Systems of Equations – Quick Reference

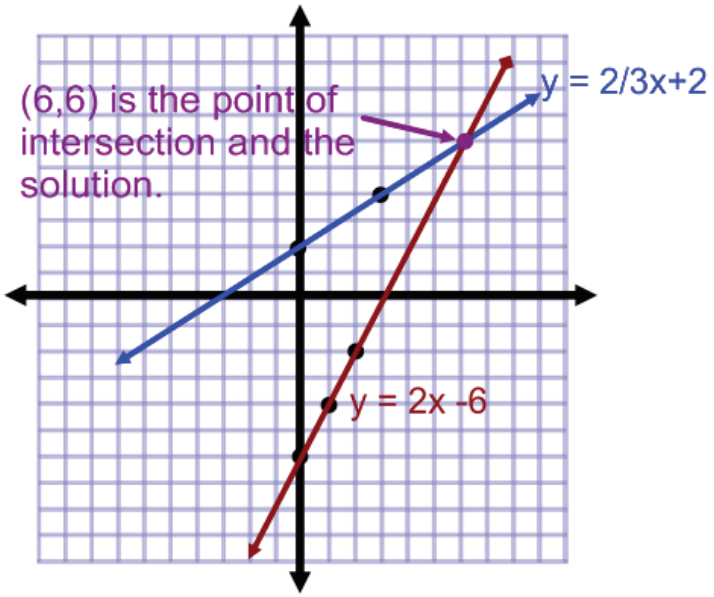
Two linear equations form a system of equations. You can solve a system of equations using one of three methods:

1. **Graphing**
2. **Substitution Method**
3. **Linear Combinations Method**

Graphing Systems of Equations

y = 2/3x +2

y = 2x -6



The solution to this system of equations is (6,6)

The solution to a system of equations is the **point of intersection**.

The **ordered pair** that is the point of intersection represents the solution that satisfies **BOTH** equations.

If two lines are **parallel** to each other, then there is **no solution**. The lines will never intersect.

If two lines lay **one on top of another** then there are **infinite solutions**. Every point on the line is a solution.

Substitution Method

Solve the following system of equations:

x – 2y = -10
y= 3x

x – 2y = -10	Since we know y = 3x, substitute 3x for y into the first equation.
x – 2(3x) = -10	
x – 6x = -10	Simplify: Multiply 2(3x) = 6x.
-5x = -10	Simplify: x – 6x = -5x
-5x = -10 -5 -5	Solve for x by dividing both sides by -5.
x= 2	The x coordinate is 2.
y = 3x	Since we know that x = 2, we can substitute 2 for x into y = 3x.
y = 3(2)	
y = 6	
Solution: (2, 6)	The solution!

Linear Combinations (Addition Method)

Solve the following system of equations:

3x+2y = 10
2x +5y = 3

-2(3x + 2y = 10) 3(2x + 5y = 3)	Create opposite terms. I'm creating opposite x terms.
-6x – 4y = -20 6x + 15 y = 9 11y = -11	Multiply to create opposite terms. Then add the like terms.
11y = -11 11 11	Solve for y by dividing both sides by 11.
y = -1	The y coordinate is -1
2x + 5y = 3 2x +5(-1) = 3	Substitute -1 for y into one of the equations.
2x – 5 = 3 2x -5 + 5 = 3 + 5 2x = 8 2 2	Solve for x!
x = 4	**The solution (4, -1)**