

GCSE Maths: Volume of cylinders, and density (Foundation): answers

GCSE Maths - Volume, Surface Area and 3D Shapes - Foundation - Lesson 19.6

Answers. Final answers to the worksheet questions. Full step-by-step solutions for every question are free at websink.site/gcse/maths/ch19-volume-surface-area-3d/foundation/volume-of-cylinders-and-density/

Exercise 19F Cylinders and density: exact answers (non-calculator)

Non-calculator

1 Work out the volume of each cylinder. Give your answers in terms of π .

- (a) radius 3 cm, height 10 cm

Answer: $90\pi \text{ cm}^3$

- (b) radius 5 cm, height 4 cm

Answer: $100\pi \text{ cm}^3$

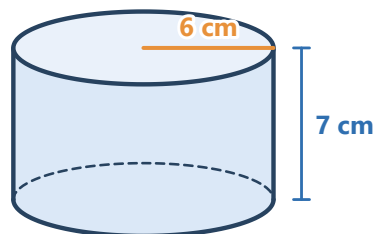
- (c) diameter 8 cm, height 5 cm

Answer: $80\pi \text{ cm}^3$

- (d) radius 1.5 cm, height 8 cm

Answer: $18\pi \text{ cm}^3$

2 The diagram shows a cylinder. Work out its volume. Leave your answer in terms of π .



Answer: $252\pi \text{ cm}^3$

3 Work out the height of each cylinder.

- (a) Radius 5 cm, volume $150\pi \text{ cm}^3$

Answer: 6 cm

- (b) Radius 6 cm, volume $252\pi \text{ cm}^3$

Answer: 7 cm

- (c) Radius 4 cm, volume $96\pi \text{ cm}^3$

Answer: 6 cm

4 A tin of tomatoes is a cylinder with radius 3.5 cm and height 10 cm. Use $\pi = 22 \div 7$ to work out the volume of the tin.

Answer: 385 cm^3

- 5 Cylinder A has radius 2 cm and height 9 cm. Cylinder B has radius 3 cm and height 4 cm. Show that the two cylinders have the same volume.

Answer: Both are $36\pi \text{ cm}^3$

- 6 A prism has a semicircle as its cross-section. The semicircle has radius 6 cm. The prism is 10 cm long. Work out the volume, in terms of π .

Answer: $180\pi \text{ cm}^3$

- 7 Work out each missing value.

- (a) A block has mass 450 g and volume 50 cm^3 . Find the density.

Answer: 9 g/cm^3

- (b) Aluminium has density 2.7 g/cm^3 . Find the mass of 200 cm^3 .

Answer: 540 g

- (c) A metal has density 8 g/cm^3 . A piece has mass 600 g. Find its volume.

Answer: 75 cm^3

- 8 A block of wood is a cuboid 10 cm by 5 cm by 4 cm. Its mass is 160 g. Work out the density of the wood.

Answer: 0.8 g/cm^3

- 9 The density of a type of oak is 750 kg/m^3 . A plank has volume 0.04 m^3 . Work out the mass of the plank.

Answer: 30 kg

- 10 A cylindrical water tank has radius 10 cm and height 20 cm. Show that its capacity is 2π litres.

Answer: $2000\pi \text{ cm}^3 = 2\pi$ litres

- 11 A cylinder contains water of volume $900\pi \text{ cm}^3$. The radius of the cylinder is 10 cm. Work out the depth of the water.

Answer: 9 cm

- 12 Ali works out the volume of a cylinder with diameter 10 cm and height 6 cm. He writes $V = \pi \times 10^2 \times 6 = 600\pi \text{ cm}^3$. What mistake has he made? Write the correct volume.

Answer: He used the diameter instead of the radius. Volume = $150\pi \text{ cm}^3$

- 13 A cylinder has radius r and height h . Write what happens to its volume when (a) the height is doubled, (b) the radius is doubled.

- (a) The height is doubled

Answer: The volume doubles

- (b) The radius is doubled

Answer: The volume is multiplied by 4

- 14 What is the area of a circle with radius 3 cm? Give your answer in terms of π .

Answer: $9\pi \text{ cm}^2$

- 15** A cylinder has a circular end with area $25\pi \text{ cm}^2$ and height 4 cm. Work out the volume in terms of π .

Answer: $100\pi \text{ cm}^3$

- 16** Write down the formula for density in terms of mass and volume.

Answer: density = mass $\div$ volume

Exercise 19G Cylinders and density (calculator) Calculator allowed

- 1** Work out the volume of each cylinder. Give your answers to 3 significant figures.

- (a) radius 4 cm, height 10 cm

Answer: 503 cm^3

- (b) radius 2.5 cm, height 7.2 cm

Answer: 141 cm^3

- (c) diameter 12 cm, height 15 cm

Answer: 1700 cm^3

- (d) radius 0.8 m, height 1.5 m

Answer: 3.02 m^3

- 2** Work out the volume of each cylinder. Give your answers correct to 1 decimal place.

- (a) radius 6.4 cm, height 3 cm

Answer: 386.0 cm^3

- (b) diameter 6.6 cm, height 11 cm

Answer: 376.3 cm^3

- 3** A can of drink is a cylinder with diameter 6.6 cm and height 11 cm. A label says the can holds 330 ml. Is the label correct? Show your working and give a reason.

Answer: Yes: the volume is about 376 cm^3 , so the can holds about 376 ml when full, which is more than 330 ml.

- 4** A water tank is a cylinder with radius 0.8 m and height 1.5 m. Work out the capacity of the tank in litres. Give your answer to the nearest litre.

Answer: 3016 litres

- 5** A metal pipe is a hollow cylinder 20 cm long. The outer radius is 5 cm and the inner radius is 4 cm. Work out the volume of metal in the pipe, to 3 significant figures.

Answer: 565 cm^3

- 6** Can A has radius 3 cm and height 10 cm. Can B has radius 4 cm and height 6 cm. Which can holds more, and by how much? Give the difference to 3 significant figures.

Answer: Can B, by 18.8 cm^3

- 7** An iron rod is a cylinder with radius 1.5 cm and length 40 cm. The density of iron is 7.8 g/cm^3 . Work out the mass of the rod in kilograms, to 3 significant figures.

Answer: 2.21 kg

- 8** A cylindrical jug has radius 8 cm. It holds 2 litres when full. Work out the height of the jug, to 3 significant figures.

Answer: 9.95 cm

- 9** A trough is a prism whose cross-section is a semicircle of radius 15 cm. The trough is 2 m long. How many litres of water does it hold when full? Give your answer to 3 significant figures.

Answer: 70.7 litres

- 10** A cylinder of radius 5 cm and height 10 cm fits exactly inside a cube of side 10 cm. What percentage of the volume of the cube is taken up by the cylinder? Give your answer to 3 significant figures.

Answer: 78.5%

- 11** A brass cylinder has radius 2 cm and height 5 cm. Its mass is 420 g. Work out the density of brass, to 1 decimal place.

Answer: 6.7 g/cm^3

- 12** Water flows through a cylindrical pipe of radius 2 cm. Work out the volume of water in a 5 m length of the pipe, in litres to 3 significant figures.

Answer: 6.28 litres