Math 303, Worksheet #3 **Name:** _____
Fall 2008

Use these vectors in each of the problems below.
$\vec{v_1} = 3\vec{\imath} - 2\vec{\jmath}$
$\vec{v_2} = \vec{\imath} + \vec{\jmath}$
$\vec{v_3} = 4\vec{\imath} + 3\vec{\jmath}$
$\vec{v_4} = 3\vec{\imath} - 2\vec{\jmath} + \vec{k}$
$\vec{v_5} = -2\vec{\imath} + \vec{\jmath} + 3\vec{k}$
$\vec{v_6} = \vec{\imath} + \vec{\jmath} + \vec{k}$

1. Compute each of the following:

a. $\vec{v_1} \cdot \vec{v_2}$

b. $3(\vec{v_3} \cdot \vec{v_4})(\vec{v_5} \cdot \vec{v_6})$

c. $(\vec{v_4} \cdot \vec{v_5})\vec{v_6}$

d. $\vec{v_4}(\vec{v_5} \cdot \vec{v_6})$

2. The Maple command for the dot product is DotProduct, so to compute $v \cdot w$ type:

restart:with(LinearAlgebra):
DotProduct(v,w)

a.
Use Maple to check each of your answers above.

3. Find a nonzero vector which is orthogonal to $\vec{v_2}$. There is more than one correct answer.

4. Find a nonzero vector which is orthogonal to $\vec{v_4}$. There is more than one correct answer.

5. Find the angle between $\vec{v_4}$ and $\vec{v_5}$

There is another vector product of vectors $\vec{v}$ and $\vec{w}$, called the cross product, written $\vec{v} \times \vec{w}$. The Maple command for the cross product is (not surprisingly) CrossProduct. So to compute $v \times w$ type:

CrossProduct(v,w)

6. Compute each of the following

a. $(\vec{\imath} + \vec{\jmath} + \vec{k}) \times (\vec{\imath} - \vec{\jmath})$

b. $(\vec{\imath} - \vec{\jmath}) \times (\vec{\imath} + \vec{\jmath} + \vec{k})$

c. $\vec{\imath} \times \vec{\jmath}$

d. $\vec{\jmath} \times k$

e. $\vec{k} \times i$

f. $(a\vec{\imath} + b\vec{\jmath} + c\vec{k}) \times (d\vec{\imath} + e\vec{\jmath} + f\vec{k})$