# Section 7.3

## Row-Echelon Form

Row-echelon form means that it has a stair-step pattern with leading coefficients of 1. Once the system is in echelon form, we use back substitution to solve it.

## Gaussian Elimination

Two systems of equations are equivalent if they have the same solution set. To solve a system that is not in row-echelon form, first convert it to an equivalent system that is in row-echelon form by using the following operations.

## Operations That Produce Equivalent Systems

Each of the following row operations on a system of linear equations produces an equivalent system of linear equations.

  a) Interchange two equations.

  b) Multiply one of the equations by a nonzero constant.

  c) Add a multiple of one of the equations to another to replace the latter equation.

**Problem 1.** Solve the system of linear equations.

a) $\begin{cases} x - 4y + 2z = 4 \\ 2x + 4y - z = 7 \\ 2x - 12y + 5z = -3 \end{cases}$

b) $\begin{cases} 3x - 4y + 4z = 7 \\ x - y - 2z = 2 \\ 2x - 3y + 6z = 5 \end{cases}$

c) $\begin{cases} 3x + 2y + z = 3 \\ x - 3y + z = 4 \\ 6x + 4y + 2z = -1 \end{cases}$

**Problem 2.** Find the equation of the parabola $y = ax^2 + bx + c$ that passes through the points $(3, 1), (2, 3),$ and $(0, -5)$.

Homework: Read section 7.3, do #7, 11, 19, 29, 39, 53