

MATH 234
QUIZ ONE

Student Name: Key Student Number: _____

Use Guauss-Jordan elimination to solve the system

$$\begin{aligned} x_1 + 2x_2 - 3x_3 + x_4 &= 1 \\ -x_1 - x_2 + 4x_3 - x_4 &= 6 \\ -2x_1 - 4x_2 + 7x_3 - x_4 &= 1 \end{aligned}$$

$$\left[\begin{array}{cccc|c} 1 & 2 & -3 & 1 & 1 \\ -1 & -1 & 4 & -1 & 6 \\ -2 & -4 & 7 & -1 & 1 \end{array} \right] \rightarrow \left[\begin{array}{cccc|c} 1 & 2 & -3 & 1 & 1 \\ 0 & 1 & 1 & 0 & 7 \\ 0 & 0 & 1 & 1 & 3 \end{array} \right]$$

$$\rightarrow \left[\begin{array}{cccc|c} 1 & 2 & 0 & 4 & 10 \\ 0 & 1 & 0 & -1 & 4 \\ 0 & 0 & 1 & 1 & 3 \end{array} \right] \rightarrow \left[\begin{array}{cccc|c} 1 & 0 & 0 & 6 & 2 \\ 0 & 1 & 0 & -1 & 4 \\ 0 & 0 & 1 & 1 & 3 \end{array} \right]$$

lead variable: x_1, x_2, x_3

free variable: x_4

let $x_4 = t \Rightarrow x_3 = 3 - t, x_2 = 4 + t, x_1 = 2 - 6t$

Sol. $(2 - 6t, 4 + t, 3 - t, t)^T$ where t is any real #.