Quiz 10

Name : _____

SID : _____

CAUTION. As you may know, questions are just the same as Sample Quiz. To make any "distribution" of scores, I will be grading more carefully. ***Minor mistakes can cause much deduction of points.*** So, please read each questions carefully and figure out what they want.

1. Let W be given by

$$\text{Span}\left\{ \begin{bmatrix} 1 \\ 2 \\ 3 \\ 1 \end{bmatrix}, \begin{bmatrix} -1 \\ 1 \\ 1 \\ -1 \end{bmatrix} \right\}.$$

   Find the vector $\mathbf{w}$ in W which is (among vectors in W) closest to $\begin{bmatrix} 0 \\ 3 \\ 2 \\ 0 \end{bmatrix}$.

   [Hint] You might use *normal equation* method. This is essentially the same question as the question about minimizing $||A\mathbf{x} - \mathbf{b}||$. WHY?

2. Let H be the subspace of $\mathbb{R}^4$ spanned by $\begin{bmatrix} 1 \\ -1 \\ 2 \\ -1 \end{bmatrix}$, $\begin{bmatrix} 4 \\ 1 \\ 6 \\ 1 \end{bmatrix}$, $\begin{bmatrix} 3 \\ 3 \\ 4 \\ 1 \end{bmatrix}$. Find an orthogonal basis for H.