

## Solutions

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

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

### 2.1

- $\cos 30^\circ = \frac{\sqrt{3}}{2}$

### 2.2

- $x = 30^\circ$
- sine is also positive in the second quadrant:  $x = 180 - 30 = \mathbf{150^\circ}$

### 2.3

- area  $= \frac{1}{2}ab \sin C$
- $\frac{1}{2}(6)(9) \sin 50^\circ = 27 \times 0.766 = \mathbf{20.7 \text{ cm}^2}$

### 3.1

- cosine rule:  $a^2 = b^2 + c^2 - 2bc \cos A$
- $a^2 = 25 + 49 - 70(0.5) = 39$
- $a = \sqrt{39} = \mathbf{6.24 \text{ cm}}$

### 3.2

- sine rule:  $\frac{b}{\sin 75^\circ} = \frac{8}{\sin 40^\circ}$   
$$b = \frac{8 \sin 75^\circ}{\sin 40^\circ} = \frac{8 \times 0.966}{0.643} = \mathbf{12.0 \text{ cm}}$$

### 3.3

(a)

- $\sin 30^\circ = \frac{1}{2}$ ,  $\cos 45^\circ = \frac{\sqrt{2}}{2}$ ,  $\tan 60^\circ = \sqrt{3}$

(b)

- $\sin x = \frac{1}{2}$
- first solution  $x = 30^\circ$
- second quadrant:  $x = 180 - 30 = \mathbf{150^\circ}$

(c)

- related acute angle  $\cos^{-1} 0.5 = 60^\circ$
- cosine is negative in the second and third quadrants
- $\mathbf{x = 120^\circ}$  and  $\mathbf{x = 240^\circ}$

(d)

- a correct sine curve:  $(0, 0)$ ,  $(90, 1)$ ,  $(180, 0)$ ,  $(270, -1)$ ,  $(360, 0)$
- maximum and minimum marked
- the curve never rises above  $y = 1$ , so  $\sin x = 1.4$  has **no solution**