Worksheet #15

(1) For $A(4, 4, -1)$ and $B(4, 1, 4)$, find a vector $\mathbf{a}$ with representation given by the directed line segment $\vec{AB}$. Draw $\vec{AB}$ and the equivalent representation starting at the orgin.

(2) Find $\mathbf{a} + \mathbf{b}$, $2\mathbf{a} + 3\mathbf{b}$, $|\mathbf{a}|$, and $|\mathbf{a} - \mathbf{b}|$ where $\mathbf{a} = 2\mathbf{i} - 4\mathbf{j} + 4\mathbf{k}$, and $\mathbf{b} = 2\mathbf{j} - \mathbf{k}$.

(3) Find a vector that has the opposite direction as $< -2, 4, 2 >$ but has length 6.

(4) Find a unit vector that has the same direction as $< -4, 2, 4 >$.

(5) If a child pulls a sled through the snow on a level path with a force of 50 N exerted at an angle of $\frac{\pi}{4}$ above the horizontal, find the horizontal and vertical components of the force.