Math 2568, Quiz #9, Spring 2013

Name KEY

1. Determine if the set of vectors $\left\{\begin{bmatrix}1\\1\\1\\0\\1\end{bmatrix}, \begin{bmatrix}2\\3\\0\\1\\2\end{bmatrix}, \begin{bmatrix}3\\2\\4\\3\\0\end{bmatrix}, \begin{bmatrix}0\\0\\0\\1\\2\end{bmatrix}\right\}$ are linearly independent. If not, explain why not.

writing as a matrix & reducing gives 4 pivots
So these are linearly independent

2. Determine if the following sets represent a basis for $\mathbf{R}^3$.

a. $\left\{\begin{bmatrix}1\\2\\2\end{bmatrix}, \begin{bmatrix}-1\\0\\1\end{bmatrix}, \begin{bmatrix}-3\\1\\1\end{bmatrix}, \begin{bmatrix}2\\1\\0\end{bmatrix}\right\}$

No. too many vectors to be independent in $\mathbb{R}^3$

b. $\left\{\begin{bmatrix}3\\1\\-1\end{bmatrix}, \begin{bmatrix}-1\\-1\\0\end{bmatrix}, \begin{bmatrix}4\\0\\-2\end{bmatrix}\right\}$

reduces to $\begin{bmatrix}1 & 0 & 2\\0 & 1 & 2\\0 & 0 & 0\end{bmatrix}$

only 2 pivots so these are not independent
& they don't span $\mathbb{R}^3$ either, so not a basis.