Each problem is worth 5 points. Provide good justification of your answers for full credit.

1. Find the magnitude of the vector $\langle 3, 0, 1 \rangle$.

The magnitude of vector $\vec{A}$ is given by

$$|\vec{A}| = \sqrt{x^2 + y^2 + z^2}$$

$$\vec{v} = \langle 3, 0, 1 \rangle$$

$$\therefore \quad |\vec{v}| = \sqrt{3^2 + 0^2 + 1^2} = \boxed{\sqrt{10}}$$

Excellent!

2. Find a unit vector with the same direction as $4\mathbf{i} - \mathbf{j} + 8\mathbf{k}$.

$$\vec{v} = \langle 4, -1, 8 \rangle$$

$$|\vec{v}| = \sqrt{(4)^2 + (-1)^2 + (8)^2}$$

$$|\vec{v}| = \sqrt{81}$$

$$|\vec{v}| = 9$$

$$\vec{u} = \frac{\vec{v}}{|\vec{v}|}$$

$$\vec{u} = \langle \tfrac{4}{9}, \tfrac{-1}{9}, \tfrac{8}{9} \rangle$$

Great

$$\begin{array}{r} 16 \\ 64 \\ 1 \\ \hline 81 \end{array}$$