



Lesmahagow High School
Mathematics Department

National 5

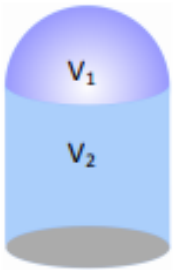
Volume

Corrective Actions

WORKSHEETS

<https://www.national5maths.co.uk/free-national-5-maths-2/>

Volumes	
Volume of a prism	$V = \text{Area of base} \times \text{height}$
Volume of a cylinder	$V = \pi r^2 h$
Volume of a cone	$V = \frac{1}{3} \pi r^2 h$
Volume of a sphere	$V = \frac{4}{3} \pi r^3$

Topic	Skills
Rearrange each of the formulae to find an unknown	<p>e.g. Cylinder has volume 400cm^3 and radius 6cm, find the height</p> $V = \pi r^2 h \qquad h = \frac{400}{\pi \times 6^2}$ $\frac{V}{\pi r^2} = h$
Volume of composite shapes	<p>These are two of the above combined: Label them V_1 and V_2</p> <p>e.g. </p> $V_1 = \frac{4}{3} \pi r^3 + 2$ $V_1 = \dots$ $V_2 = \pi r^2 h$ $V_2 = \dots$



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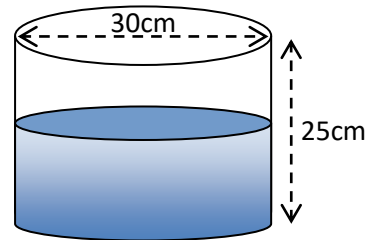
Volume

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VOLUME of a CYLINDER

2. A milk dispenser is cylindrical in shape with diameter 30cm.

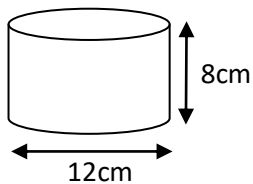
- (a) If 14 litres of milk are poured into it, calculate the depth of the milk in the cylinder.



- (b) The height of the cylinder is 25cm.

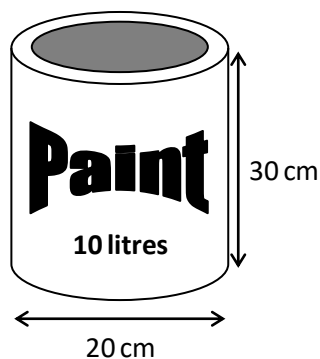
How many **more** litres of milk are needed to completely fill it?

3.



Calculate the volume of a cylinder with diameter 12cm and height 8cm.

4. This paint tin has diameter 20 cm and height 30 cm as shown in the diagram.

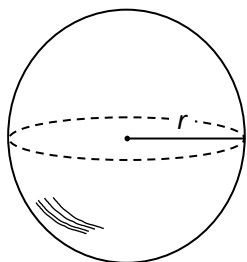


It is claimed that it can hold 10 litres of paint. Is this claim correct?

You must show all working and give a reason for your answer.

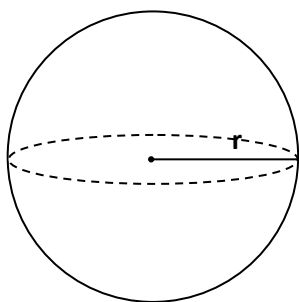
WORKING with the VOLUME of a SOLID SPHERE, CONE, PYRAMID

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) $d = 48\text{cm}$ |

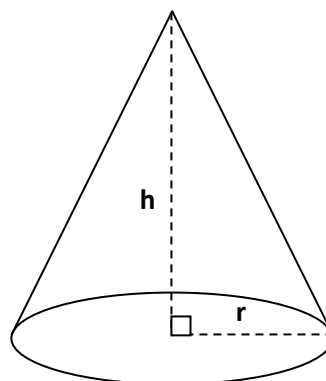
3. A sphere has a diameter of 8cm.

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) $r = 12\text{cm}$ | $h = 7\text{cm}$ |

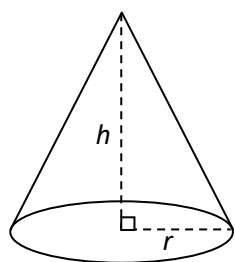


5. Find the volume of a cone for the following values of d and h .

(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.

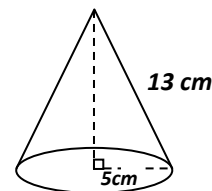


- (a) $r = 3\text{cm}$ and $h = 6\text{cm}$
(b) $r = 8\text{mm}$ and $h = 12\text{mm}$
(c) $r = 3\text{cm}$ and $h = 5\text{cm}$
(d) $r = 2\text{m}$ and $h = 6\text{m}$

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.



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Solutions

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WORKING with VOLUME of a CYLINDER

1. (a) 1696.5 cm^3 (b) 4825.5 cm^3 (c) 603.2 cm^3 (d) 2513.3 cm^3 (e) 75398.2 cm^3
(f) 3078.8 cm^3 (g) 28274.3 cm^3 (h) 13304.6 cm^3 (i) 760265 cm^3 (j) 7298.5 cm^3
2. (a) 19.8 cm (b) 3.7 litres 3. 904 cm^3
4. No; volume is 9.72 litres

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

1. (a) 904.3 cm^3 (b) 33.5 m^3 (c) 3052.1 mm^3 (d) 113.0 cm^3
2. (a) 4190 cm^3 (b) 65400 cm^3 (c) 4.19 m^3 (d) 33500000 mm^3
(e) 697 cm^3 (f) 3050 cm^3 (g) 2140000 mm^3 (h) 87100 cm^3
(i) 180 m^3 (j) 57900 cm^3
3. 268 cm^3
4. (a) 366 cm^3 (b) 1280 cm^3 (c) 207 cm^3 (d) 1060 cm^3
5. (a) 2369 cm^3 (b) 1170 cm^3 (c) 15800 cm^3 (d) 608 cm^3
6. (a) 56.5 cm^3 (b) 803.8 mm^3 (c) 47.1 cm^3 (d) 25.1 cm^3
7. 83.7 cm^3 8. 314 cm^3 9. 1020 cm^3 10. 37 cm^3
11. 640 mm^3