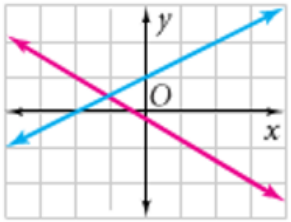
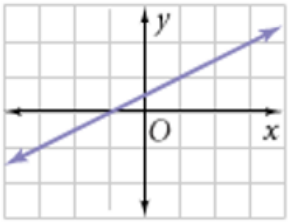
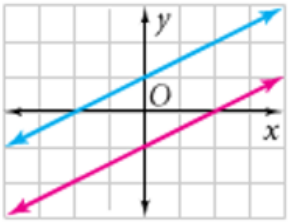
Algebra 2
Lesson 2 – Graphing Systems of Equations and Inequalities
Mrs. Snow, Instructor

Two or more linear equations form a **system of equations**. We can classify systems of equations by the number of solutions:

Intersecting Lines	Coinciding Lines	Parallel Lines
		
Independent: slopes: y-intercepts: one solution	**Dependent:** slopes: y-intercepts: infinite solutions	**Inconsistent:** slopes: y-intercepts: no solutions

Without graphing, determine fi each system is independent, dependent, or inconsistent.

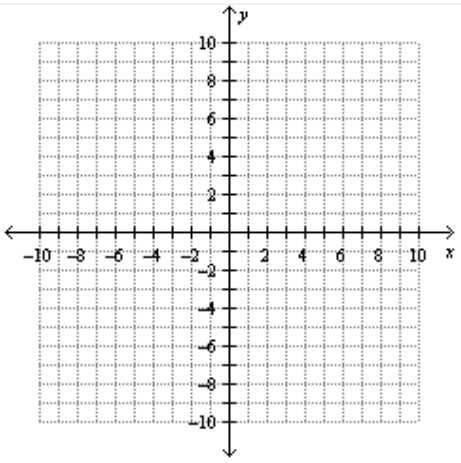
$\begin{cases} 3x + y = 5 \\ 15x + 5y = 2 \end{cases}$

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

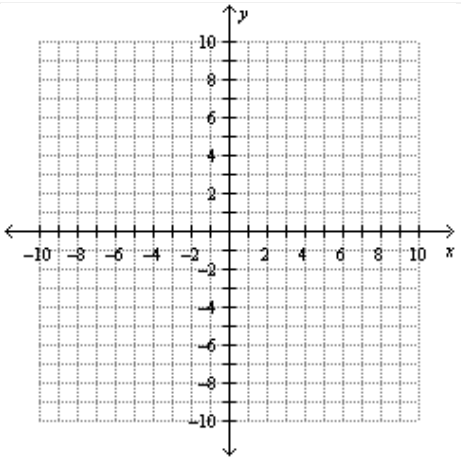
The solution to a system of equations **is the common point of intersection**. One way to find a solution to a system of equations is to graph both equations and locate the (x,y) coordinates where the two lines intersect.

Solve by graphing. Determine if the system is independent, dependent, or inconsistent.

$\begin{cases} 2x + y = 5 \\ -x + y = 2 \end{cases}$



$\begin{cases} x + 3y = 2 \\ 3x + 3y = -6 \end{cases}$



LINEAR INEQUALITIES AND SYSTEMS OF LINEAR INEQUALITIES

A **linear inequality** divides a graph into two regions – one that will contain only true solutions and one that will contain only false solutions. The **boundary line** that divides both regions may, at times, be a part of the solution.

Review:

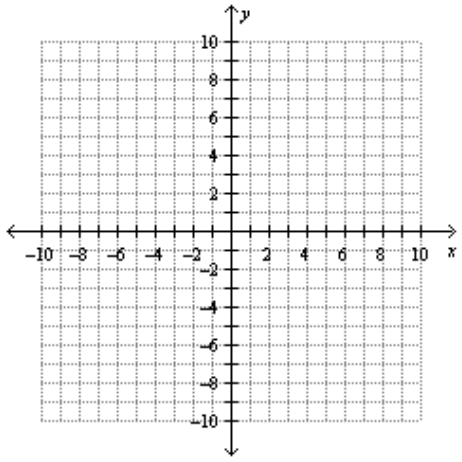
Rules to remember when graphing inequalities and absolute values:

First and foremost: ALWAYS SOLVE FOR Y AND THEN GRAPH USING SLOPE INTERCEPT!!!

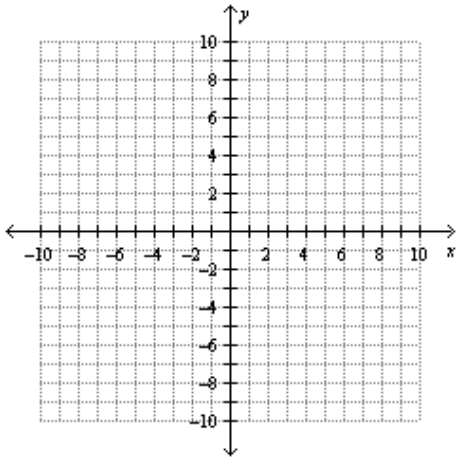
1. Inequalities with a $< or >$ is drawn as a dotted line.
2. Inequalities with a $\leq or \geq$ is drawn as a solid line.
3. Inequalities with a $< or \leq$ are shaded downward.
4. Inequalities with a $> or \geq$ are shaded upward.

Graph the inequalities

$y < \frac{1}{2}x - 3$



$-2y \leq -4x + 6$



A simple way to check a graph is to pick a point (x,y) not on the line, but found in the shaded region. Plug it into the given equation. If the result is a true statement, then you have shaded the graph correctly

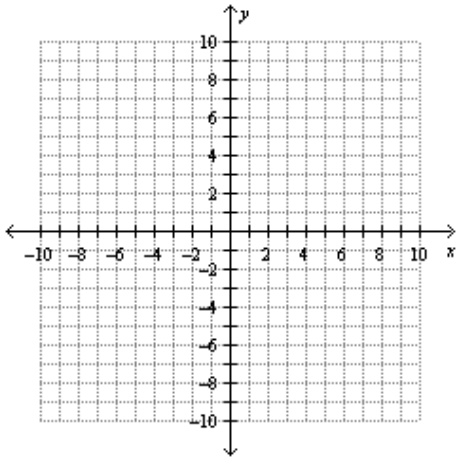
Now consider two inequalities in the same coordinate grad. The solution in such cases is the area that both equations have in common – overlap.

Solve each system in inequalities

$$\begin{cases} 2x + y \geq 5 \\ -x + y < 2 \end{cases}$$

Example: Graph: $\boldsymbol{m} =$	$\boldsymbol{b} =$	$\boldsymbol{m} =$	$\boldsymbol{b} =$
Inequality type	shading	Inequality type	shading

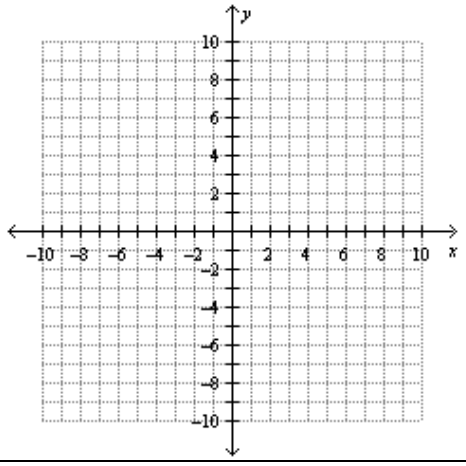
A *table helps to organize facts so you don't mess up!*



$$\begin{cases} x + 3y > 2 \\ 3x + 3y \leq -6 \end{cases}$$

Example: Graph: $\boldsymbol{m} =$	$\boldsymbol{b} =$	$\boldsymbol{m} =$	$\boldsymbol{b} =$
Inequality type	shading	Inequality type	shading

Also notice the common solution area is double shaded.



Also notice the common solution area is double shaded.