Math 2250-4
Quiz 6
February 24, 2012

1a) What does it mean for a vector $\underline{v}$ to be a <u>linear combination</u> of the vectors $\underline{v}_1$, $\underline{v}_2$, ... $\underline{v}_n$?

(1 point)

1b) What is the <u>span</u> of a collection of vectors $\underline{v}_1$, $\underline{v}_2$, ... $\underline{v}_n$?

(1 points)

1c) What does it mean for vectors $\underline{v}_1$, $\underline{v}_2$, ... $\underline{v}_n$ to be <u>linearly independent</u>?

(1 point)

2) Find a basis for the span of the following five vectors in $\mathbb{R}^4$. Explain your reasoning. You may find the reduced row echelon form computation below useful. The five vectors are

$$\underline{v}_1 = \begin{bmatrix} 1 \\ 2 \\ 1 \\ 2 \end{bmatrix}, \ \underline{v}_2 = \begin{bmatrix} -2 \\ -4 \\ -2 \\ -4 \end{bmatrix}, \ \underline{v}_3 = \begin{bmatrix} 0 \\ 1 \\ 2 \\ 0 \end{bmatrix}, \ \underline{v}_4 = \begin{bmatrix} -2 \\ -3 \\ 0 \\ -4 \end{bmatrix}, \ \underline{v}_5 = \begin{bmatrix} 1 \\ 0 \\ -4 \\ 2 \end{bmatrix}.$$

$$\begin{bmatrix} 1 & -2 & 0 & -2 & 1 \\ 2 & -4 & 1 & -3 & 0 \\ 1 & -2 & 2 & 0 & -4 \\ 2 & -4 & 0 & -4 & 2 \end{bmatrix} \rightarrow \begin{bmatrix} 1 & -2 & 0 & -2 & 0 \\ 0 & 0 & 1 & 1 & 0 \\ 0 & 0 & 0 & 0 & 1 \\ 0 & 0 & 0 & 0 & 0 \end{bmatrix}.$$

(7 points)