Solutions

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

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

2.1

- $75 = 25 \times 3$ and 25 is a square

$$\sqrt{75} = \mathbf{5\sqrt{3}}$$

2.2

- $\sqrt{8} = 2\sqrt{2}$ and $\sqrt{18} = 3\sqrt{2}$

$$2\sqrt{2} + 3\sqrt{2} = \mathbf{5\sqrt{2}}$$

2.3

- multiply top and bottom by $\sqrt{5}$: $\dfrac{10\sqrt{5}}{5}$

$$= \mathbf{2\sqrt{5}}$$

2.4

- $\sqrt{2} \times \sqrt{50} = \sqrt{100} = \mathbf{10}$

2.5

- $\left(2+\sqrt{3}\right)\left(2+\sqrt{3}\right) = 4 + 2\sqrt{3} + 2\sqrt{3} + 3$

$$= \mathbf{7 + 4\sqrt{3}}$$

3.1

(a)

- expand: $9 - 3\sqrt{2} + 3\sqrt{2} - 2$ – the middle terms cancel

$$= \mathbf{7}$$

(b)

- $\sqrt{48} = 4\sqrt{3}$ and $\sqrt{12} = 2\sqrt{3}$

$$4\sqrt{3} - 2\sqrt{3} = \mathbf{2\sqrt{3}}$$

3.2

- multiply top and bottom by $\sqrt{6}$: $\dfrac{8\sqrt{6}}{6}$
- divide top and bottom by 2

$$= \frac{\mathbf{4\sqrt{6}}}{\mathbf{3}}$$

3.3

- side $= \sqrt{18}$, and $18 = 9 \times 2$

$$= \mathbf{3\sqrt{2}} \text{ cm}$$

3.4

- split the fraction: $\dfrac{\sqrt{12}}{\sqrt{3}} + \dfrac{6}{\sqrt{3}}$
- $\dfrac{\sqrt{12}}{\sqrt{3}} = \sqrt{4} = 2$, and $\dfrac{6}{\sqrt{3}} = \dfrac{6\sqrt{3}}{3} = 2\sqrt{3}$

$$= \mathbf{2 + 2\sqrt{3}}$$

3.5

(a)

- Pythagoras: $h^2 = \left(\sqrt{3}+1\right)^2 + \left(\sqrt{3}-1\right)^2 = \left(4 + 2\sqrt{3}\right) + \left(4 - 2\sqrt{3}\right) = 8$

$$h = \sqrt{8} = \mathbf{2\sqrt{2}} \text{ cm}$$

(b)

- area $= \frac{1}{2}\left(\sqrt{3}+1\right)\left(\sqrt{3}-1\right) = \frac{1}{2}(3-1) = \mathbf{1}$ cm^2