Surface Area & Volume of 3-D Objects (Grade 9)

MEMORANDUM

Name: ..... Class: .....

Date: .....

MARK ____ / 31

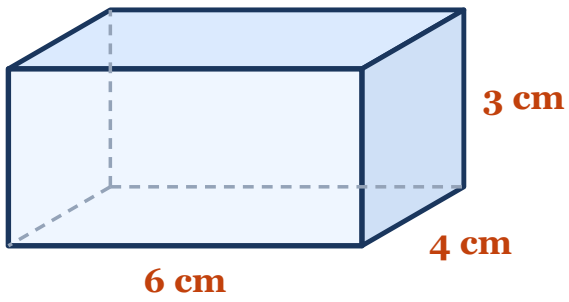
Answer all questions. Show all your working — marks are awarded for method as well as the final answer. **Teacher copy: accept any correct equivalent method.**

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1 A cube has a volume of 512 cm^3. Determine the length of one edge, and hence the total surface area of the cube. **(4)**

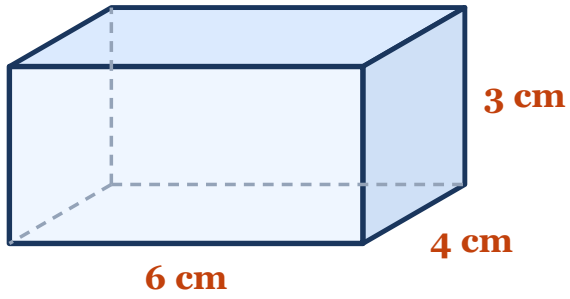
> edge $= \sqrt[3]{512} =$ **8 cm** *(2)*
> A cube has 6 square faces, so SA $= 6 \times 8^2$ *(1)*
> $=$ **384 cm^2** *(1)* ✓✓✓✓ (4)

2 Volume of a box 6 cm × 4 cm × 3 cm. **(2)**



> **72 cm^3** ✓✓ (2)

3 Surface area of a box 6 cm $\times$ 4 cm $\times$ 3 cm. (3)

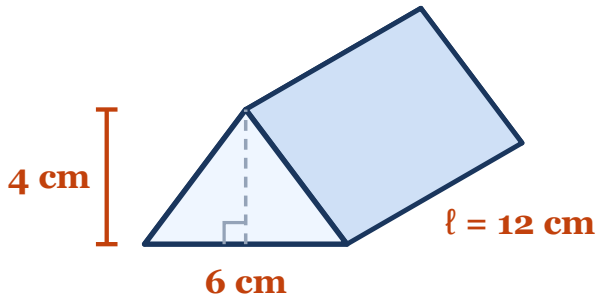


> $2(24 + 18 + 12) = \mathbf{108\ cm^2}$ ✓✓✓ (3)

4 Volume of a cube with side 5 cm. (1)

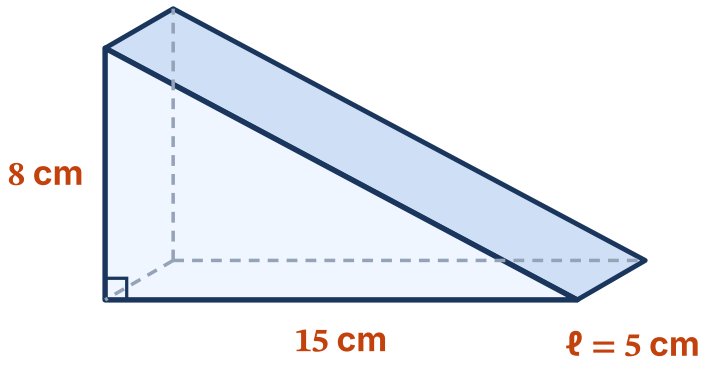
> $5^3 = \mathbf{125\ cm^3}$ ✓ (1)

5 Triangular prism: base 6, height 4, length 12 cm. Find the volume. (3)



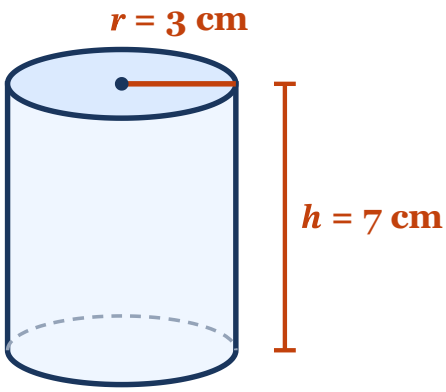
> $\frac{1}{2}(6)(4) = 12$; $12 \times 12 = \mathbf{144\ cm^3}$ ✓✓✓ (3)

6 The diagram below shows a triangular prism whose cross-section is a right-angled triangle with sides of 15 cm and 8 cm. The prism is 5 cm long. Calculate the length of the third side of the triangle, and then the total surface area of the prism. **(5)**



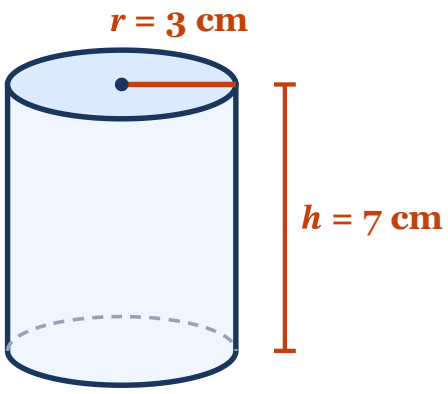
Third side $= \sqrt{15^2 + 8^2} = \sqrt{289} =$ **17 cm** *(2)*
Two ends $= 2 \times ½ \times 15 \times 8 = 120$ cm^2 *(1)*
Three rectangles $= (15 + 8 + 17) \times 5 = 200$ cm^2 *(1)*
SA $= 120 + 200 =$ **320 cm^2** *(1)* ✓✓✓✓✓ **(5)**

7 Cylinder radius 3 cm, height 7 cm. Find the volume ($\pi \approx 3{,}14$). **(3)**



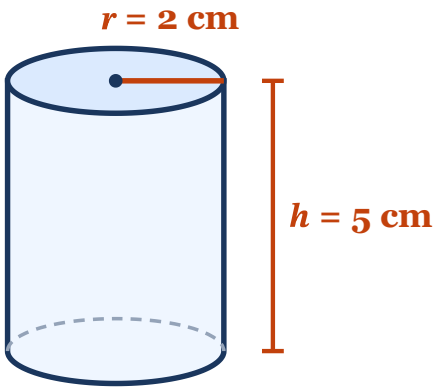
$3{,}14 \times 9 \times 7 =$ **197,82 cm^3** ✓✓✓ **(3)**

8 Cylinder radius 3 cm, height 7 cm. Find the surface area ($\pi \approx 3{,}14$). **(3)**



$2(3{,}14)(9) + 2(3{,}14)(3)(7) = 56{,}52 + 131{,}88 = \mathbf{188{,}4\ cm^2}$ ✓✓✓ (3)

9 Cylinder radius 2 cm, height 5 cm. Find the volume ($\pi \approx 3{,}14$). **(2)**

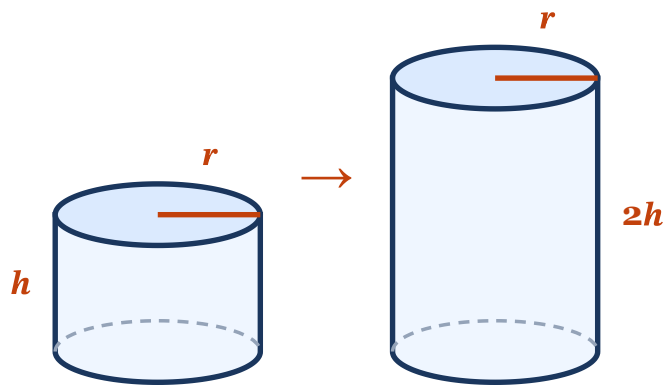


$3{,}14 \times 4 \times 5 = \mathbf{62{,}8\ cm^3}$ ✓✓ (2)

10 How many $m\ell$ does a container of 250 cm^3 hold? **(1)**

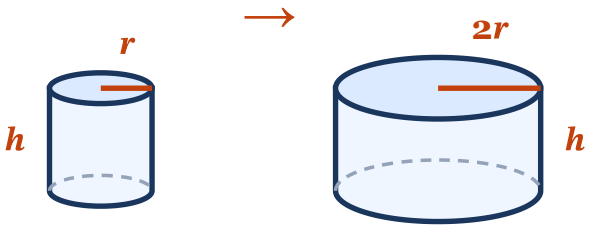
250 mℓ (1 cm^3 = 1 mℓ) ✓ (1)

11 A cylinder's height is doubled. What happens to its volume? (2)



It **doubles** (height is not squared). ✓✓ (2)

12 A cylinder's radius is doubled. What happens to its volume? (2)



It becomes **4 times** bigger (r is squared). ✓✓ (2)

TOTAL: 31 marks

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