Math 002B Assignment III Name:_____

Instructions
Write complete solutions to the following problems. Be sure to provide all the necessary steps to support your answers.

Problems 1 through 3

Let $\mathbf{v} = \langle 4,2,2 \rangle, \mathbf{u} = \langle 3,5,2 \rangle, \mathbf{w} = \langle 8,7,9 \rangle$, find the following.

1) $\mathbf{Proj}_{\mathbf{w}}\,\mathbf{v}$

2. $\|\mathbf{Proj}_{\mathbf{u}}\,\mathbf{v}\|$

3. A vector orthogonal to both **u** and **v** .

4) Find the equation of the line that passes through the point $P(2,-2,1)$ and parallel to **w**.

5) Find the equation of the line segment with end points $P(2,-2,1),\ Q(-1,3,4)$

6) Find the equation of the plane that contains the point $P(3,2,1)$ and normal vector **u**

7) Find the equation of the plane that contains the point $P(3,2,1)$ and parallel to the plane that contains the vectors **u** and **w**.

8) Find the distance from $P(4,1,1)$, and the plane $2x-y+z=4$.

9) Find the vector and symmetric equations of the of the line of intersection of the planes

$$2x-y-z=5$$
$$4x+3y-z=5$$

10. Find the distance from the point $P(1,-2,1)$ and the line $\mathbf{r}(t)=(2,1,3)+t(-1,1,3)$