Math 2551 Worksheet Section 12.2

1. Let $A = (1, 1)$, $B = (1, 0)$, $C = (-1, 3)$, and $D = (-2, 2)$. Let $\vec{v} = \overrightarrow{AB} + \overrightarrow{CD}$.
   (a) Find the component form of $\vec{v}$.
   (b) Express $\vec{v}$ in the form of $v_1\hat{i} + v_2\hat{j}$.
   (c) Find the magnitude (length) of the $\vec{v}$.
   (d) Find the unit vector in the direction of $\vec{v}$.
2. Let $\vec{u} = \langle 1, 1, -1\rangle$ and $\vec{v} = \langle 2, 0, 3\rangle$.
   (a) Find the component form of $2\vec{u} - \vec{v}$.
   (b) Express $\vec{u}$ as a product of its length and direction.
   (c) Find a vector of magnitude 2 in the direction of $\vec{v}$.
3. Let $A = (-1, 1, 5)$ and $B = (2, 5, 0)$.
   (a) What is the midpoint of line segment AB?
   (b) If $\overrightarrow{AC} = \hat{i} + 4\hat{j} - 2\hat{k}$, what is C?