Day 2 on 7-4

Ex 1) Use the matrix capabilities of a graphing calculator to reduce the augmented matrix corresponding to the system of equations, and solve the system.

$3x + 3y + 12z = 6$
$x + y + 4z = 2$
$2x + 5y + 20z = 10$
$-x + 2y + 8z = 4$

$$\begin{bmatrix} 3 & 3 & 12 & : & 6 \\ 1 & 1 & 4 & : & 2 \\ 2 & 5 & 20 & : & 10 \\ -1 & 2 & 8 & : & 4 \end{bmatrix}$$

reduced row echelon form.

$$\begin{bmatrix} 1 & 0 & 0 & : & 0 \\ 0 & 1 & 4 & : & 2 \\ 0 & 0 & 0 & : & 0 \\ 0 & 0 & 0 & : & 0 \end{bmatrix}$$

$X = 0$

$(0, 2-4z, z)$

$y + 4z = 2$
$y = 2 - 4z$

Ex 2) **Borrowing Money:** A small corporation $1,500,000 to expand its line of shoes. Some of the money was borrowed at 7%, some at 8%, and some at 10%. Use a system of equations to determine how much was borrowed at each rate if teh annual interest was $130,500 and the amount borrowed at 10% was four times the amount borrowed at 7% Solve the system using matrices.

$x = \$ $ at 7% $z = 4x$
$y = \$ $ at 8%
$z = \$ $ at 10%

$x + y + z = 1,500,000$
$0.07x + 0.08y + 0.10z = 130,500$
$4x \qquad - z = 0$

$$\begin{bmatrix} 1 & 1 & 1 & : & 1,500,000 \\ 0.07 & 0.08 & 0.10 & : & 130,500 \\ 4 & 0 & -1 & : & 0 \end{bmatrix}$$

reduced row echelon form

$$\begin{bmatrix} 1 & 0 & 0 & : & 150,000 \\ 0 & 1 & 0 & : & 750,000 \\ 0 & 0 & 1 & : & 600,000 \end{bmatrix}$$

7% → $150,000
8% → $750,000
10% → $600,000