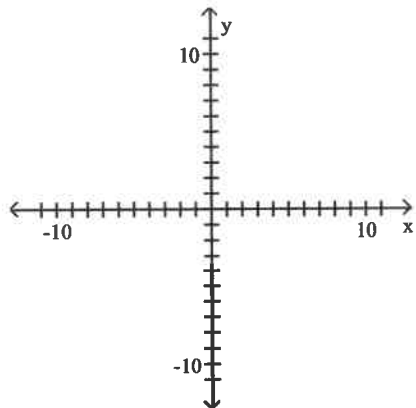


Find the component form, magnitude, and direction of  $\overrightarrow{PQ}$ .

- 1) Given that  $P = (-15, 9)$  and  $Q = (-7, 8)$

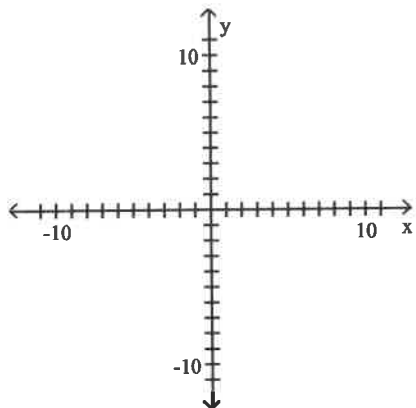
Find the component form of the indicated resultant vector by drawing the vectors on the graph below.

- 2) Let  $\mathbf{u} = \langle -5, -2 \rangle$ ,  $\mathbf{v} = \langle -4, 7 \rangle$ . Find  $\mathbf{u} + \mathbf{v}$ .



Find the component form of the indicated resultant vector by drawing the vectors on the graph

- 3) Let  $\mathbf{u} = \langle -2, 7 \rangle$ ,  $\mathbf{v} = \langle 8, -7 \rangle$ . Find  $\mathbf{u} - \mathbf{v}$ .



**Find  $\mathbf{a} \cdot \mathbf{b}$ .**

4)  $\mathbf{a} = \langle 4, -2 \rangle$ ,  $\mathbf{b} = \langle 8, 1 \rangle$

**Find the angle between the given vectors to the nearest tenth of a degree.**

5)  $\mathbf{u} = \langle 7, 1 \rangle$ ,  $\mathbf{v} = \langle -6, 5 \rangle$

**Determine whether the vectors  $\mathbf{u}$  and  $\mathbf{v}$  are parallel, orthogonal, or neither.**

6)  $\mathbf{u} = \langle 4, -2 \rangle$ ,  $\mathbf{v} = \langle 6, 12 \rangle$

7)  $\mathbf{u} = \langle 2, -7 \rangle$ ,  $\mathbf{v} = \langle -10, 35 \rangle$

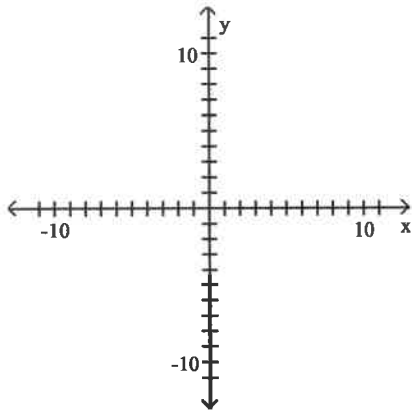
**Solve the problem.**

- 8) An airplane flies on a compass heading of  $90.0^\circ$  at 230 mph. The wind affecting the plane is blowing at an angle of  $152^\circ$  at 40 mph. What is the true course and ground speed of the airplane?

- 9) A force of 110 lb acts on an object at an angle of  $45^\circ$ . A second force of 90 lb acts on the object at an angle of  $-30^\circ$ . Find the direction and magnitude of the resultant force.

**Graph the pair of parametric equations. Then use an algebraic method to eliminate the parameter.**

10)  $x = 2t - 1$ ,  $y = t^2 + 7$ ,  $-2 \leq t \leq 3$



**Eliminate the parameter.**

11)  $x = 6 \cos t$ ,  $y = 6 \sin t$

Find the parametrization for the curve.

12) The line through the points  $(3, -3)$  and  $(7, 3)$

13) The circle with center  $(9, -2)$  and radius 4

14) Suppose a boat leaves port P headed for an island in a direction of 205 degrees with the automatic pilot set for 22 knots. On this particular day, there is 8 knot ocean current with a direction of 116 degrees. At what speed and in what direction will the captain actually need to travel during the first hour to account for the wind and land at the desired location.