SAT PREP MATH: WEEK #2
SYSTEMS OF EQUATIONS

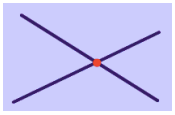
A system of equations consists of two or more equations relating two or more variables. The systems on the SAT are usually limited to two equations with two variables.

There's some information that you need to remember about systems to be successful on this section.

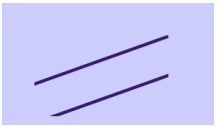
#1: If you graph a system of linear equations, the solution is where the two lines cross.

#2: Systems can have one solution, no solution, or an infinite number of solutions.

- So graphically, **if the two lines cross in one place**, then the system has **one answer**.



- If the two lines are **parallel**, then the lines will never cross and there is **no solution**.



REMEMBER, Parallel lines have EQUAL SLOPES but different y-intercepts.

Example: $y = 5x + 4$ and $y = 5x - 1$

- If the two lines are actually the **same line**, then there are an **infinite number of solutions**.

Example: $y = 2x + 1$ and $2y = 4x + 2$

#3: You can solve a system of equations in the following ways:

- Graphing
- Elimination
- Substitution

#4: If you solve a system by elimination or substitution, here's how you will know if you have no solutions or infinite solutions:

$y = 3x + 5$

$-6x + 2y = 10$

$-6x + 2(3x + 5) = 10$

$-6x + 6x + 10 = 10$

$10 = 10$

true statement

∞ solutions

$2x + 2y = 8$

$x + y = -4$

$2x + 2y = 8$

$+(-2x - 2y = 8)$

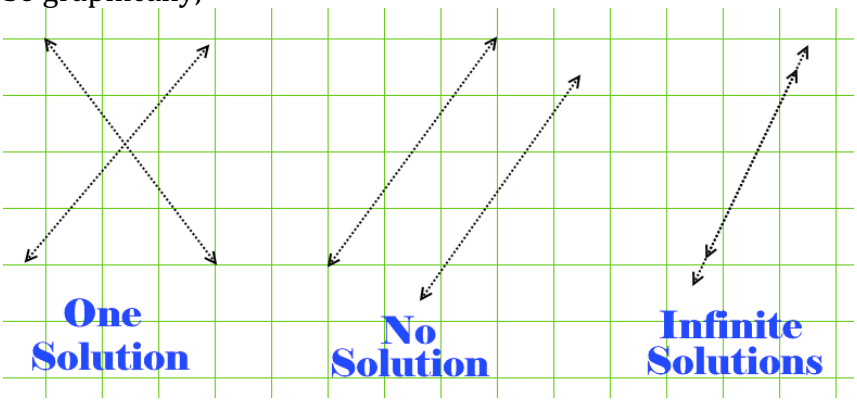
$0 + 0 = 16$

$0 \neq 16$

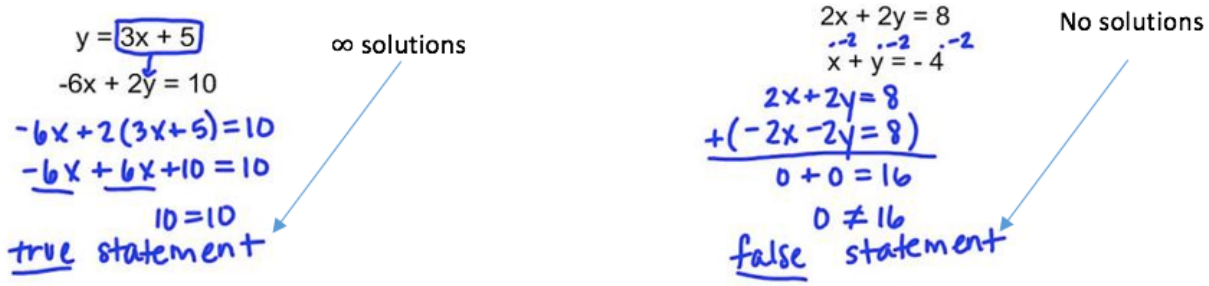
false statement

No solutions

So graphically,



Algebraically,



Two reminders about inequalities:

1) When they are finally solved, you have to write the variable on the left:
   We write $x > 5$ and not $5 < x$ though they mean the same thing

2) When you divide or multiply by a negative, you flip the inequality sign

Class Practice:

Log-in to your Khan Academy account and go under the PRACTICE tab.

Scroll down to the HEART OF ALGEBRA.

Practice:

1) Solving Systems of Linear Equations
2) Systems of Linear Equations and Word Problems
3) Systems of Linear Inequalities and Word Problems