Homework

1. Determine whether the vector is in the span of the vectors $\vec{v_1}, \vec{v_2}, \cdots, \vec{v_m}$

(1) $\vec{v_1} = \begin{pmatrix} 1 \\ 1 \\ 0 \end{pmatrix}, \vec{v_2} = \begin{pmatrix} 2 \\ 0 \\ 1 \end{pmatrix}, \vec{x} = \begin{pmatrix} 2 \\ 3 \\ 4 \end{pmatrix}$ (2) $\vec{v_1} = \begin{pmatrix} 1 \\ 1 \\ 0 \\ 0 \end{pmatrix}, \vec{v_2} = \begin{pmatrix} 0 \\ 1 \\ 1 \\ 0 \end{pmatrix}, \vec{v_3} = \begin{pmatrix} 0 \\ -1 \\ 0 \\ 1 \end{pmatrix}, \vec{x} = \begin{pmatrix} 5 \\ 4 \\ 3 \\ 2 \end{pmatrix}$

2. Let $\vec{a_1} = \begin{pmatrix} 1 \\ 4 \\ -2 \end{pmatrix}, \vec{a_2} = \begin{pmatrix} -2 \\ -3 \\ 7 \end{pmatrix}, \vec{b} = \begin{pmatrix} 4 \\ 1 \\ h \end{pmatrix}$. For what values of h is $\vec{b}$ in the plane spanned by $\vec{a_1}, \vec{a_2}$.

3. For which values of the constants b and c is the vector $\begin{pmatrix} 3 \\ b \\ c \end{pmatrix}$ a linear combination of $\begin{pmatrix} 1 \\ 3 \\ 2 \end{pmatrix}, \begin{pmatrix} 2 \\ 6 \\ 4 \end{pmatrix}$, and $\begin{pmatrix} -1 \\ -3 \\ -2 \end{pmatrix}$?

4. (1) Let $\vec{v_1} = \begin{pmatrix} 1 \\ 0 \\ -1 \\ 8 \end{pmatrix}, \vec{v_2} = \begin{pmatrix} 0 \\ -1 \\ 0 \\ 1 \end{pmatrix}, \vec{v_3} = \begin{pmatrix} 1 \\ 0 \\ 0 \\ -1 \end{pmatrix}$. Does $\{\vec{v_1}, \vec{v_2}, \vec{v_3}\}$ span R^4? Why or why not?

(2) Let $\vec{v_1} = \begin{pmatrix} 8 \\ 0 \\ -2 \end{pmatrix}, \vec{v_2} = \begin{pmatrix} 0 \\ -3 \\ 8 \end{pmatrix}, \vec{v_3} = \begin{pmatrix} 4 \\ -1 \\ -5 \end{pmatrix}$. Does $\{\vec{v_1}, \vec{v_2}, \vec{v_3}\}$ span R^3? Why or why not?