Name ______________________________

• No calculators allowed.
• Show sufficient work to justify each answer.
• You have 15 minutes for this quiz.

1. (2 points) Suppose \( \vec{u} = -2\vec{i} + 1\vec{j} + 3\vec{k} \) and \( \vec{v} = \vec{j} + 2\vec{k} \). Determine \( |\vec{u} - 3\vec{v}| \).

2. (2 points) Determine a unit vector which has the opposite direction of \( \vec{w} = \langle 3, -2, -5 \rangle \).

3. (2 points) Find all values of \( a \) for which the vectors \( \langle a, -5, 2 \rangle \) and \( \langle a, a, 3 \rangle \) are orthogonal.
4. (2 points) Determine whether the vectors \( \mathbf{a} = \langle -2, 3, 4 \rangle \) and \( \mathbf{b} = \langle 1, -3, 2 \rangle \) are orthogonal, parallel or neither.

5. (2 points) Determine \( \mathbf{u} \times \mathbf{v} \) given that \( \mathbf{u} = \langle 2, -3, 3 \rangle \) and \( \mathbf{v} = \langle 1, -2, 4 \rangle \).