Key

Quiz 2

(8 points) Suppose the following matrices are the row echelon forms of the augmented matrices of some linear systems. Use these matrices to determine if each linear system is inconsistent (I) or consistent (C), and if the system is consistent, decide whether it has a unique (U) solution.

$$\begin{bmatrix} 4 & 2 & -6 & 8 & 11 \\ 0 & 9 & 1 & 5 & 2 \\ 0 & 0 & 3 & -1 & 8 \\ 0 & 0 & 0 & 1 & 7 \\ 0 & 0 & 0 & 0 & 3 \end{bmatrix}$$ I

$$\begin{bmatrix} 1 & 0 & 0 & 4 & 0 & 1 & 2 & 5 \\ 0 & 3 & 7 & 0 & 4 & 0 & 11 & 0 \\ 0 & 0 & 0 & 0 & 2 & 1 & 0 & 2 \\ 0 & 0 & 0 & 0 & 0 & 0 & 3 & -5 \end{bmatrix}$$ C

$$\begin{bmatrix} 1 & 0 & 0 & 0 & 7 & 2 & 1 \\ 0 & 1 & 0 & 3 & 6 & 3 & 0 \\ 0 & 0 & 4 & 1 & -6 & 0 & 0 \\ 0 & 0 & 0 & 3 & 0 & 2 & 5 \\ 0 & 0 & 0 & 0 & -1 & 0 & 1 \\ 0 & 0 & 0 & 0 & 0 & 2 & 0 \end{bmatrix}$$ CU

$$\begin{bmatrix} 3 & -2 & 7 & 0 & 0 & 4 \\ 0 & 1 & 0 & 4 & 0 & 3 \\ 0 & 0 & 2 & 0 & 3 & -1 \\ 0 & 0 & 0 & 0 & 1 & 3 \\ 0 & 0 & 0 & 0 & 0 & 0 \end{bmatrix}$$ C

(2 points) Suppose the following matrix is the reduced row echelon form of the augmented matrix of a certain linear system. Write the general solution of the linear system in parametric form (ie: convert the answer from a matrix back into terms of x_i's).

$$\begin{bmatrix} 1 & -3 & 0 & 0 & -2 & 0 \\ 0 & 0 & 1 & 0 & 3 & 2 \\ 0 & 0 & 0 & 1 & 5 & 11 \end{bmatrix} \Longrightarrow \begin{cases} x_1 - 3x_2 \qquad\quad - 2x_5 = 0 \\ \qquad\quad x_3 + 3x_5 = 2 \\ \qquad\quad\quad x_4 + 5x_5 = 11 \end{cases}$$

So $\begin{cases} x_1 = 3x_2 + 2x_5 \\ x_2 = \text{free} \\ x_3 = -3x_5 + 2 \\ x_4 = -5x_5 + 11 \\ x_5 = \text{free} \end{cases}$