Math 002B Assignment III Part 1 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.

a. $\mathbf{Proj}_{\mathbf{w}}\mathbf{v}$

b. $\|\mathbf{Proj}_{\mathbf{u}}\mathbf{v}\|$

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

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

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

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

3. 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** from problem number 1.

4. Use a projection of a vector to find the distance from $P(4,1,1)$, and the plane $2x-y+z=4$

5. Find the vector equation of the line of intersection of the planes
$2x-y-z=5$
$4x+3y-z=5$

6. Use projection of a vector to find the distance from the point $P(1,-2,1)$ and the line $\mathbf{r}(t)=(2,1,3)+t(-1,1,3)$

7. Find three vectors orthogonal to the vector $\mathbf{v}=\langle 2,-1,3,1\rangle$