10/10

Name: PHONG VO

Linear Algebra: Quiz 1

Show ALL work, as unjustified answers may receive no credit. Calculators are not allowed on any quiz or test paper. Make sure to exhibit skills discussed in class. Box all answers and clean up answers as much as possible.

1. [10pts] Write the augmented matrix corresponding to the system below:

10

$$\begin{cases} x_1 - 6x_2 - 4x_3 = -5 \\ 2x_1 - 10x_2 - 9x_3 = -4 \\ -x_1 + 6x_2 + 5x_3 = 3 \end{cases}$$

Solve the system by applying the row reduction algorithm. If the system is consistent, find the general solution set.

$$A = \left[\begin{array}{ccc|c} 1 & -6 & -4 & -5 \\ 2 & -10 & -9 & -4 \\ -1 & 6 & 5 & 3 \end{array}\right] \xrightarrow[nR_3]{R_1 + R_3} \left[\begin{array}{ccc|c} 1 & -6 & -4 & -5 \\ 2 & -10 & -9 & -4 \\ 0 & 0 & 1 & -2 \end{array}\right]$$

$$\xrightarrow[nR_2]{2R_1 - R_2} \Rightarrow \left[\begin{array}{ccc|c} 1 & -6 & -4 & -5 \\ 0 & -2 & 1 & -6 \\ 0 & 0 & 1 & -2 \end{array}\right]$$

$$\xrightarrow[-2]{R_2} \Rightarrow \left[\begin{array}{ccc|c} 1 & -6 & -4 & -5 \\ 0 & 1 & -\frac{1}{2} & 3 \\ 0 & 0 & 1 & -2 \end{array}\right] \xrightarrow[nR_2]{R_2 + \frac{1}{2}R_3} \left[\begin{array}{ccc|c} 1 & -6 & -4 & -5 \\ 0 & 1 & 0 & 2 \\ 0 & 0 & 1 & -2 \end{array}\right]$$

$$\xrightarrow[nR_1]{R_1 + 6R_2} \Rightarrow \left[\begin{array}{ccc|c} 1 & 0 & -4 & 7 \\ 0 & 1 & 0 & 2 \\ 0 & 0 & 1 & -2 \end{array}\right] \xrightarrow[nR_1]{R_1 + 4R_3} \Rightarrow \left[\begin{array}{ccc|c} 1 & 0 & 0 & -1 \\ 0 & 1 & 0 & 2 \\ 0 & 0 & 1 & -2 \end{array}\right]$$

$$\Rightarrow \begin{bmatrix} x_1 \\ x_2 \\ x_3 \end{bmatrix} = \begin{bmatrix} -1 \\ 2 \\ -2 \end{bmatrix}$$