Quiz 3

Spring 2012

Math 0280 **Your name:** _____

1. [5 points] Let S be the collection of vectors $\begin{bmatrix} x \\ y \\ z \end{bmatrix}$ in $\mathbb{R}^3$ that satisfy the property $y = 2x$. Either prove that S forms a subspace of $\mathbb{R}^3$ or give a counterexample to show that it does not. In your proof use the definition or an essential property of a subspace.

2. [5 points] With a full explanation determine whether the vector $\mathbf{b} = [1 - 3 - 3]$ is in $row(A)$ if

$$A = \begin{bmatrix} 1 & 1 & -1 \\ 1 & 3 & 0 \\ 3 & -1 & -5 \end{bmatrix}$$

[Hint: Start from the definition of $row(A)$].

3. [5 points] Find a basis for $null(A)$ if

$$A = \begin{bmatrix} 1 & 1 & -1 \\ 1 & 3 & 0 \\ 3 & -1 & -5 \end{bmatrix}$$

You can use any method.

bonus problem [5 points extra] Show that $\mathbf{w}$ is in $span(\mathcal{B})$ and find the coordinate vector $[\mathbf{w}]_{\mathcal{B}}$ if

$$\mathbf{w} = \begin{bmatrix} 1 \\ 6 \\ 2 \end{bmatrix}, \qquad \mathcal{B} = \left\{ \begin{bmatrix} 1 \\ 2 \\ 0 \end{bmatrix}, \begin{bmatrix} 1 \\ 0 \\ -1 \end{bmatrix} \right\}$$