



ACHIEVE ACADEMY

GCSE Maths — Foundation Tier

Volume & Surface Area · Practice Booklet

NAME: _____

CLASS: _____

DATE: _____

☐ Developing

☒ Secure

☐ Greater Depth

Answer every question in the working space provided. Method marks are available for correct working even if the final answer is wrong. Check the time allowed with your tutor before you start.

Volume & Surface Area

Total marks available: 90

● Volume & Surface Area

✓104m²

Q1 · ● Developing · 3 marks

METHOD

$$\text{Surface area} = 2(lw + lh + wh)$$

$$\text{Surface area} = 2 \times ((5 \times 6) + (5 \times 2) + (6 \times 2))$$

$$\text{Surface area} = 2 \times (30 + 10 + 12) = 104\text{m}^2$$

✓210cm²

Q2 · ● Developing · 3 marks

METHOD

$$\text{Surface area} = 2(lw + lh + wh)$$

$$\text{Surface area} = 2 \times ((8 \times 5) + (8 \times 5) + (5 \times 5))$$

$$\text{Surface area} = 2 \times (40 + 40 + 25) = 210\text{cm}^2$$

✓184m²

Q3 · ● Developing · 3 marks

METHOD

$$\text{Surface area} = 2(lw + lh + wh)$$

$$\text{Surface area} = 2 \times ((8 \times 4) + (8 \times 5) + (4 \times 5))$$

$$\text{Surface area} = 2 \times (32 + 40 + 20) = 184\text{m}^2$$

✓108m²

Q4 · ● Developing · 3 marks

METHOD

$$\text{Surface area} = 2(lw + lh + wh)$$

$$\text{Surface area} = 2 \times ((3 \times 6) + (3 \times 4) + (6 \times 4))$$

$$\text{Surface area} = 2 \times (18 + 12 + 24) = 108\text{m}^2$$

✓160cm³

Q5 · ● Developing · 2 marks

METHOD

Volume = length × width × height

$$\text{Volume} = 8 \times 5 \times 4 = 160\text{cm}^3$$

✓102m²

Q6 · ● Developing · 3 marks

METHOD

Surface area = 2(lw + lh + wh)

$$\text{Surface area} = 2 \times ((7 \times 3) + (7 \times 3) + (3 \times 3))$$

$$\text{Surface area} = 2 \times (21 + 21 + 9) = 102\text{m}^2$$

✓160cm³

Q7 · ● Developing · 2 marks

METHOD

Volume = length × width × height

$$\text{Volume} = 8 \times 4 \times 5 = 160\text{cm}^3$$

✓180m²

Q8 · ● Developing · 3 marks

METHOD

Surface area = 2(lw + lh + wh)

$$\text{Surface area} = 2 \times ((8 \times 6) + (8 \times 3) + (6 \times 3))$$

$$\text{Surface area} = 2 \times (48 + 24 + 18) = 180\text{m}^2$$

✓48m³

Q9 · ● Developing · 2 marks

METHOD

Volume = length × width × height

$$\text{Volume} = 3 \times 4 \times 4 = 48\text{m}^3$$

✓ 60cm^3

Q10 · ● Developing · 2 marks

METHOD

Volume = length $\times$ width $\times$ height

Volume = $10 \times 3 \times 2 = 60\text{cm}^3$

✓ 336cm^3

Q11 · ● Secure · 3 marks

METHOD

Cross-sectional area = $\frac{1}{2} \times \text{base} \times \text{height} = \frac{1}{2} \times 12 \times 7 = 42\text{cm}^2$

Volume = cross-sectional area $\times$ length = $42 \times 8 = 336\text{cm}^3$

✓ 270cm^3

Q12 · ● Secure · 3 marks

METHOD

Cross-sectional area = $\frac{1}{2} \times \text{base} \times \text{height} = \frac{1}{2} \times 12 \times 9 = 54\text{cm}^2$

Volume = cross-sectional area $\times$ length = $54 \times 5 = 270\text{cm}^3$

✓ 100cm^3

Q13 · ● Secure · 3 marks

METHOD

Cross-sectional area = $\frac{1}{2} \times \text{base} \times \text{height} = \frac{1}{2} \times 8 \times 5 = 20\text{cm}^2$

Volume = cross-sectional area $\times$ length = $20 \times 5 = 100\text{cm}^3$

✓ 108m^3

Q14 · ● Secure · 3 marks

METHOD

Cross-sectional area = $\frac{1}{2} \times \text{base} \times \text{height} = \frac{1}{2} \times 4 \times 6 = 12\text{m}^2$

Volume = cross-sectional area $\times$ length = $12 \times 9 = 108\text{m}^3$

✓60cm³

Q15 · ● Secure · 3 marks

METHOD

$$\text{Cross-sectional area} = \frac{1}{2} \times \text{base} \times \text{height} = \frac{1}{2} \times 4 \times 3 = 6\text{cm}^2$$

$$\text{Volume} = \text{cross-sectional area} \times \text{length} = 6 \times 10 = 60\text{cm}^3$$

✓126m³

Q16 · ● Secure · 3 marks

METHOD

$$\text{Cross-sectional area} = \frac{1}{2} \times \text{base} \times \text{height} = \frac{1}{2} \times 4 \times 9 = 18\text{m}^2$$

$$\text{Volume} = \text{cross-sectional area} \times \text{length} = 18 \times 7 = 126\text{m}^3$$

✓72cm³

Q17 · ● Secure · 3 marks

METHOD

$$\text{Cross-sectional area} = \frac{1}{2} \times \text{base} \times \text{height} = \frac{1}{2} \times 6 \times 3 = 9\text{cm}^2$$

$$\text{Volume} = \text{cross-sectional area} \times \text{length} = 9 \times 8 = 72\text{cm}^3$$

✓7602.7cm³

Q18 · ● Secure · 3 marks

METHOD

$$\text{Volume} = \pi r^2 h$$

$$\text{Volume} = \pi \times 11^2 \times 20 = \pi \times 121 \times 20 = 7602.7\text{cm}^3$$

✓600cm³

Q19 · ● Secure · 3 marks

METHOD

$$\text{Cross-sectional area} = \frac{1}{2} \times \text{base} \times \text{height} = \frac{1}{2} \times 12 \times 10 = 60\text{cm}^2$$

$$\text{Volume} = \text{cross-sectional area} \times \text{length} = 60 \times 10 = 600\text{cm}^3$$

✓3053.6cm³

Q20 · ● Secure · 3 marks

METHOD

$$\text{Volume} = \pi r^2 h$$

$$\text{Volume} = \pi \times 9^2 \times 12 = \pi \times 81 \times 12 = 3053.6\text{cm}^3$$

✓10m

Q21 · ● Greater Depth · 3 marks

METHOD

$$\text{Height} = \text{Volume} \div (\text{length} \times \text{width})$$

$$\text{Height} = 500 \div (10 \times 5) = 500 \div 50 = 10\text{m}$$

✓490.1m²

Q22 · ● Greater Depth · 4 marks

METHOD

$$\text{Surface area} = 2\pi rh + 2\pi r^2$$

$$\text{Surface area} = (2 \times \pi \times 6 \times 7) + (2 \times \pi \times 6^2)$$

$$\text{Surface area} = 263.9 + 226.2 = 490.1\text{m}^2$$

✓7cm

Q23 · ● Greater Depth · 3 marks

METHOD

$$\text{Height} = \text{Volume} \div (\text{length} \times \text{width})$$

$$\text{Height} = 140 \div (4 \times 5) = 140 \div 20 = 7\text{cm}$$

✓6m

Q24 · ● Greater Depth · 3 marks

METHOD

$$\text{Height} = \text{Volume} \div (\text{length} \times \text{width})$$

$$\text{Height} = 324 \div (6 \times 9) = 324 \div 54 = 6\text{m}$$

✓7m

Q25 · ● Greater Depth · 3 marks

METHOD

$$\text{Height} = \text{Volume} \div (\text{length} \times \text{width})$$

$$\text{Height} = 637 \div (13 \times 7) = 637 \div 91 = 7\text{m}$$

✓9cm

Q26 · ● Greater Depth · 3 marks

METHOD

$$\text{Height} = \text{Volume} \div (\text{length} \times \text{width})$$

$$\text{Height} = 810 \div (10 \times 9) = 810 \div 90 = 9\text{cm}$$

✓1470.3m²

Q27 · ● Greater Depth · 4 marks

METHOD

$$\text{Surface area} = 2\pi rh + 2\pi r^2$$

$$\text{Surface area} = (2 \times \pi \times 9 \times 17) + (2 \times \pi \times 9^2)$$

$$\text{Surface area} = 961.3 + 508.9 = 1470.3\text{m}^2$$

✓9m

Q28 · ● Greater Depth · 3 marks

METHOD

$$\text{Height} = \text{Volume} \div (\text{length} \times \text{width})$$

$$\text{Height} = 630 \div (10 \times 7) = 630 \div 70 = 9\text{m}$$

✓377.0cm²

Q29 · ● Greater Depth · 4 marks

METHOD

$$\text{Surface area} = 2\pi rh + 2\pi r^2$$

$$\text{Surface area} = (2 \times \pi \times 5 \times 7) + (2 \times \pi \times 5^2)$$

$$\text{Surface area} = 219.9 + 157.1 = 377.0\text{cm}^2$$

✓1696.5m²

Q30 · ● Greater Depth · 4 marks

METHOD

$$\text{Surface area} = 2\pi rh + 2\pi r^2$$

$$\text{Surface area} = (2 \times \pi \times 10 \times 17) + (2 \times \pi \times 10^2)$$

$$\text{Surface area} = 1068.1 + 628.3 = 1696.5\text{m}^2$$