6.1 – 6.3 Review

1) Find the component form, magnitude and direction of $\overrightarrow{PQ}$.
   Given that P = (-7, 8) and Q = (-9, 2)

2) Find the component form of the indicated vector $2\mathbf{u} - 3\mathbf{v}$.
   $\mathbf{u} = \langle -2, 3 \rangle \qquad \mathbf{v} = \langle -1, -1 \rangle$

3) Find the unit vector in the direction of the given vector. Write your answer in component form. Let $\mathbf{u} = \langle 6, 9 \rangle$.

4) A plane is flies on a compass heading of 100 degrees at 275 mph. The wind is blowing at an angle of 205 degrees at 30 mph. What is the true course and ground speed of the plane?

5) Find $\mathbf{a} \cdot \mathbf{b}$, given $\mathbf{a} = \langle 2,5 \rangle$, and $\mathbf{b} = \langle -3,8 \rangle$

6) Find the angle between the two vectors.

   $\mathbf{u} = \langle 2,-3 \rangle, \quad \mathbf{v} = \langle -4,5 \rangle$

7) Determine if the vectors are parallel or orthogonal. If the vectors are orthogonal, prove using the dot product.

A) $\mathbf{u} = \langle 5,4 \rangle$, $\mathbf{v} = \langle 4,-5 \rangle$ B) $\mathbf{u} = \langle -3,2 \rangle$, $\mathbf{v} = \langle 3,-2 \rangle$

8)   a)   For the given parameter interval, graph the parametric equations.
      b)   Then, eliminate the parameter and identify the graph of the parametric curve

$x = 2t^2 - 1$ $y = t$ on the interval $0 \le t \le 2$
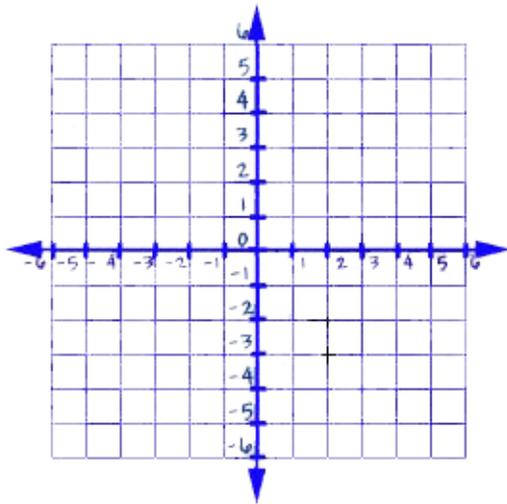
Find a parametrizations for the curve.

9)   The line through the points A = (-1, 5) and B = (2, 7)

10) The men's horseshoe pitching court has metal stakes **40 feet apart**. The stakes stand **18 inches** out of the ground.

    a.   Alan pitches a horseshoe at **48 feet per second**, at a **12° angle** to the ground. He releases the horseshoe at about **3 feet above** the ground and **2 feet in front** of the stake at one end. **Write parametric equations** modeling a typical throw.

    b.   How long is the thrown horseshoe in the air?

    c.   How close to 40ft is the horizontal component when the horseshoe hits the ground?

11) Determine whether a baseball hit from a height at 1.5 feet, at a speed of 135 feet per second, and at an angle of 32° relative to level ground will clear a 10-foot wall 425 feet away.