Algebra 2 Lesson Ch4: Matrices – Solving systems of 3 Variables By Hand Mrs. Snow, Instructor

All systems of 3 equations would be really nice to solve if they were all like:



Gaussian Elimination

Gaussian Elimination (aka row echelon form) is an effective algorithm (a step by step procedure for calculations) that may be used to reduce systems of 3 equations into a triangular shaped form:



In a college level algebra class you would learn how to perform Gaussian elimination to a matrix, in this class we will work with systems of equations. We saw last class that systems are easily converted to matrix equations.

To perform Gaussian Elimination on a system of equations, one uses a sequence of elementary row operations to modify the system until the last row of the system is a variable equal to a number, the second row is 2 variables equal to a number and the 1st row is 3 variables equal to a number.

There are three types of elementary row operations:

- 1) Swapping two rows,
- 2) Multiplying a row by a non-zero number, and
- 3) Adding a multiple of one row to another row.



NOTE: You will <u>use one row to change another</u> without actually changing the one row. For example: Below we will add – 4 times row 3 to row 2 so to change row 2.

Let's put the words to a problem: Solve using the Gaussian Method:

$(2m - m + 2\pi - 12)$	Work:
$\binom{2x - y + 3z = 15}{4x + 3y - 2z - 5}$	
4x + 5y - 2z = 5 x - y - 4z = -4	
(x y 12 1	

$\begin{cases} x - 2y + 3z = 4\\ 2x + y - 4z = 3\\ -3x + 4y - z = -2 \end{cases}$	