

MATH 275

August 29, 2007

Names _____

Please work in groups with no more than four people and complete this worksheet during class. Hand in one worksheet for each group.

1. If $\mathbf{a} = \langle 0, 2 \rangle$ and $\mathbf{b} = \langle 1, 1 \rangle$ find $\mathbf{a} \cdot \mathbf{b}$.

2. If $\mathbf{a} = 2\mathbf{i} - \mathbf{j} + \mathbf{k}$ and $\mathbf{b} = \mathbf{i} + \mathbf{j} + 2\mathbf{k}$ find $\mathbf{a} \cdot \mathbf{b}$ and determine the angle between \mathbf{a} and \mathbf{b} .

3. Sketch a graph of $\mathbf{u} = 2\mathbf{i} - 4\mathbf{j} + 4\mathbf{k}$ and estimate the direction angles to the nearest degree.

4. If $\mathbf{u} = \langle 1, -1, 0 \rangle$ and $\mathbf{v} = \langle 1, 0, 1 \rangle$ find the projection of \mathbf{u} onto \mathbf{v} , i.e. find $\text{proj}_{\mathbf{v}}\mathbf{u}$. Sketch a graph of \mathbf{u} , \mathbf{v} and $\text{proj}_{\mathbf{v}}\mathbf{u}$.

5. Find the scalar and vector projections of \mathbf{u} onto \mathbf{v} if $\mathbf{u} = \mathbf{i} - \mathbf{j}$ and $\mathbf{v} = \mathbf{i} + \mathbf{k}$.

6. Find $\mathbf{u} \times \mathbf{v}$ if $\mathbf{u} = \langle 1, 2, -2 \rangle$ and $\mathbf{v} = \langle 3, 0, 1 \rangle$.

7. Calculate $\mathbf{a} \cdot (\mathbf{b} \times \mathbf{c})$ where $\mathbf{a} = 3\mathbf{i} - 2\mathbf{j} - 5\mathbf{k}$, $\mathbf{b} = \mathbf{i} + 4\mathbf{j} - 4\mathbf{k}$ and $\mathbf{c} = 3\mathbf{j} + 2\mathbf{k}$.