Solutions

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

2.1

- $\sqrt{a^2 + b^2}$

2.2

- $\langle 4, 6 \rangle$

2.3

- $\sqrt{3^2 + 4^2} = \sqrt{25} = 5$

2.4

- $4\vec{a} = \langle 12, -8 \rangle$
- $\vec{a} = 3\vec{i} - 2\vec{j}$

3.1 B

- $\sqrt{a^2 + b^2}$.

3.2 A

- $\langle 5, 6 \rangle$.

3.3

(a)

- $\sqrt{36 + 64} = 10$

(b)

- $\langle 12, 16 \rangle$

(c)

- $\langle 7, 8 \rangle$

3.4

(a)

- $\vec{u} = \langle 8, 0 \rangle$
- $\vec{v} = \langle 5\cos 60°, 5\sin 60° \rangle = \langle 2.5, 4.330 \rangle$

(b)

- $\vec{u} + \vec{v} = \langle 10.5, 4.330 \rangle$
- $\|\vec{u} + \vec{v}\| = \sqrt{10.5^2 + 4.330^2} = \sqrt{129} \approx \mathbf{11.36}$

(c)

- tip-to-tail, the angle between the two sides inside the triangle is $180° - 60° = 120°$
- $c^2 = 8^2 + 5^2 - 2(8)(5)\cos 120° = 89 + 40 = 129$, so $c = \sqrt{129}$, as in (b)

(d)

- $\vec{u} \cdot \vec{v} = 8(2.5) + 0(4.330) = \mathbf{20}$
- check: $\|\vec{u}\|\|\vec{v}\| \cos 60° = 8 \times 5 \times 0.5 = 20$