

WORKSHEET #1, 8/28/07

MATH 54, FALL 2007

1. Write the following system of equations as an augmented matrix, and then solve the system of equations by using Gaussian elimination on the matrix:

(a)

$$\left\{ \begin{array}{cccc} & & 2x_3 & + & 4x_4 & = & 0 \\ 3x_1 & + & 6x_2 & + & 3x_3 & - & 3x_4 & = & 0 \\ 2x_1 & + & 4x_2 & + & 4x_3 & + & 2x_4 & = & 2 \end{array} \right\}$$

2. Suppose we have variables x_1 , x_2 , x_3 , and x_4 . For each of the following augmented matrices, (1) Is it in reduced row-echelon form? (2) If not, use Gaussian elimination to put it into reduced row-echelon form. (3) With your matrix in reduced row-echelon form, find all solutions to the associated system of equations. (Assume that we've ordered the variables in the standard way.)

(a)

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

(b)

$$\left[\begin{array}{cccc|c} 0 & 1 & 4 & 0 & -8 \\ 0 & 0 & 0 & 1 & 3 \\ 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 \end{array} \right]$$

(c)

$$\left[\begin{array}{cccc|c} 1 & 4 & 0 & 0 & 4 \\ 0 & 1 & 5 & 6 & -3 \\ 0 & 0 & 1 & 0 & -2 \\ 0 & 0 & 0 & 1 & 1 \end{array} \right]$$

3. (a) Suppose I have 13 coins (all nickels, dimes, and quarters) in my pocket totaling to \$2.00. What are the possibilities for how many of each I have? (Hint: Set up a system of linear equations and solve it, but keep in mind that the number of e.g. nickels that you have is a nonnegative integer.)