Appendix J.3: Additional Problems

1. Does the point $(41, 103)$ lie on the line represented by the vector equation $\mathbf{r}(t) = \langle 1 + 2t, 3 + 5t \rangle$? justify your answer.

2. Here are two lines represented by the vector equations, L_1 and L_2.

   $L_1(t) = \langle 1 + t, 8 + 3t \rangle$ $\qquad$ $L_2(s) = \langle 3 - s, 7 - 2s \rangle$

   (a) Determine if these lines are parallel, perpendicular, or neither.

   (b) If the lines are not parallel, then find the angle θ, where $0 < \theta \leq \frac{\pi}{2}$, that is made at the intersection of the two lines.

   (c) If the lines are not parallel(and are not the same line), find the intersection point.

3. Sketch the graph of the parametric curve. Give the Cartesian equation also.
   $x = \cos(t), \quad y = \cos^2(t)$

4. Sketch the graph of the parametric curve. Give the Cartesian equation also.
   $x = -5 + 3\sin(t), \quad y = 1 + 3\cos(t)$

5. Sketch the graph of the parametric curve. Give the Cartesian equation also.
   $x = -5 + 3\cos(t), \quad y = 1 + 3\sin(t)$