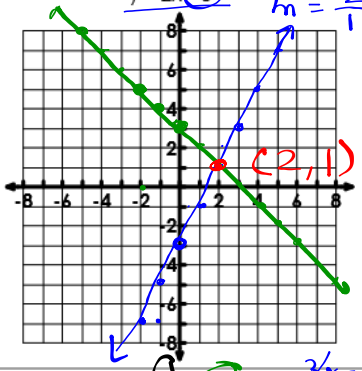
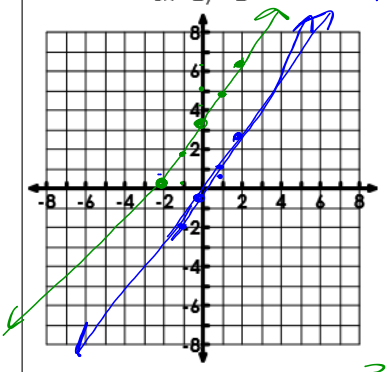
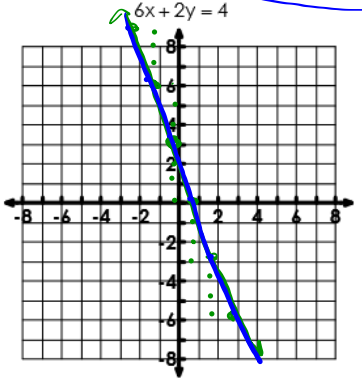
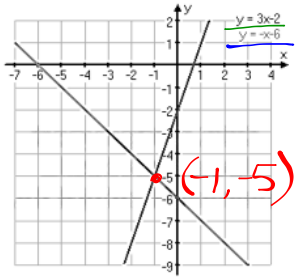
Day 1 – Graphing Systems of Equations

Two or more linear equations in the same variable form a **system of equations**. A **solution** to a system is a pair of numbers a and b for which x = a and y = b to make each equation a true statement. A solution is also the point where the two equations intersect each other on a graph.

Graph the following:	What Did You Notice?
$y = -x + 3$ $y = 2x - 3$  $m = \frac{2}{1} = \frac{-2}{-1}$ x | $y=-x+3$ | $y=2x-3$ -2 | 5 | -7 -1 | 4 | -5 0 | 3 | -3 1 | 2 | -1 2 | 1 | 1	• Type of Solution: ONE SOLUTION • Lines are intersecting • Different/Same slope (m) • Different y-intercept (b) (2, 1)
$y = \frac{3}{2}x + 3$ $3x - 2y = 2$  $-2y = -3x + 2$ $y = \frac{3}{2}x - 1$ x | $y=\frac{3}{2}x+3$ | $y=\frac{3}{2}x-1$ -2 | 0 | -4 -1 | 1.5 | -2.5 0 | 3 | -1 1 | 4.5 | 0.5 2 | 6 | 2	• Type of Solution: NO SOLUTION • Lines are parallel • Same slope (m) • Different y-intercept (b)
$y = -3x + 2$ $6x + 2y = 4$  $m = \frac{-3}{1} = \frac{-3}{-1}$ $6x + 2y = 4$ $2y = -6x + 4$ $y = -3x + 2$ $y=-3x+2$ $y=-3x+2$ x | 8 | 8 -2 | 5 | 5 -1 | 2 | 2 0 | -1 | -1 1 | -4 | -4 2	• Type of Solution: INFINITE the same • Lines are slope (m) • Same y-intercept (b) • Same

Example: Find the solution of the linear equation and check your answer.



(-1, -5)

$y = 3x - 2$
$-5 = 3(-1) - 2$
$-5 = -3 - 2$
$-5 = -5$ ✓

$y = -x - 6$
$-5 = -(-1) - 6$
$-5 = -5$ ✓

Examples: Check whether the ordered pair is a solution of the system of linear equations.

Ex. (1, 1) x y

$2x + y = 3$
$x - 2y = -1$

$2(1) + (1) = 3$
$2 + 1 = 3$
$3 = 3$ ✓

Yes!

$x - 2y = -1$
$(1) - 2(1) = -1$
$1 - 2 = -1$
$-1 = -1$ ✓

Ex. (-2, 4) x y

$4x + y = -4$
$-x - y = 1$

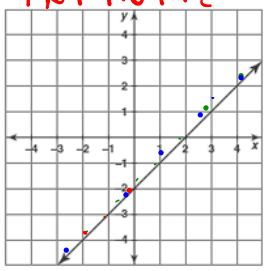
$4(-2) + (4) = -4$
$-8 + 4 = -4$
$-4 = -4$ ✓

NO!

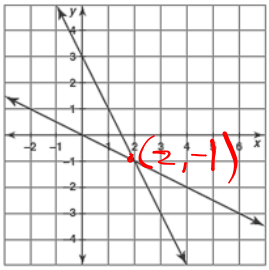
$-x - y = 1$
$-(-2) - (4) = 1$
$2 - 4 = 1$
$-2 \neq 1$

Practice: Tell how many solutions the systems of equations has. If it has one solution, name the solution.

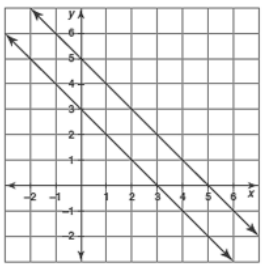
INFINITE



ONE



NO SOLUTION



Identify Solutions to a System from a Table

Remember, that the solution to a system of equations is where the two lines intersect each other. The point of the intersection is the **solution. The solution is where the x-value (input) produces the same y-value (output) for both equations.** Using the tables below, identify the solution.

a. (3, -3)

x	y = −x	y = x − 6
0	0	−6
3	−3	−3
6	−6	0
9	−9	3

b. (1, 6)

x	y = 2x + 4	y = 4x + 2
−2	0	−6
−1	2	−2
0	4	2
1	6	6