Volume and Surface Area: exam questions

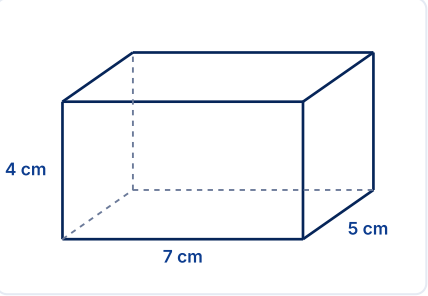
10 questions · 30 marks · mark schemes at the end

Name _____ Date _____ Score / 30

- Calculators are allowed on both 4MA1 Higher papers (1H and 2H). Show your working: most marks are for method.
- Mark schemes start after the questions. M marks are for a correct method, A marks for an accurate answer that follows a correct method, and B marks for a correct result on its own.
- Online, with more practice: igcsemathrevision.com/igcse-frontend/4ma1/exam-questions/volume-and-surface-area

1. **3 marks**

A cuboid measures 4 cm by 5 cm by 7 cm.



(a) Work out its volume. **(1)**

(b) Work out its total surface area. **(2)**

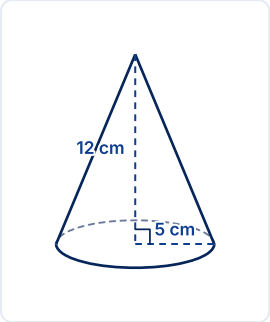
2. **2 marks**

A cylinder has radius 3 cm and height 10 cm.

Work out its volume.

3. **4 marks**

A solid cone has base radius 5 cm and vertical height 12 cm.



(a) Work out its volume. **(2)**

(b) Work out its curved surface area. **(2)**

4. **4 marks**

A sphere has radius 4.5 cm.

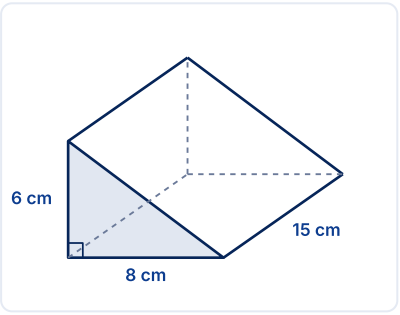
(a) Work out its volume. **(2)**

(b) Work out its surface area. **(2)**

5. **2 marks**

A prism is 15 cm long. Its cross-section is a right-angled triangle with shorter sides 6 cm and 8 cm.

Work out the volume of the prism.



6. **3 marks**

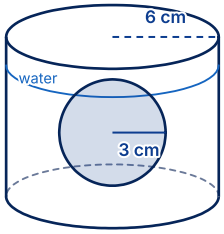
A solid hemisphere has a volume of 2000 cm^3.

Work out its radius.

7. **3 marks**

A cylinder of radius 6 cm contains water. A metal sphere of radius 3 cm is placed in the water and is completely covered.

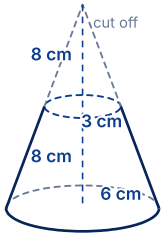
Work out how much the water level rises.



8. **4 marks**

A cone has base radius 6 cm and height 16 cm. A small cone of radius 3 cm and height 8 cm is cut off the top, leaving a frustum.

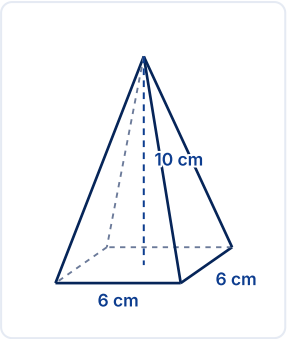
Work out the volume of the frustum.



9. **2 marks**

A pyramid has a square base of side 6 cm and a vertical height of 10 cm.

Work out the volume of the pyramid.



10. **3 marks**

A metal cuboid measuring 10 cm by 8 cm by 6 cm is melted down and made into a sphere.

Work out the radius of the sphere.

Answers and worked solutions

Question 1 — 3 marks

(a)

B1 $140\,\text{cm}^3$

(b)

M1 $2(4\times5+4\times7+5\times7)$

A1 $166\,\text{cm}^2$

Answer: (a) $140\,\text{cm}^3$; (b) $166\,\text{cm}^2$

Question 2 — 2 marks

M1 $\pi\times3^2\times10$

A1 $283\,\text{cm}^3$

Answer: $283\,\text{cm}^3$

Question 3 — 4 marks

(a)

M1 $\frac{1}{3}\times\pi\times5^2\times12$

A1 $314\,\text{cm}^3$

(b)

M1 slant height $\sqrt{5^2+12^2}=13$

A1 $\pi\times5\times13=204\,\text{cm}^2$

Answer: (a) $314\,\text{cm}^3$; (b) $204\,\text{cm}^2$

Question 4 — 4 marks

(a)

M1 $\frac{4}{3}\times\pi\times4.5^3$

A1 $382\,\text{cm}^3$

(b)

M1 $4\times\pi\times4.5^2$

A1 $254\,\text{cm}^2$

Answer: (a) $382\,\text{cm}^3$; (b) $254\,\text{cm}^2$

Question 5 — 2 marks

M1 $\frac{1}{2}\times6\times8\times15$

A1 $360\,\text{cm}^3$

Answer: $360\,\text{cm}^3$

Question 6 — 3 marks

M1 $\frac{2}{3}\pi r^3=2000$

M1 $r^3=\dfrac{3000}{\pi}$

A1 9.85 cm

Answer: 9.85 cm

Question 7 — 3 marks

M1 volume of sphere $\frac{4}{3}\pi\times27=36\pi$

M1 $\pi\times6^2\times h=36\pi$

A1 1 cm

Answer: 1 cm

Question 8 — 4 marks

M1 large cone $\frac{1}{3}\pi\times36\times16=192\pi$

M1 small cone $\frac{1}{3}\pi\times9\times8=24\pi$

M1 $192\pi-24\pi=168\pi$

A1 $528\,\text{cm}^3$

Answer: $528\,\text{cm}^3$

Question 9 — 2 marks

M1 $\frac{1}{3}\times36\times10$

A1 $120\,\text{cm}^3$

Answer: $120\,\text{cm}^3$

Question 10 — 3 marks

M1 volume $480\,\text{cm}^3$

M1 $\frac{4}{3}\pi r^3=480$

A1 4.86 cm

Answer: 4.86 cm

Online, with every solution: igcsemathrevision.com/igcse-frontend/4ma1/exam-questions/volume-and-surface-area
Our own original questions, written and checked by IGCSE Math Revision. Independent, not affiliated with Pearson Edexcel.