Math02B Assignment VII Name________________________

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

1. Let **W** be the plane in R^3 with equation $x + 2y - z = 2$, find a parametric equation for $\mathbf{W}^{\perp}$

2. Let $S = \{(1,1,2,1),(1,-1,1,1),(1,3,3,1)\}$ be a subset of R^4 with the Euclidean inner product , find the orthogonal complement of S.

3. Let R^2 have the Euclidean inner product. Use the Gram-Schmidt process to transform the set S into an orthonormal basis for. Draw both the set S and the ON basis on the xy-plane.

$S = \{(-2,1),(2,1)\}$

Problems 4, 5 and 6.

Let $S = \{\mathbf{v}_1, \mathbf{v}_2, \mathbf{v}_3,\} = \{(0,1,0), (1,1,1), (0,1,1)\}$

4. a) Show that S forms a basis for R^3.
   b) Transform S into an orthonormal basis for R^3.
   c. Express $\mathbf{v} = (2,-1,1)$ as a linear combination of the ON basis from part b

5. Find an orthonormal basis for Span(S) for the set S in problem 2, then find the projection of $\mathbf{v} = (3,1,2,1)$ onto Span(S).

6. Let $A = [v_1 \quad v_2 \quad v_3]$, find matrices Q and R such that A = QR