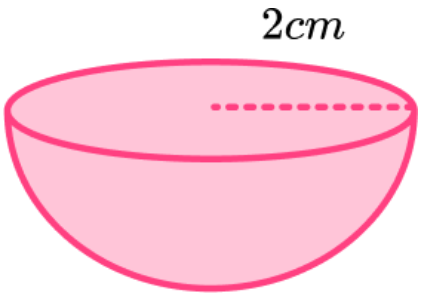

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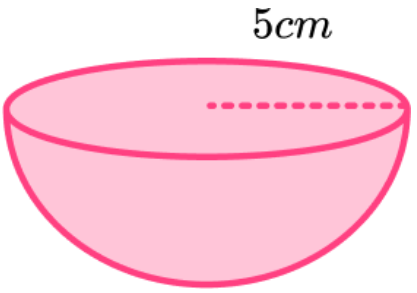
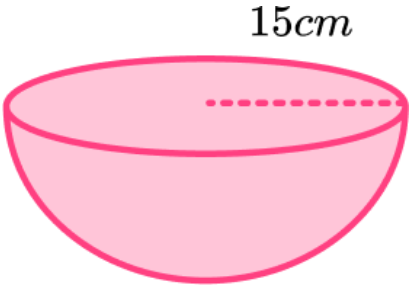
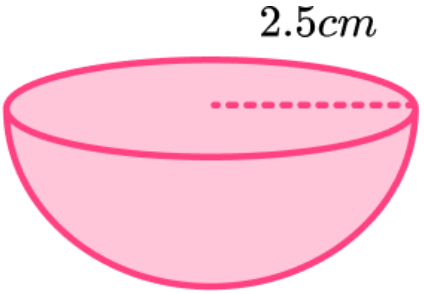


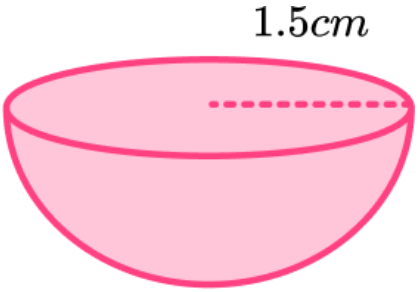
4)



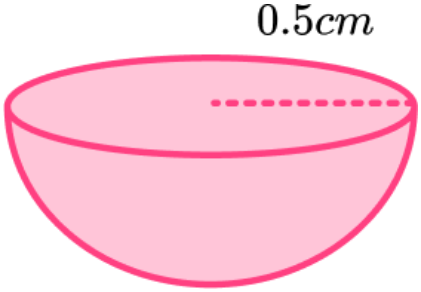
5)



6)



7)



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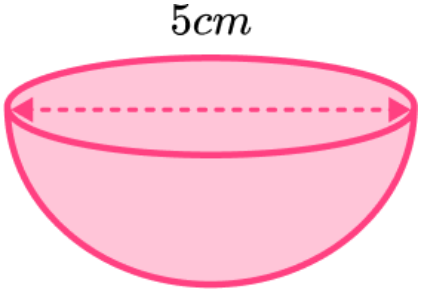

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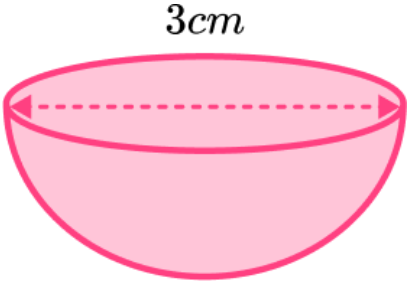
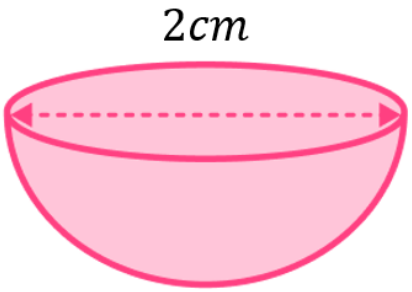
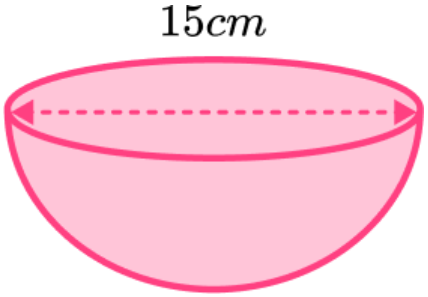


10)



11)



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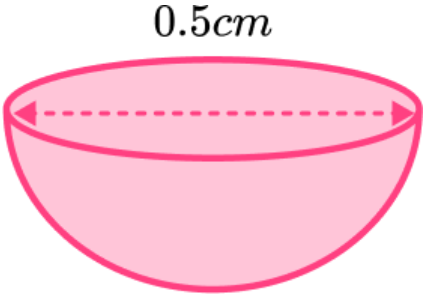
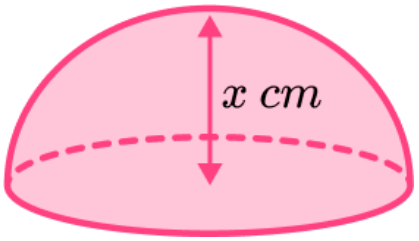


Volume and Surface Area of a Hemisphere - Worksheet

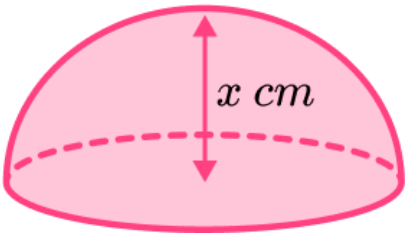
Group C - Find the radius or diameter of a hemisphere

Find the radius or diameter given the volume or surface area:

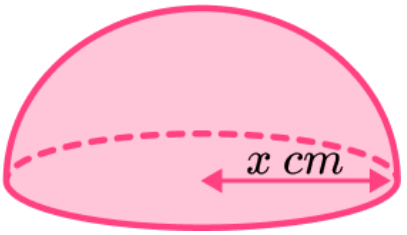
1) volume = $2094.4cm^3$



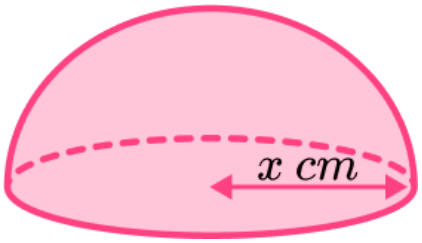
2) volume = $89.80cm^3$



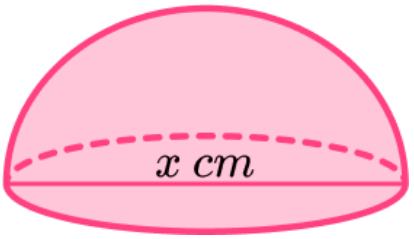
3) volume = $1526.81cm^3$



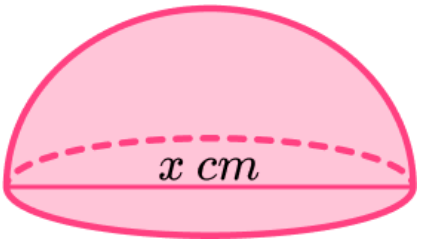
4) volume = $12.21cm^3$



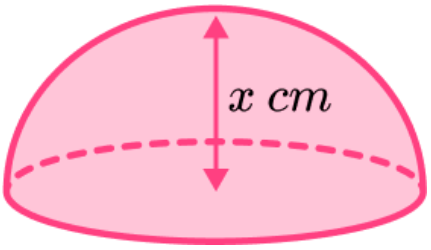
5) volume = $134.04cm^3$



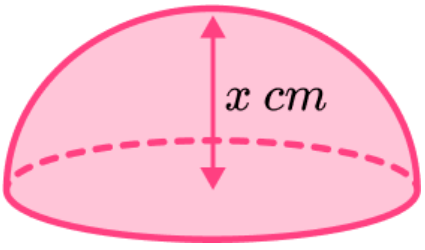
6) volume = $\frac{16}{3}\pi\ cm^3$



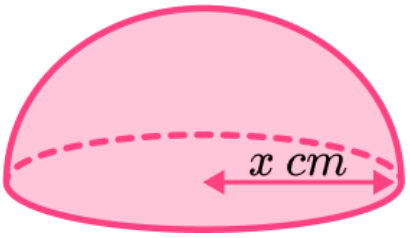
7) Surface area = $339.29cm^2$



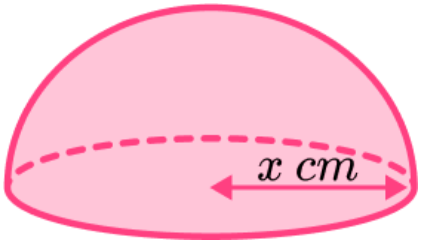
8) Surface area = $1357.17cm^2$



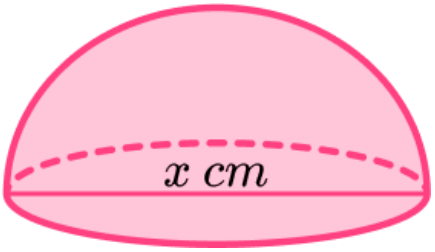
9) Surface area = $84.82cm^2$



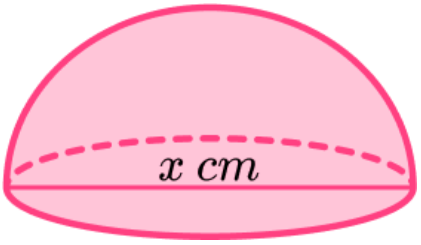
10) Surface area = $12\pi\ cm^3$



11) Surface area = $150.80cm^2$



12) Surface area = $3769.91cm^2$



Volume and Surface Area of a Hemisphere - Worksheet

Applied

1) **(a)** A glass paperweight is in the shape of a hemisphere.
The paperweight has a diameter of $7cm$.
Calculate the volume of the paperweight.

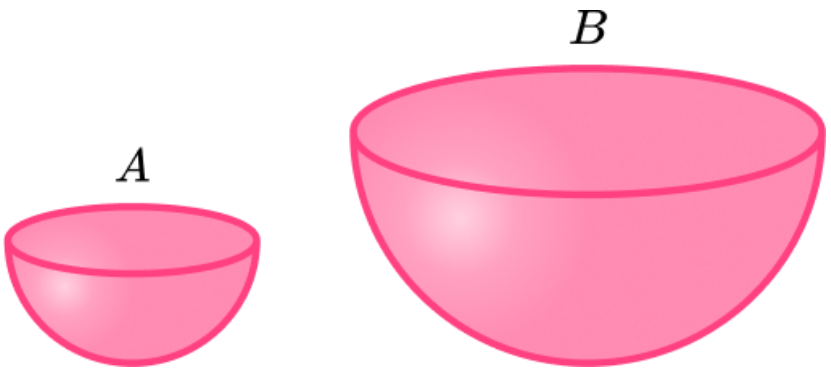
(b) The mass of the paperweight is $250g$.
Calculate its density.

2) The total surface area of a solid hemisphere is $675\pi\ cm^2$.
Find the volume of the hemisphere.

3) How many litres of milk can a hemispherical bowl of diameter $10cm$ hold?
($1000cm^3 = 1$ litre)

4) The total surface area of a solid hemisphere is $675\pi\ cm^2$.
Find the curved surface area of the hemisphere.

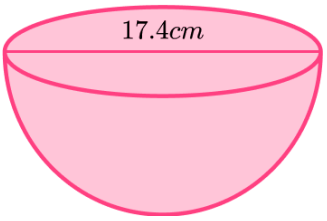
5) Hemisphere A has a radius of $8cm$.
Hemisphere B has a radius of $16cm$.



Calculate the ratio of the surface areas of hemisphere A to hemisphere B in the form $1:n$.

Volume and Surface Area of a Hemisphere - Exam Questions

1) The diagram shows a hemisphere with a diameter of $17.4cm$.



Work out the volume of the hemisphere.
Give your answer to 3significant figures.

..... cm^3

(3 marks)

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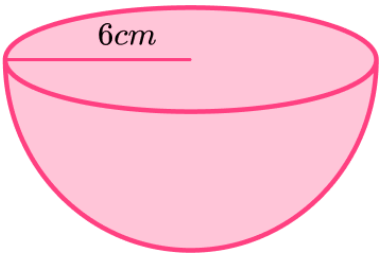
2) **(a)** Shown below is a hemisphere.



Calculate the curved surface area of the hemisphere.

..... cm^2

(2)

(b) Calculate the total surface area of the hemisphere.
Give your answer to 3significant figures.

..... cm^2

(2)

(4 marks)

Volume and Surface Area of a Hemisphere - Exam Questions

3) The volume of a hemisphere is $\frac{250}{3}\pi$.

Work out the exact total surface area of the solid hemisphere.
Give your answer as a multiple of π.

.....

(5 marks)

---

4) **(a)** Work out the volume of a hemisphere of radius $8cm$.

.....

(3)

(b) Three hemispheres of radius $8cm$ are packed tightly into a cuboid as shown.

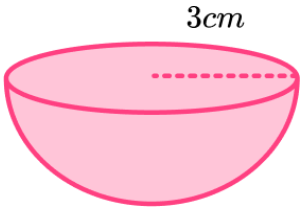
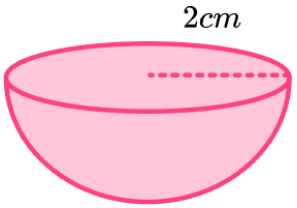
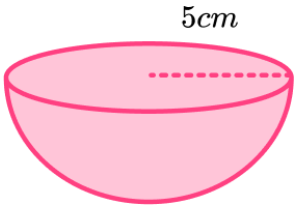
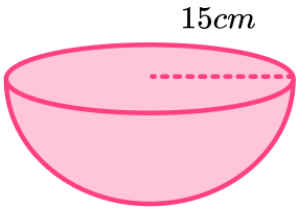
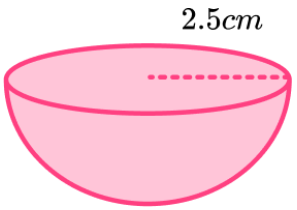
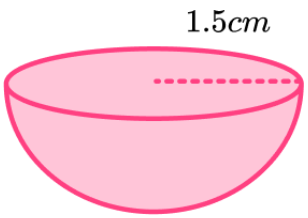
Work out the volume of the cuboid.

.....

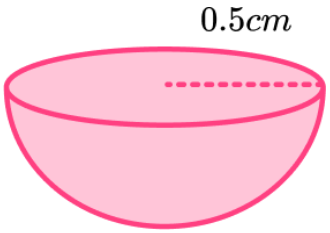
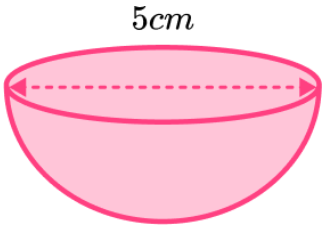
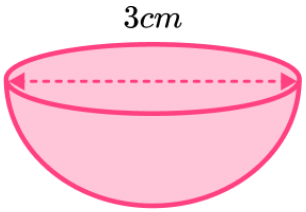
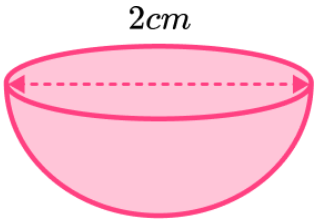
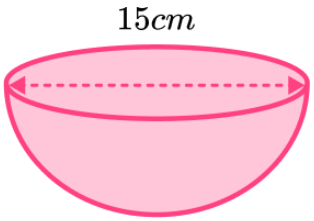
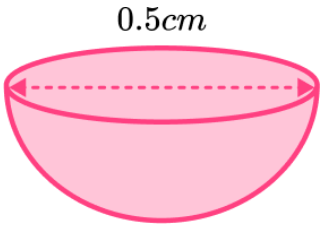
(4)

(7 marks)

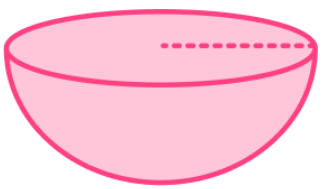
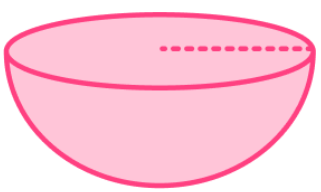
Volume and Surface Area of a Hemisphere - Answers

	Question	Answer
	Skill Questions	
Group A	Calculate the volume of the hemispheres below. Give your answer to 3 significant figures:	
	1) 	**1)** $56.5\ cm^3$
	2) 	**2)** $16.8\ cm^3$
	3) 	**3)** $262\ cm^3$
	4) 	**4)** $7070\ cm^3$
	5) 	**5)** $32.7\ cm^3$
	6) 	**6)** $7.07\ cm^3$

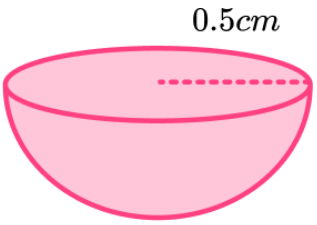
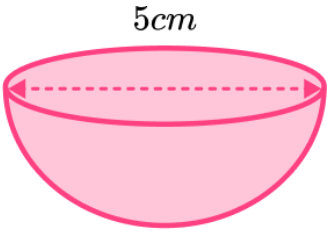
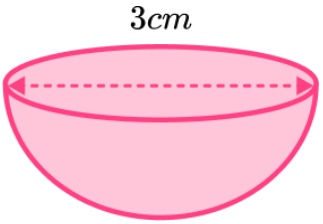
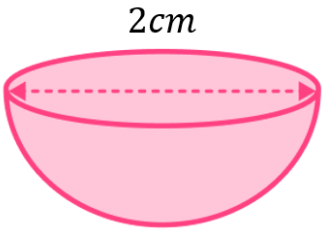
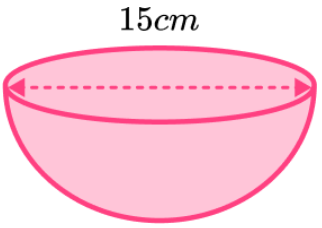
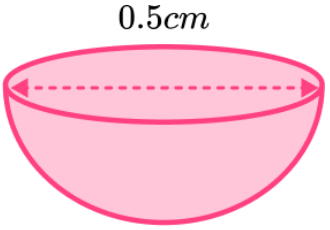
Volume and Surface Area of a Hemisphere - Answers

Group A contd	**7)** 	**7)** $0.262\ cm^3$
	8) 	**8)** $32.7\ cm^3$
	9) 	**9)** $7.07\ cm^3$
	10) 	**10)** $2.09\ cm^3$
	11) 	**11)** $884\ cm^3$
	12) 	**12)** $0.0327\ cm^3$

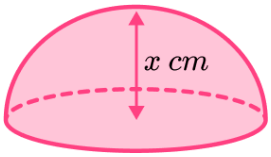
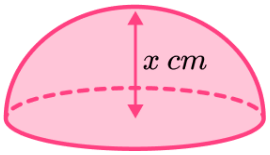
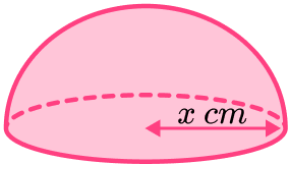
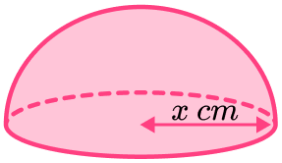
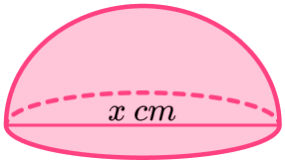
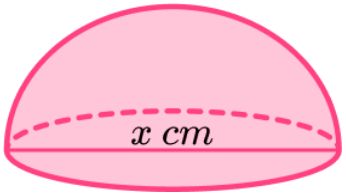
Volume and Surface Area of a Hemisphere - Answers

Group B	Calculate the total surface area of the hemisphere's below: **1)** $3cm$  **2)** $2cm$  **3)** $5cm$  **4)** $15cm$  **5)** $2.5cm$  **6)** $1.5cm$ 	**1)** $84.8\ cm^2$ **2)** $37.7\ cm^2$ **3)** $236\ cm^2$ **4)** $2120\ cm^2$ **5)** $58.9\ cm^2$ **6)** $21.2\ cm^2$

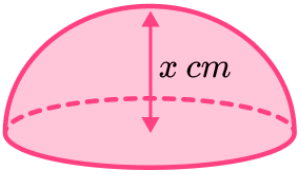
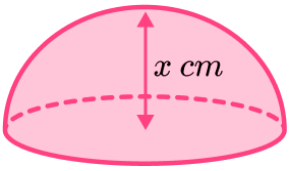
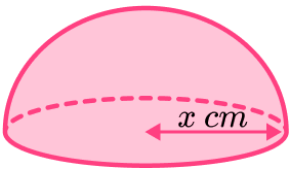
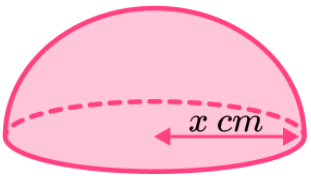
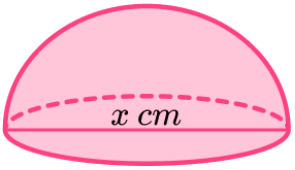
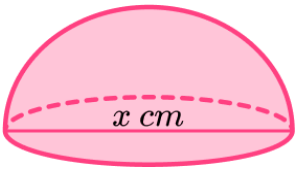
Volume and Surface Area of a Hemisphere - Answers

Group B contd	**7)** 	**7)** $2.36\ cm^2$
	8) 	**8)** $58.9\ cm^2$
	9) 	**9)** $21.2\ cm^2$
	10) 	**10)** $9.42\ cm^2$
	11) 	**11)** $530\ cm^2$
	12) 	**12)** $0.589\ cm^2$

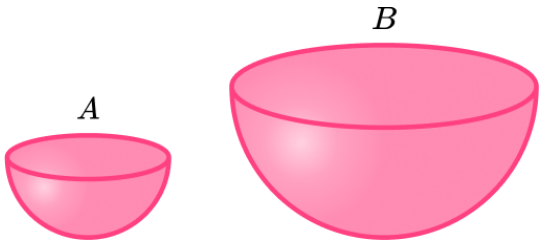
Volume and Surface Area of a Hemisphere - Answers

Group C	Find the radius or diameter given the volume or surface area: **1)** volume $= 2094.4cm^3$  **2)** volume $= 89.80cm^3$  **3)** volume $= 1526.81cm^3$  **4)** volume $= 12.21cm^3$  **5)** volume $= 134.04cm^3$  **6)** volume $= \frac{16}{3}\pi\ cm^3$  	**1)** $10cm$ **2)** $3.5cm$ **3)** $9cm$ **4)** $1.8cm$ **5)** $8cm$ **6)** $4cm$

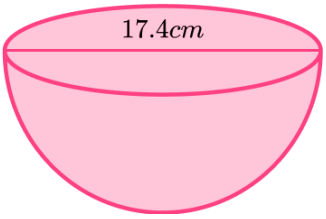
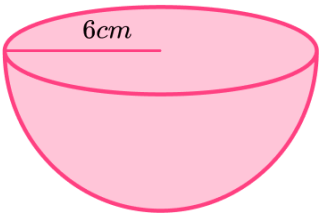
Volume and Surface Area of a Hemisphere - Answers

Group C contd	**7)** Surface area = $339.29cm^2$ 	**7)** $6cm$
	8) Surface area = $1357.17cm^2$ 	**8)** $12cm$
	9) Surface area = $84.82cm^2$ 	**9)** $3cm$
	10) Surface area = $12\pi\ cm^3$ 	**10)** $2cm$
	11) Surface area = $150.80cm^2$ 	**11)** $8cm$
	12) Surface area = $3769.91cm^2$ 	**12)** $40cm$

Volume and Surface Area of Hemispheres - Answers

	Question	Answer
	Applied Questions	
1)	A glass paperweight is in the shape of a hemisphere. The paperweight has a diameter of $7cm$. **a)** Calculate the volume of the paperweight. **b)** The mass of the paperweight is $250g$. Calculate its density.	**a)** $89.80\ cm^3$ **b)** $2.78g/cm^3$
2)	The total surface area of a solid hemisphere is $675\pi\ cm^2$. Find the volume of the hemisphere.	radius $=\ 15cm$ volume $=\ 7069\ cm^3$
3)	How many litres of milk can a hemispherical bowl of diameter $10cm$ hold? $(1000cm^3 = 1\ litre)$	0.262 litres
4)	The total surface area of a solid hemisphere is $675\pi\ cm^2$. Find the curved surface area of the hemisphere.	$450\pi\ cm^2$ or $1413.72\ cm^2$
5)	Hemisphere A has a radius of $8cm$. Hemisphere B has a radius of $16cm$.  Calculate the ratio of the surface areas of hemisphere A to hemisphere B in the form $1:n$.	$192\pi: 768\pi$ $192: 768$ $1: \frac{768}{192}$ $1: 4$ **or** Ratio of lengths $8: 16\ =\ 1: 2$ Ratio of areas $1^2: 2^2$ Ratio of areas $1: 4$

Volume and Surface Area of Hemispheres - Mark Scheme

	Question	Answer	
	Exam Questions		
1)	The diagram shows a hemisphere with a diameter of $17.4cm$.  Work out the volume of the hemisphere. Give your answer to 3 significant figures.	$\frac{4}{3} \times \pi \times 8.7^3 = 2758.33...$ $2758.33 \div 2 = 1379.165...$ $1380\ cm^3$	(1) (1) (1)
2) (a)	Shown below is a hemisphere.  Calculate the curved surface area of the hemisphere.	(a) $2 \times \pi \times 6^2$ $226.19cm^2$	(1) (1)
(b)	Calculate the total surface area of the hemisphere. Give your answer to 3 significant figures.	(b) $\pi \times 6^2 = 113.097...$ $229.19 + 113.097 = 339.29...$ $339\ cm^2$	(1) (1)
3)	The volume of a hemisphere is $\frac{250}{3}\pi$. Work out the exact total surface area of the solid hemisphere. Give your answer as a multiple of π.	$\frac{2}{3}\pi \times r^3 = \frac{250}{3}\pi$ $r^3 = 125$ $r = 5$ $3 \times \pi \times 5^2$ 75π	(1) (1) (1) (1) (1)

Volume and Surface Area of Hemispheres - Mark Scheme

4) (a)	Work out the volume of a hemisphere of radius $8cm$.	**(a)** $\frac{4}{3} \times \pi \times 8^3 = 2144.66...$ $2144.66 \div 2$ $1072.33\ cm^3$	**(1)** **(1)** **(1)**
(b)	Three hemispheres of radius $8cm$ are packed tightly into a cuboid as shown.  Work out the volume of the cuboid.	**(b)** $8 \times 2 = 16$ $16 \times 3 = 48$ $48 \times 16 \times 8$ $6144\ cm^3$	**(1)** **(1)** **(1)** **(1)**