

Solutions

Marking: **M1** a correct method, **A1** the correct answer.

Each answer shows the steps, then the **result**.

2.1

- $4 \times 3 = \mathbf{12}$ cm

2.2

- $2^2 : 5^2 = \mathbf{4 : 25}$

2.3

- $1^3 : 2^3 = \mathbf{1 : 8}$

3.1

- area ratio $= 3^2 : 4^2 = 9 : 16$

$$18 \times \frac{16}{9} = \mathbf{32} \text{ cm}^2$$

3.2

- length ratio $10 : 15 = 2 : 3$; volume ratio $2^3 : 3^3 = 8 : 27$

$$400 \times \frac{27}{8} = \mathbf{1350} \text{ ml}$$

3.3

(a)

$$\text{scale factor} = \frac{15}{6} = \mathbf{2.5}$$

- $QR = 9 \times 2.5 = \mathbf{22.5}$ cm

(b)

- areas scale by the **square** of the length scale factor
- $2.5^2 = 6.25$
- area $= 20 \times 6.25 = \mathbf{125} \text{ cm}^2$

(c)

- volumes scale by the cube of the length scale factor

$$\left(\frac{h_2}{h_1}\right)^3 = \frac{128}{54} = \frac{64}{27}$$

- $\frac{h_2}{h_1} = \frac{4}{3}$, so the ratio is **3 : 4**

(d)

- equal angles fix the **shape**, so one figure is an enlargement of the other
- equal areas fix only the space enclosed — a 2×8 rectangle and a 4×4 square both have area 16 but are not similar