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MTH 1230 — LINEAR ALGEBRA — FALL 1997

QUIZ #1

1. Solve the following system by Gaussian elimination in matrix form, with back substitution. Indicate for each step which row operation you use.

$$\begin{array}{rcrcrl} x & + & y & + & 2z & = 9 \\ 2x & + & 4y & - & 3z & = 1 \\ 3x & + & 6y & - & 5z & = 0 \end{array}$$

2. Consider the following system of linear equations:

$$\begin{array}{rrrrrrl} x_1 & +3x_2 & -2x_3 & & +4x_5 & & = 5 \\ & & -x_3 & +2x_4 & & +3x_6 & = 1 \\ & & & & 2x_5 & +x_6 & = 2 \end{array}$$

Identify which variables are leading and which are free. Write down the general solution of the system.

3. Let:

$$A = \begin{bmatrix} 2 & 1 \\ 1 & 1 \end{bmatrix}, \qquad B = \begin{bmatrix} 2 & 3 \\ 4 & 6 \end{bmatrix}, \qquad C = \begin{bmatrix} -3 & 5 \end{bmatrix}.$$

For each of the following, indicate whether the operation is possible, and, if it is, compute the result.

(i) $A + C =$

(ii) $3 \cdot A - 2 \cdot B =$

(iii) $A \cdot B =$

(iv) $A \cdot C =$

(v) $C \cdot A =$

(vi) $A^{-1} =$

(vii) $B^{-1} =$

(viii) $C^{-1} =$