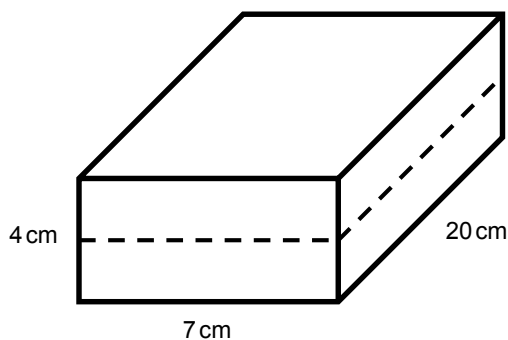


Topic Check In - 10.04 Volume and surface area calculations

1. Calculate the volume of a cuboid which has sides 4 cm, 6 cm and 10 cm.
2. Calculate the surface area of a cuboid which has sides 4 cm, 6 cm and 10 cm.
3. Calculate the volume of a cylinder of height 12 cm and radius 6 cm.
4. Calculate the surface area of a cylinder of radius 3 cm and height 5 cm.
5. The volume of a cube is 64 cm^3 . What is the length of the sides of the cube?
6. A small cube has sides of length 2 cm and surface area 24 cm^2 . 8 small cubes are put together to make a larger cube with 4 cm sides. How many times larger is the surface area of the new cube? Explain your answer.
7. William has a cylinder of height 14 cm and diameter 6 cm. He calculates the curved surface area as $2 \times \pi \times 6 \times 14$. Explain what he has done wrong.
8. A cuboid has length 20 cm, width 7 cm and height 4 cm. It is cut in half horizontally as shown on the diagram below. What is the difference between the surface area of the original shape, and the total surface area of the two pieces?



9. Sam has a watering can holding 5 litres of water. He needs to fill some cylindrical jars with a base of 81 cm^2 to a depth of 6 cm. How many pots can he completely fill?
10. A cylinder has a cross-section with radius 3 cm and surface area 435 cm^2 . Calculate the length of the cylinder.

Extension

Find the volume and surface area of some cubes. Is it possible for a cube to have the same numerical value for surface area and volume?



GCSE (9–1) MATHEMATICS

Answers

1. 240 cm^3
2. 248 cm^2
3. 1357.2 cm^2 [1360 cm^2 (3sf)]
4. 150.8 cm^2
5. 4 cm
6. Scale factor of enlarged cube is 2 therefore surface area of enlarged cube is 4 (2^2) times the original.
7. Used the diameter not the radius (Circumference = $2\pi r$) or incorrectly multiplied by 2 (Circumference = πd).
8. The difference in total surface area is the same as the area of the two new faces created by the cut which is $2 \times 7 \times 20 = 280 \text{ cm}^2$.
9. 10
10. 20.1 cm

Extension

A cube of 6 cm has surface area 216 cm^2 and volume 216 cm^3



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| Assessment Objective | Qu. | Topic | R | A | G |
|----------------------|-----|--|---|---|---|
| AO1 | 1 | Calculate volume of cuboid. | | | |
| AO1 | 2 | Calculate surface area of cuboid. | | | |
| AO1 | 3 | Calculate volume of cylinder. | | | |
| AO1 | 4 | Calculate surface area of cylinder. | | | |
| AO1 | 5 | Find length given volume of cube. | | | |
| AO2 | 6 | Surface area of cube calculation. | | | |
| AO2 | 7 | Explain calculation for curved surface area of a cylinder. | | | |
| AO2 | 8 | Calculate surface area of cuboids. | | | |
| AO3 | 9 | Calculate volume of cylinder to solve word problem. | | | |
| AO3 | 10 | Find length given surface area of cylinder. | | | |

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