

## MA 371 8/26/03. Linear Equations 1.

1. For each of the following systems, write the associated augmented matrix and find the reduced row echelon form.

$$a) \quad \begin{aligned} u + v + w &= -1 \\ u + w &= 2 \end{aligned}$$

$$b) \quad \begin{aligned} 2x_1 + x_2 &= 1 \\ x_1 - x_2 + x_3 &= 0 \\ 4x_1 + 2x_2 &= 2 \end{aligned}$$

$$c) \quad \begin{aligned} -x_2 + x_3 &= 0 \\ 2x_1 + 2x_2 + 4x_3 &= 0 \\ -4x_1 - 2x_2 &= 1 \end{aligned}$$

$$d) \quad \begin{aligned} x_1 - x_2 + 2x_3 + x_4 &= 0 \\ x_3 - x_4 &= 0 \\ x_1 - x_2 + 3x_3 &= 0 \\ -x_1 + x_2 - x_3 - 2x_4 &= 0 \end{aligned}$$

$$e) \quad \begin{aligned} 2x_1 + x_2 + x_3 &= 0 \\ -1x_2 - 1x_3 + 2x_4 &= 0 \\ x_1 + x_2 + x_3 + x_4 &= 0 \end{aligned}$$

$$f) \quad \begin{aligned} x_2 + x_4 &= 0 \\ x_1 - 2x_3 &= 0 \\ x_1 - x_2 + 2x_4 &= 0 \\ -x_1 + x_2 - x_3 - 2x_4 &= 0 \end{aligned}$$

2. Find the solution to each of the systems above. Express each solution as a linear combination of the column vectors.

3. Suppose the right-hand side of each equation in 1.f above is set equal to one. How does this change the system? What is the solution?