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Math 227Q (Roby)

Quiz #1

6 September 2005

PLEASE WRITE YOUR NAME AT THE BOTTOM OF THE BACK OF THIS SHEET, NOT ON THE FRONT.

1. Find the general solution of the system whose augmented matrix is as follows:

$$\begin{pmatrix} 0 & 1 & -6 & 5 \\ 1 & -2 & 7 & -6 \end{pmatrix}$$

$$\begin{bmatrix} 0 & 1 & -6 & 5 \\ 1 & -2 & 7 & -6 \end{bmatrix} \text{ switch } R_1 \text{ and } R_2$$

$$\begin{bmatrix} 1 & -2 & 7 & -6 \\ 0 & 1 & -6 & 5 \end{bmatrix} R_1 \leftarrow R_1 + R_2(2)$$

$$\begin{bmatrix} 1 & 0 & -5 & 4 \\ 0 & 1 & -6 & 5 \end{bmatrix} \begin{cases} x_1 - 5x_3 = 4 \\ x_2 - 6x_3 = 5 \end{cases}$$

$$\begin{cases} x_1 = 4 + 5x_3 \\ x_2 = 5 + 6x_3 \\ x_3 \text{ is a free variable} \end{cases}$$

2. Is the following matrix in reduced echelon form, echelon form, or neither? Explain!

$$\begin{matrix} & 1 & 2 & 3 & 4 \\ 1 & \begin{pmatrix} 1 & 0 & 1 & 0 \\ 0 & 1 & 1 & 0 \\ 0 & 0 & 0 & 1 \end{pmatrix} \end{matrix}$$

This matrix is in reduced echelon form. In order for a matrix to be in reduced echelon form, it must ^① have all 1's in pivot positions, and ^② have zeroes both above and below the pivots. This matrix follows the rules for reduced echelon form, as the pivots in row 1 column 1, row 2 column 2, and row 3 column 4 are all 1's and have zeroes above and below them. The '1' in row 2 column 3 is not a pivot and therefore the 1 above it is fine.