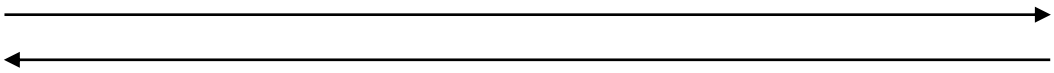
SYSTEMS OF TWO EQUATIONS

** Finding Out How Many Solutions There Are **

Ask, where are the lines touching or meeting?



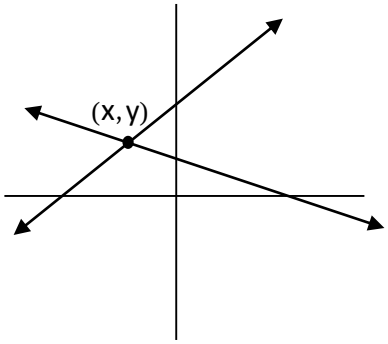
When solving systems of equations, the goal is to determine where the lines meet or touch. In other words, what point or points do the equations have in common?

Three Scenarios:

Intersecting Lines

Meeting at one point

Consistent / Independent



One solution

You will get an x-value and a y-value, such as:

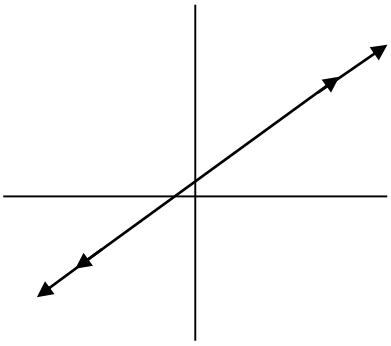
x = -3 and **y = 5**

In other words, an ordered pair (-3, 5)

Coinciding Lines

Meeting at every point

Consistent / Dependent



Infinite solutions

You will get an answer that looks something like:

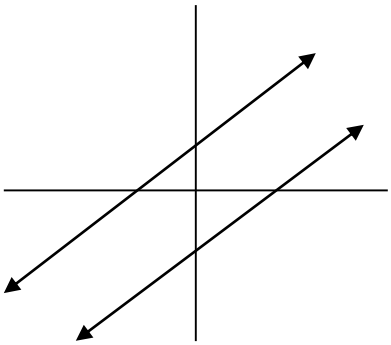
0 = 0 or **2 = 2**

This makes sense. 0 does equal 0 and 2 does equal 2.

Parallel Lines

Lines that never meet

Inconsistent / Independent



No solution

You will get an answer that makes no sense, such as:

0 = 4 or **-7 = 8**

(No Sense = No Solution)

What's all this Math vocabulary ?

Consistent or Inconsistent

A system of two equations is *consistent* if the equations have one or more (or infinite) solutions. The system of equations is *inconsistent* if the equations have no common solution.

Dependent or Independent

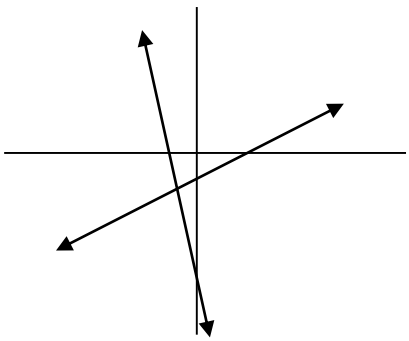
Two equations are *dependent* if the equations have an infinite number of solutions (they are the same line). The equations are *independent* if they have one solution or no common solution.

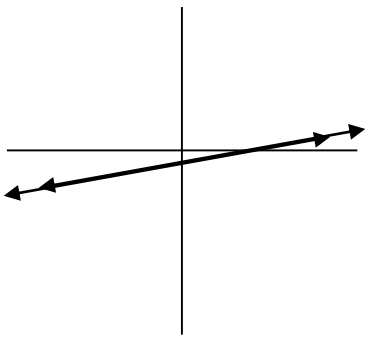
Intersecting, Coinciding or Parallel

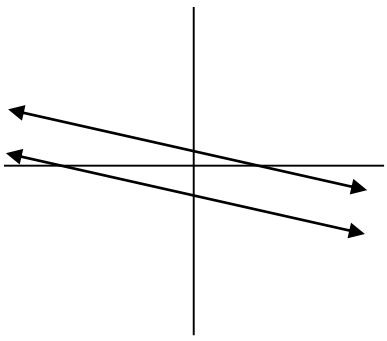
Two distinct lines *intersect* (meet or touch each other) in one point. *Coinciding* lines intersect at every point, and are they actually the same line. *Parallel* lines never intersect.

The three examples of equations and graphs below use this vocabulary.

Example A	Example B	Example C
$4x + y = -13$ $-3x + 2y = -4$	$2x - 6y = 10$ $5x - 15y = 25$	$-2x - 5y = 7$ $-2x - 5y = -2$
One Solution: (-2, -5) Equations: independent System: consistent Lines: intersecting	Infinite # of solutions Equations: dependent System: consistent Lines: coinciding	No common solution Equations: independent System: inconsistent Lines: parallel







Methods used to solve systems of three equations are discussed in Handout 25.