3d Shapes

KS3 Maths · Follows the national curriculum

Name _____ Class _____ Date _____

1. Worked example

Find the surface area of a cuboid 4cm × 3cm × 2cm.

Step 1 · Find the area of each pair of faces

Top/bottom: 4×3=12. Front/back: 4×2=8. Sides: 3×2=6

Step 2 · Apply the formula

SA = 2(12+8+6) = 2×26

Step 3 · Calculate

= 52cm²

Answer: 52cm²

Check: 6 faces total: 2×12+2×8+2×6 = 24+16+12 = 52 ✓

2. Now try one with the steps

Find the volume of a triangular prism 12 cm long whose triangular end has base 8 cm and height 5 cm.

Step 1 · Area of the cross-section (the triangle)

Step 2 · Volume = cross-section area × length

Answer:

3. Practice

Show your working. The marks tell you how much is expected.

1. Find the volume of a cuboid measuring 5cm × 4cm × 3cm. [2]

2. Find the volume of a cube with side length 6cm. [2]

3. Find the volume of a cylinder with radius 4cm and height 10cm. (Use π = 3.14) [3]

4. Find the surface area of a cube with side length 5cm. [2]

5. A triangular prism has a triangular cross-section with area 12cm^2 and length 8cm. Find its volume. [3]

6. A cuboid has volume 120cm^3. Its length is 6cm and width is 5cm. Find its height. [3]

7. Find the volume of a cuboid measuring 10 cm × 2 cm × 3 cm. [1]

8. How many faces, edges and vertices does a cuboid have? [2]

9. How many 1 cm cubes fit exactly into a box measuring 5 cm × 4 cm × 3 cm? [1]

10. A cube has a volume of 64 cm^3. How long is each edge? [1]

11. A triangular prism is 10 cm long. Its triangular end has base 6 cm and height 4 cm. Find its volume. [2]

12. A prism has a cross-section of area 18 cm^2 and a volume of 270 cm^3. How long is it? [2]

13. Find the surface area of a cuboid measuring 6 cm × 4 cm × 2 cm. [3]

14. Find the volume of a cylinder with radius 3 cm and height 5 cm. Use the π button and give your answer to 1 decimal place. [2]

15. A fish tank measures 50 cm × 30 cm × 40 cm. How many litres of water does it hold when full? (1 litre = 1,000 cm^3) [3]

16. A cylinder has a volume of 500 cm^3 and a radius of 5 cm. Find its height to 1 decimal place. [3]

4. Before you hand it in

Using a 2D area formula (like length×width) for volume of a 3D shape

Volume always involves THREE dimensions multiplied together (or area × length for prisms). Area is for flat 2D shapes only — volume needs an extra dimension.

Forgetting to multiply the cross-sectional area by the length for a prism

For prisms: Volume = (area of the 2D cross-section) × (length). Find the cross-section area FIRST using the appropriate 2D formula, THEN multiply by length.

Thinking 1 m^3 = 100 cm^3

1 m = 100 cm, so 1 m^3 = 100 cm × 100 cm × 100 cm = 1,000,000 cm^3. For areas, 1 m^2 = 10,000 cm^2.