Homework Section 12.6

1. Find parametric equations of the line:

   a) Through the point $(2,0,-5)$ and parallel to $\mathbf{v} = 3\mathbf{i} + 2\mathbf{j} - \mathbf{k}$.
   b) Through the point $(-1,3,2)$ and parallel to the line $x = 1 + 2t$, $y = 3t$ and $z = 4 - 3t$.

2. a) Find a vector equation for the line in 1(a).
   b) Find the symmetric equations of the line from 1(b).

3. Find the points where the line $x = 1 + 2t$, $y = 3t$, and $z = 4 - 3t$ intersects the yz-plane.

4. Decide if each pair of lines are intersecting, skew, or parallel. If there is an intersection point, find it.

   a) Line 1: $x = 1 + 2t$, $y = 4 + 3t$ and $z = 4 - 5t$
      Line 2: $x = 2 - 8s$, $y = -12s$ and $z = -11 + 20s$

   b) Line 1: $x = 2 + 2t$, $y = 4 + t$ and $z = 4 - 5t$
      Line 2: $x = -8s$, $y = -1 - 3s$ and $z = 4 + s$

   c) Line 1: $x = 2 + 2t$, $y = 4 + t$ and $z = 11 - t$
      Line 2: $x = -8s$, $y = -1 - 3s$ and $z = 7s$

5. Find an equation of the plane:

   a) passing through $(-4,1,3)$ and perpendicular to the vector $\mathbf{v} = \langle 2,-7,3 \rangle$.
   b) passing through $(-4,1,3)$ and perpendicular to the line $x = 1 + 2t$, $y = 3t$ and $z = 4 - 3t$.
   c) passing through the points $(-4,1,3)$, $(5,-1,-3)$, and $(2,2,-6)$.
   d) passing through $(-4,1,3)$ and containing the line $x = 1 + 2t$, $y = 3t$ and $z = 4 - 3t$.

6. Determine the point of intersection of the line $x = 2 + 2t$, $y = 4 + t$ and $z = 4 - 5t$ and the plane $x + 2y - 3z = 36$.

7. Find a set of parametric equations of the line of intersection of the planes $x - y + z = 1$ and $2x + y + z = 0$.

8. Decide if the planes below are perpendicular or parallel to the plane $2x - 9y + z = 4$.

   a) $-6x + 27y - 3z = 9$
   b) $-3x - y - 3z = -12$

9. Find the angle between the planes $x - y + z = 1$ and $2x + y + z = 0$. Round your answer to the nearest hundredth of a degree.

10. Find the distance between the parallel planes $2x - 9y + z = 4$ and $2x - 9y + z = 10$