

GCSE Maths: Pyramids and cones (Higher): answers

GCSE Maths - Volume, Surface Area and 3D Shapes - Higher - Lesson 19.8

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/higher/pyramids-and-cones/

Exercise 19J Pyramids and cones Non-calculator

1 Work out the volume of each pyramid.

- (a) square base of side 6 cm, vertical height 4 cm

Answer: 48 cm^3

- (b) rectangular base 8 cm by 5 cm, vertical height 9 cm

Answer: 120 cm^3

- (c) square base of side 10 cm, vertical height 12 cm

Answer: 400 cm^3

- (d) rectangular base 9 cm by 4 cm, vertical height 5 cm

Answer: 60 cm^3

2 Work out the total surface area of each square-based pyramid.

- (a) base side 6 cm, vertical height 4 cm

Answer: 96 cm^2

- (b) base side 10 cm, vertical height 12 cm

Answer: 360 cm^2

- (c) base side 16 cm, vertical height 15 cm

Answer: 800 cm^2

- (d) base side 8 cm, slant height 5 cm

Answer: 144 cm^2

3 Work out the volume of each cone. Give your answers in terms of π .

- (a) radius 3 cm, vertical height 4 cm

Answer: $12\pi \text{ cm}^3$

- (b) radius 6 cm, vertical height 5 cm

Answer: $60\pi \text{ cm}^3$

- (c) radius 5 cm, slant height 13 cm

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

- (d) diameter 10 cm, vertical height 12 cm

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

4 Work out the curved surface area of each cone. Give your answers in terms of π .

- (a) radius 3 cm, vertical height 4 cm

Answer: $15\pi \text{ cm}^2$

- (b) radius 5 cm, vertical height 12 cm

Answer: $65\pi \text{ cm}^2$

- (c) radius 8 cm, slant height 17 cm

Answer: $136\pi \text{ cm}^2$

5 Work out the total surface area of each cone. Give your answers in terms of π .

- (a) radius 5 cm, slant height 13 cm

Answer: $90\pi \text{ cm}^2$

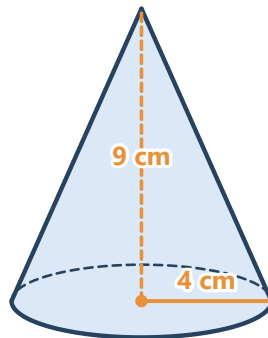
- (b) radius 3 cm, vertical height 4 cm

Answer: $24\pi \text{ cm}^2$

- (c) radius 6 cm, slant height 10 cm

Answer: $96\pi \text{ cm}^2$

6 A paper cup is a cone with radius 4 cm and vertical height 9 cm. Work out how much water it holds when full. Give your answer to 3 significant figures.



Answer: 151 cm^3

7 Work out the volume of each cone, to 3 significant figures.

- (a) radius 2.5 cm, vertical height 6 cm

Answer: 39.3 cm^3

- (b) radius 7 cm, slant height 25 cm

Answer: 1230 cm^3

8 Work out the vertical height of each solid.

- (a) A square-based pyramid has volume 96 cm^3 and base side 6 cm.

Answer: 8 cm

- (b) A pyramid has a rectangular base 5 cm by 8 cm and volume 200 cm^3 .

Answer: 15 cm

- (c) A cone has radius 4 cm and volume $144\pi \text{ cm}^3$.

Answer: 27 cm

- (d) A cone has radius 5 cm and volume $100\pi \text{ cm}^3$.

Answer: 12 cm

9 A cone has curved surface area $65\pi \text{ cm}^2$ and slant height 13 cm. Work out the radius of the base.

Answer: 5 cm

10 The Great Pyramid in Egypt has a square base of side about 230 m and a vertical height of about 146 m. Work out its volume to 3 significant figures.

Answer: $2,570,000 \text{ m}^3$

11 A tent is shaped like a cone with radius 2 m and vertical height 3 m. Work out the area of canvas needed for the curved surface, to 3 significant figures.

Answer: 22.7 m^2

12 A pyramid has a square base of side 6 cm and vertical height 4 cm. Show that its volume is one third of the volume of the cuboid with the same base and height.

Answer: 48 cm^3 and 144 cm^3 : $48 = 144 \div 3$

13 A cone and a cylinder have the same radius r and the same vertical height h . Show that the volume of the cone is one third of the volume of the cylinder.

Answer: cone = $\frac{1}{3}\pi r^2 h$, cylinder = $\pi r^2 h$

14 Sam calculates the curved surface area of a cone with radius 5 cm and vertical height 12 cm. He writes $\pi \times 5 \times 12 = 60\pi \text{ cm}^2$. What mistake has he made? What is the correct answer?

Answer: He used the vertical height instead of the slant height. Correct: $65\pi \text{ cm}^2$

15 A cone has radius 6 cm and curved surface area $60\pi \text{ cm}^2$. Work out its volume, in terms of π .

Answer: $96\pi \text{ cm}^3$

16 A solid cone has radius 6 cm and slant height 10 cm. Work out the ratio of its curved surface area to the area of its circular base, in its simplest form.

Answer: 5 : 3