Today: § 1.1: Systems of Linear Equations

Next: § 1.2: Row Reduction & Echelon Forms

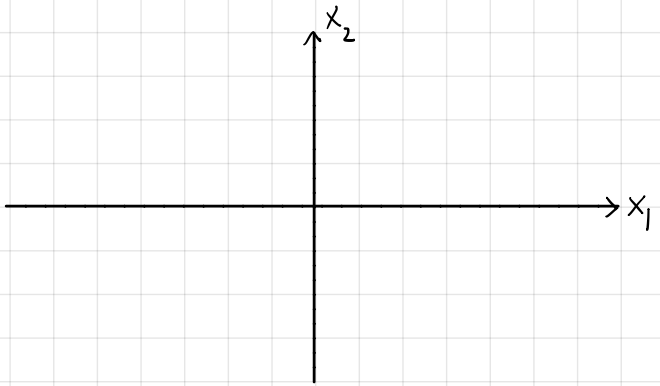
Reminders:

MyMathLab Homework #1 & #2: Due Mon, Jan 22

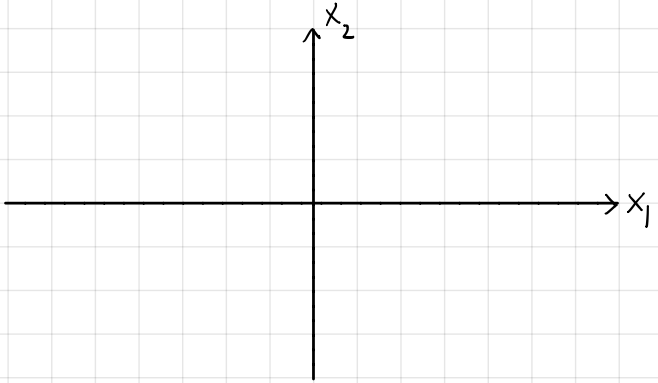
MATLAB Homework #1: Due Fri Jan 19

Linear Equations

$$x_1 - 2x_2 = -1$$
$$-x_1 + 3x_2 = 3$$



$$x_1 - 2x_2 = -1$$
$$-x_1 + 2x_2 = 3$$



Row Operations

$$x_1 - 2x_2 = -1$$
$$-x_1 + 3x_2 = 3$$

$$x_1 - 2x_2 = -1$$
$$-x_1 + 2x_2 = 3$$

Classification

If two systems of equations have exactly the same solution set, they are called _____.

There are three basic kinds of outcomes for the solution set:

* no solution
* one unique solution
* infinitely-many solutions

Given 2 equations in 2 unknowns, it's pretty quick to solve completely; often you can tell what will happen at a glance. Scaling up to more unknowns, we need to do the math.

E.g.
$$\begin{aligned} x_1 - 2x_2 + x_3 &= 0 \\ 2x_2 - 8x_3 &= 8 \\ 5x_1 - 5x_3 &= 10 \end{aligned}$$

$$\left[\begin{array}{ccc|c} 1 & -2 & 1 & 0 \\ 0 & 2 & -8 & 8 \\ 5 & 0 & -5 & 10 \end{array}\right]$$