Name:

Problem 1: *Please give the **reduced** echelon form of this matrix*

$$\begin{pmatrix} 1 & 3 & 1 \\ 2 & 6 & 2 \\ -1 & 0 & 0 \end{pmatrix}$$

Solution:

$$\begin{pmatrix} 1 & 3 & 1 \\ 2 & 6 & 2 \\ -1 & 0 & 0 \end{pmatrix} \underset{\rho_3+\rho_1}{\overset{\rho_2-2\rho_1}{\sim}} \begin{pmatrix} 1 & 3 & 1 \\ 0 & 0 & 0 \\ 0 & 3 & 1 \end{pmatrix} \overset{\rho_2\leftrightarrow\rho_3}{\sim} \begin{pmatrix} 1 & 3 & 1 \\ 0 & 3 & 1 \\ 0 & 0 & 0 \end{pmatrix}$$

$$\overset{1/3\rho_2}{\sim} \begin{pmatrix} 1 & 3 & 1 \\ 0 & 1 & 1/3 \\ 0 & 0 & 0 \end{pmatrix} \overset{\rho_1-3\rho_2}{\sim} \begin{pmatrix} 1 & 0 & 0 \\ 0 & 1 & 1/3 \\ 0 & 0 & 0 \end{pmatrix}$$

And we are done.