Name ________________________________

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

1. (2 points) Suppose \( \vec{u} = 1\vec{i} - 2\vec{j} + 2\vec{k} \) and \( \vec{v} = 4\vec{i} - 3\vec{j} + 2\vec{k} \). Determine \( |2\vec{u} - \vec{v}| \).

2. (2 points) Find the vector with length 7 that has the same direction as the given vector \( \vec{w} = \langle 3, -2, 2 \rangle \).

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

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