Due 11/3/11

Math 215 Sect. 6 HW

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1. Let
$$B = \left(\begin{bmatrix} 1 \\ -3 \end{bmatrix}, \begin{bmatrix} 1 \\ -2 \end{bmatrix} \right)$$
be a basis of $\mathbb{R}^2$, and
$$\mathbf{x} = \begin{bmatrix} 4 \\ 5 \end{bmatrix} .$$
Find $[\mathbf{x}]_B$, the B-coordinates of $\mathbf{x}$.

2. Let
$$A = \begin{bmatrix} 1 & -2 & -1 & -1 \\ 1 & -1 & -1 & 0 \\ 2 & -6 & -1 & -4 \\ 3 & -5 & 0 & -2 \end{bmatrix} .$$
Find $\dim(Col(A))$ and $\dim(Nul(A))$.

3. Turn in Sect. 4.5 #28.

   Hint: One way to show this is to first show that the vector space $\mathbb{P}$ of all polynomials is a subspace of $C(\mathbb{R})$, the vector space of all continuous functions of a single real variable. In #27, you showed that $\mathbb{P}$ is infinite-dimensional. You can use this fact, in combination with one of the theorems in Sect. 4.5, to show that $C(\mathbb{R})$ is infinite-dimensional. (For this problem, you can assume the result of #27.)