Math 2568, Quiz #9, Fall 2013 Name KEY

Instructions: Justify answers with work or explanation. Use exact values.

1. Determine whether the set of vectors $\left\{\begin{bmatrix}1\\4\\1\\0\end{bmatrix}, \begin{bmatrix}-2\\3\\0\\5\end{bmatrix}, \begin{bmatrix}-5\\-4\\2\\13\end{bmatrix}, \begin{bmatrix}0\\-2\\1\\1\end{bmatrix}\right\}$ forms a basis for R^4. If it does not, explain why not.

it does not form a basis. it does not span $\mathbb{R}^4$ nor is the set linearly independent.

2. Determine whether the set of vectors $\left\{\begin{bmatrix}1\\3\\2\\-1\end{bmatrix}, \begin{bmatrix}-2\\2\\1\\1\end{bmatrix}, \begin{bmatrix}1\\0\\2\\1\end{bmatrix}, \begin{bmatrix}0\\-2\\4\\1\end{bmatrix}, \begin{bmatrix}1\\0\\0\\0\end{bmatrix}, \begin{bmatrix}11\\14\\-25\\6\end{bmatrix}\right\}$ spans R^4. If it does, find a basis for the space.

rref $\Rightarrow \begin{bmatrix}1 & 0 & 0 & 0 & 2/57 & -188/57\\ 0 & 1 & 0 & 0 & -14/57 & 57/57\\ 0 & 0 & 1 & 0 & 9/19 & 275/19\\ 0 & 0 & 0 & 1 & -11/57 & -676/57\end{bmatrix}$

There are too many vectors to be independent in $\mathbb{R}^4$. Confirmed by echelon form.

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

3. Determine if the polynomials $\{1-2t, 3+5t^2, -t+2t^2\}$ form a basis for P_2. [Hint: Write them as vectors, first.]

$\left\{\begin{bmatrix}1\\-2\\0\end{bmatrix}, \begin{bmatrix}3\\0\\5\end{bmatrix}, \begin{bmatrix}0\\-1\\2\end{bmatrix}\right\}$ rref $\Rightarrow \begin{bmatrix}1 & 0 & 0\\ 0 & 1 & 0\\ 0 & 0 & 1\end{bmatrix}$

yes, this forms a basis for $\mathbb{P}_2$.