MTH 3331 - Test #2

Spring 2018

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Show CLEARLY how you arrive at your answers!

1. Solve the system of equations:

$$\begin{array}{rcrcrcr} x & + & 2y & + & z & = & 13 \\ -x & + & y & - & 7z & = & -34 \\ 2x & + & 5y & - & 4z & = & -1 \end{array}$$

2. Give the general solution to the system of equations:

$$\begin{array}{rcrcrcrcr} 2x_1 & & & + & 4x_3 & + & 16x_4 & = & -2 \\ -2x_1 & + & x_2 & - & 6x_3 & - & 22x_4 & = & 4 \\ 4x_1 & - & 2x_2 & + & 10x_3 & + & 40x_4 & = & -10 \end{array}$$

3. A system of equations has been reduced to "row echelon form (below)." Give the general solution of the system, if the variables are x_1, x_2, x_3, x_4.

$$\left[\begin{array}{cccc|c} 1 & 0 & 2 & 0 & 5 \\ 0 & 1 & -2 & 0 & -3 \\ 0 & 0 & 0 & 1 & 8 \end{array}\right]$$

4. (15 points)

   (a) If $\vec{x}_1$ is a solution of the system of equations $[A]\,[\vec{x}] = \left[\vec{b}\right]$, and $\vec{y}_1$ is a solutions of the corresponding homogeneous system $[A]\,[\vec{x}] = \left[\vec{0}\right]$, what can we say about $(\vec{x}_1 + \vec{y}_1)$, and why?

   (b) If $\vec{x}_1$ and $\vec{x}_2$ are both solutions of the system of equations $[A]\,[\vec{x}] = \left[\vec{b}\right]$, what can we say about $(\vec{x}_1 - \vec{x}_2)$, and why?

   (c) If $\vec{y}_1$ and $\vec{y}_2$ are both solutions of the system of equations $[A]\,[\vec{x}] = \left[\vec{0}\right]$, what can we say about $(\vec{y}_1 + \vec{y}_2)$, and why?