

7.3 Vectors

- Write the vector in component form that has starting point at $P(-2, 7)$ and ending point at $(3, -1)$.
- Find the component form for each vector \mathbf{v} with the given magnitude and direction angle θ .
 - $\|\mathbf{v}\| = 2, \theta = 30^\circ$
 - $\|\mathbf{v}\| = 12, \theta = 120^\circ$
 - $\|\mathbf{v}\| = 4, \theta = 210^\circ$
 - $\|\mathbf{v}\| = 3, \theta = 315^\circ$
- Find the magnitude and direction angle of each vector. Find the angle in degrees. Round to the nearest tenth of a degree when necessary.
 - $\mathbf{a} = \langle -1, \sqrt{3} \rangle$
 - $\mathbf{b} = \langle -1/2, -\sqrt{3}/2 \rangle$
 - $\mathbf{c} = \langle -3, -3 \rangle$
 - $\mathbf{d} = \langle -3, 4 \rangle$
 - $\mathbf{v} = \langle 12, -5 \rangle$
- Let $\mathbf{r} = \langle 3, -2 \rangle$, $\mathbf{s} = \langle -1, 5 \rangle$, and $\mathbf{t} = \langle 4, -6 \rangle$. Perform the operations indicated.
 - $-4\mathbf{s}$
 - $3\mathbf{r} - 2\mathbf{t}$
 - $-\mathbf{r} + 3\mathbf{s}$
 - $2\mathbf{r} - \mathbf{s} - 4\mathbf{t}$
 - $\mathbf{s} \cdot \mathbf{r}$
 - $\mathbf{s} \cdot \mathbf{t}$
 - $\mathbf{r} \cdot \mathbf{t}$
- Find the angle to the nearest tenth of a degree between each of given pair of vectors.

- (a) $\langle 3, 4 \rangle, \langle -12, 5 \rangle$
- (b) $\langle -2, -5 \rangle, \langle 1, -3 \rangle$
- (c) $\langle 1, -5 \rangle, \langle 2, -2 \rangle$

6. Determine whether each pair of vectors is parallel, perpendicular, or neither.

- (a) $\langle 2, 3 \rangle, \langle 8, 12 \rangle$
- (b) $\langle 2, 3 \rangle, \langle -6, 4 \rangle$
- (c) $\langle 2, -4 \rangle, \langle 2, 1 \rangle$

7. Write each vector as a linear combination of vectors \mathbf{i} and \mathbf{j} .

- (a) $\langle 7, -3 \rangle$
- (b) $\langle 1, 5 \rangle$
- (c) $\langle \sqrt{2}, -5 \rangle$

8. Find the magnitude of the resultant force and the angle between the resultant and each force, when forces of 2 lb and 12 lb act at an angle of 60° to each other.