Solutions

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

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

2.1

$$\boldsymbol{\frac{\sqrt{3}}{2}}$$

2.2

$$\boldsymbol{1}$$

2.3

$$\boldsymbol{\frac{\sqrt{3}}{2}}$$

2.4

- $\tan 30^\circ = \dfrac{1}{\sqrt{3}} = \boldsymbol{\dfrac{\sqrt{3}}{3}}$

2.5

- $\dfrac{\sqrt{2}}{2} \times \dfrac{\sqrt{2}}{2} = \dfrac{2}{4} = \boldsymbol{\dfrac{1}{2}}$

3.1

- opposite = hypotenuse $\times \sin 30^\circ = 12 \times \frac{1}{2}$

$$= \mathbf{6} \text{ cm}$$

3.2

- split the triangle down the middle to make a 30–60–90 triangle
- the height $= 8 \sin 60^\circ = 8 \times \frac{\sqrt{3}}{2} = 4\sqrt{3}$ cm
- area $= \frac{1}{2} \times 8 \times 4\sqrt{3}$

$$= \mathbf{16\sqrt{3}} \text{ cm}^\mathbf{2}$$

3.3

- $\sin 45^\circ = \frac{\sqrt{2}}{2}$, so $x = 45^\circ$
- sin is also positive in the second quadrant, so $x = 180 - 45$

$$x = \mathbf{45}^\circ \text{ or } \mathbf{135}^\circ$$

3.4

- $\cos 30^\circ = \dfrac{\text{adjacent}}{\text{hypotenuse}}$: $\dfrac{\sqrt{3}}{2} = \dfrac{5\sqrt{3}}{h}$

$$h = \frac{5\sqrt{3} \times 2}{\sqrt{3}} = \mathbf{10} \text{ cm}$$

exercises.lol exercises.com.cn

3.5

(a)

- $\sin 60^\circ = \dfrac{\sqrt{3}}{2}$ and $\cos 60^\circ = \dfrac{1}{2}$
- $\dfrac{3}{4} + \dfrac{1}{4} = 1$, as required

(b)

- $\sin 30^\circ = \dfrac{1}{2}$ and $\tan 60^\circ = \sqrt{3}$

$$2 \times \frac{1}{2} + \left(\sqrt{3}\right)^2 = 1 + 3 = \mathbf{4}$$