Name _____

Homework 6
Section 13.3

1. (6) Let $\vec{a}$ and $\vec{b}$ be two 3-dimensional vectors, and let $\vec{v} = \|\vec{b}\|\vec{a} + \|\vec{a}\|\vec{b}$ and $\vec{w} = \|\vec{b}\|\vec{a} - \|\vec{a}\|\vec{b}$. Determine $\vec{v} \cdot \vec{w}$. Simplify your answer as much as possible.

2. (2ea) Consider the plane $z = 3x + 4y - 8$.

   (a) Find a vector perpendicular to the plane.

   (b) Find a vector parallel to the plane.

3. (6) Write the vector $\vec{a} = 4\vec{i} - \vec{j} - 5\vec{k}$ as the sum of two vectors, one parallel, and one perpendicular, to $\vec{b} = 3\vec{i} + 2\vec{j} + \vec{k}$.

4. (4) Compute the angle between the vectors $\vec{v} = 2\vec{i} + 5\vec{j} + 7\vec{k}$ and $\vec{w} = -\vec{i} - 3\vec{j} + 4\vec{k}$.