

1. An airplane is flying on a compass bearing of 320° at 550 mph. Find the component form of the velocity of the airplane.

2. A basketball is shot at a 70° angle from the horizontal direction with an initial speed of 10 m/sec. Find the component form of the initial velocity.

3. Find the magnitude and direction of the following vectors.

a. $\langle 2, 4 \rangle$

b. $\langle 4, -3 \rangle$

c. $\langle -5, -1 \rangle$

d. $\langle -6, 2 \rangle$

4. Find the component form of the vector using the given direction and magnitude.

a. $\theta = 44^\circ$
 $|v| = \sqrt{15}$

b. $\theta = 332^\circ$
 $|v| = 7$

5. Given: $u = \langle 3, -6 \rangle$, $v = \langle -5, -3 \rangle$ find each of the following:

a. $u + v$

b. $3u - v$

c. $u - v$

d. $2u - 4v$

6. Given $u = \langle 3, -2 \rangle$ and $v = \langle -5, 2 \rangle$, find each of the following:

a. $u \cdot v$

b. $u \cdot u$

7. Find the angle between the given vectors.

a. $\langle -2, 5 \rangle$
 $\langle 13, 2 \rangle$

b. $\langle -3, -1 \rangle$
 $\langle 2, 5 \rangle$

8. For each parametric equation, graph, eliminate the parameter, and check your solution with your calculator.

a. $x = 2t + 1$
 $y = t - 1$

b. $x = t^2 + 1$
 $y = 3t + 2$

c. $x = 3 \cos t$
 $y = 3 \sin t$

9. Write the parametric equation that represents each situation.

a. The line through the points $A = (2, -3)$
 $B = (-6, -2)$.

b. The circle with center $(-4, 5)$ and radius 3.

10. Plot each coordinate point on the polar plane. Rename each point using co-terminal angles. Convert each polar coordinate point into a rectangular coordinate pair.

a. $\left(3, \frac{3\pi}{4}\right)$

b. $\left(-4, \frac{\pi}{3}\right)$

c. $(2, 375^\circ)$

d. $\left(-5, \frac{11\pi}{4}\right)$

11. Find a polar coordinate pair for the point with the given rectangular coordinate.

a. $(1, -1)$

b. $(-3, 0)$

c. $(-2\sqrt{2}, -2\sqrt{2})$

d. $(3\sqrt{3}, 3)$

12. Graph each circle. Check your answer on a graphing calculator.

a. $r = 2 \cos \theta$

b. $r = 4 \sin \theta$

13. Graph each rose curve. Check your answer on a graphing calculator.

a. $r = 3 \cos 2\theta$

b. $r = 4 \sin 3\theta$

14. Graph each curve. Check your answer on a graphing calculator.

a. $r = 1 + 2 \cos \theta$

b. $r = 1 - 4 \sin \theta$

c. $r = 2 - 2 \cos \theta$

d. $r = 1 + \sin \theta$

e. $r = 3 + 2 \cos \theta$

f. $r = 4 - 2 \sin \theta$