Math 202 Quiz # 7

Name: _____ **Section #** _____ **Sr. #**____

Solve the following system:

$$5x_1 + 4x_2 - 16x_3 = -10$$
$$x_1 - x_2 - 5x_3 = 7$$
$$x_2 + x_3 = -5$$

Solution:

$$\begin{bmatrix} 5 & 4 & -16 & -10 \\ 1 & -1 & -5 & 7 \\ 0 & 1 & 1 & -5 \end{bmatrix}$$

$$R_1 \leftrightarrow R_2 \quad \begin{bmatrix} 1 & -1 & -5 & 7 \\ 5 & 4 & -16 & -10 \\ 0 & 1 & 1 & -5 \end{bmatrix}$$

$$-5R_1 + R_2 \quad \begin{bmatrix} 1 & -1 & -5 & 7 \\ 0 & 9 & 9 & -45 \\ 0 & 1 & 1 & -5 \end{bmatrix}$$

$$\tfrac{1}{9}R_2 \quad \begin{bmatrix} 1 & -1 & -5 & 7 \\ 0 & 1 & 1 & -5 \\ 0 & 1 & 1 & -5 \end{bmatrix}$$

$$\begin{bmatrix} 1 & -1 & -5 & 7 \\ 0 & 1 & 1 & -5 \\ 0 & 0 & 0 & 0 \end{bmatrix}$$

$$R_2 + R_1 \quad \begin{bmatrix} 1 & 0 & -4 & 2 \\ 0 & 1 & 1 & -5 \\ 0 & 0 & 0 & 0 \end{bmatrix}$$

$$\Rightarrow \quad x_2 = -5 - x_3 \quad \& \quad x_1 = 2 + 4x_3$$

Then $x_3 = t$, we have the solution

$$x_1 = 2 + 4t$$
$$x_2 = -5 - t$$
$$x_3 = t$$