

## Solving Systems of Linear Equations on the TI-86

$$x + y + z = 6$$

We want to solve the following system:  $2x - y + 3z = 5$

$$3x + 4 - 7z = 1$$

1. What is the augmented matrix that represents the above system?

$$\left[ \begin{array}{ccc|c} & & & \end{array} \right]$$

2. On the calculator, find the **MATRIX** menu (depending on what calculator you have, it may be in different locations). Select **EDIT**. Give your matrix a name. You can use any set of letters, or just one letter.
3. The calculator asks for the dimensions of the matrix. What are the dimensions of this augmented matrix?
4. Enter the values of your augmented matrix into the matrix on the calculator. It should look just like your augmented matrix. Exit.
5. The goal is to get the matrix in reduced row echelon form:

$$\left[ \begin{array}{ccc|c} 1 & 0 & 0 & a \\ 0 & 1 & 0 & b \\ 0 & 0 & 1 & c \end{array} \right]$$

where  $x = a$ ,  $y = b$ , and  $z = c$ .

6. Go back to the **MATRIX** menu and select **OPS** (depending on your calculator, this may be different). In the **OPS** menu, select **rref** (this stands for reduced row echelon form).
7. Type in the name of your matrix, so that you see this on the screen: **rref A**. Hit enter. What is the solution to the system?

8. Using the calculator, solve the following systems of equations. (to convert answers from decimals to fractions, use **FRAC** in the **MATH** menu)

a.  $3x + 2y + 3z = 3$   
 $4x - 5y + 7z = 1$   
 $2x + 3y - 2z = 6$

c.  $5x + 12y + z = 10$   
 $2x + 5y + 2z = -1$   
 $x + 2y - 3z = 5$

b.  $2x + 3y - z - w = -3$   
 $2x - y - 3z + 2w = -5$   
 $x - y + z - w = -4$   
 $3x - 2y + z + w = 0$

$-p + 5q - 8r + 3s + 9t = 12$   
 $-6p + 9q - 2r - 4s + 10t = 14$   
d.  $14p - 6q + 12r + 16s + 7t = -24$   
 $p + q + r + s + t = 9$   
 $7p - 19 + q + 13r + 6s - 2t = 25$