Math02B Assignment 6.3 Last Name_________________1st____________

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

1. let W be a the set of all points on a line parallel to $\mathbf{v} = 4\mathbf{i} + 3\mathbf{j}$ and passing through the origin.

a. Show that W is vector subspace of $\Re^2$.

b. Find the orthogonal complement of W.

2. Let $S = \{(-1,4,3),(1,1,0)\}$, $\mathbf{u} =,(-1,1,0)$

Find the projection of **u** onto the linear span of S

3. Let $S = \{(-4,-1,1),(0,1,1)\}$, $\mathbf{x} =,(-1,1,0)$

Express **x** as a linear combination of two vectors, one in the linear span of S and another in the orthogonal complement of span S.

4. Let $S = \{(1,1,0,-1),(0,-1,1,-1),(1,0,1,1)\}$, $\mathbf{x} =,(3,4,5,6)$

Express **x** as a linear combination of two vectors, one in the linear span of S and another in the orthogonal complement of span S.

5. Let $S = \{(-1,1,1),(1,0,1)\}$, $\mathbf{x} =,(1,2,3)$

Find the projection of x onto the linear span of S

a. using vector projection.

b. using a projection matrix U who's columns are the orthogonal basis vectors in S.

6. Find the distance from **v** to the plane in $\Re^3$ spanned by the vectors $\mathbf{u}_1$ and $\mathbf{u}_2$.

$\mathbf{v}_1 = (3,5,2),\ \mathbf{u}_1 = (1,-1,2),\ \mathbf{u}_2 = (1,2,1)$