

MA 2733

Worksheet 9 – November 4, 2015

Name \_\_\_\_\_

1. (a) How many vectors are there that are orthogonal to  $\langle 1, 2 \rangle$  and have length 1?

(b) How many vectors are there that are orthogonal to  $\langle 1, 2, 3 \rangle$  and have length 1?

(c) Find  $\text{proj}_{\vec{1}} \langle 1, 2, 3 \rangle$  and  $\text{proj}_{\langle 1, 2, 3 \rangle} \mathbf{i}$ .

2. (a) If  $\vec{a}$  and  $\vec{b}$  are orthogonal, then  $\text{proj}_{\vec{a}} \vec{b}$  is which of the following?  
a)  $\vec{a}$       b)  $\vec{b}$       c)  $\vec{a} + \vec{b}$       d)  $\vec{a} - \vec{b}$       e)  $\vec{0}$

- (b) If  $\vec{a}$  and  $\vec{b}$  are parallel, then  $\text{proj}_{\vec{a}} \vec{b}$  is which of the following?  
a)  $\vec{a}$       b)  $\vec{b}$       c)  $\vec{a} + \vec{b}$       d)  $\vec{a} - \vec{b}$       e)  $\vec{0}$

3. Suppose that  $\vec{v}$  and  $\vec{u}$  are vectors, and that  $\vec{v} + \vec{u}$  is orthogonal to  $\vec{v} - \vec{u}$ . Show that  $\|\vec{v}\| = \|\vec{u}\|$ .