7.5: Special Types of Linear Systems

Goals: *Solve and identify when a system of equations has one solution, no solution or an infinite number of solutions
*Arrange systems so you can state the number of solutions without solving

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****Review/Preview****

· What is a solution to a linear system?
1)

2)

· Then what would you say is the solution if you graphed two lines and they happened to be parallel?
When are two lines parallel?

· What would you say if you graphed two lines and they were the exact same line?
When are two lines **exactly the same**?

· If two lines are **not** parallel, then what must be true about them?
When are lines **not** parallel?

****RECALL****

Solve each equation or inequality.

Ex: $3(x + 4) = 3x + 16$

Ex: $4(2x + 6) = 8(x + 3)$

Ex: $2x - 3x + 6 \leq -(x - 10)$

Ex: $3(6x - 1) > 2(9x - 1)$

***Regardless of if you are solving an equation or an inequality what is the general rule that applies to both types of problems?**

Now we are going to apply this same concept to systems of equations…

Solve each system using the method of your choice:

Ex: $3x + 2y = 10$
$3x + 2y = 2$

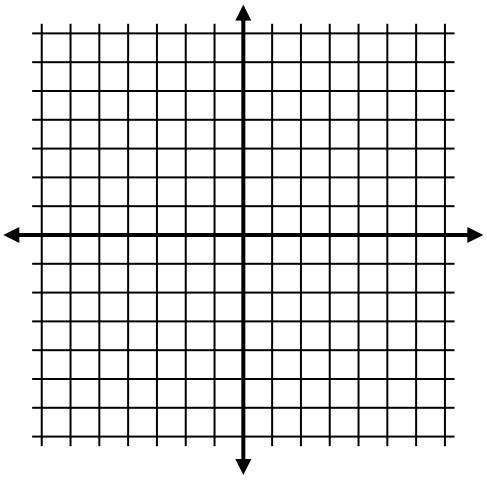
Ex: $x - 2y = -4$
$y = \frac{1}{2}x + 2$

Ex: $5x + 3y = 6$
$-5x - 3y = 3$

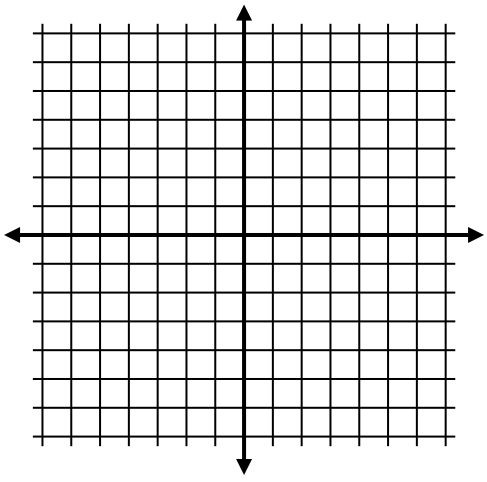
Ex: $y = 2x - 4$
$-6x + 3y = -12$

Solve each system by graphing.

Ex: $2x - 3y = 6$
$2x - 3y = -4$



Ex: $4x - 2y = 8$
$y = 2x - 4$



Identify the number of solutions of a linear system:

· A system of equations will have **no solution** when the two lines are:

They are _____ when:

· A system of equations will have an **infinite number of solutions** when the two lines are:

They are _____ when:

· A system of equations will have exactly **one solution** when the two lines are:

They are _____ when:

Number of Solutions	**Slopes and *y*-intercepts**

If you can quickly identify the slope and *y*-intercept of each line, then you can state how many solutions the system has **without solving.**

- What do you need to do to be able to quickly identify the slope and *y*-intercept of a line?

Without solving the system, tell whether there is one solution, no solution or infinitely many solutions.

Ex: $5x + y = -2$
$-10x - 2y = 4$

Ex: $6x + 2y = 3$
$6x + 2y = -5$

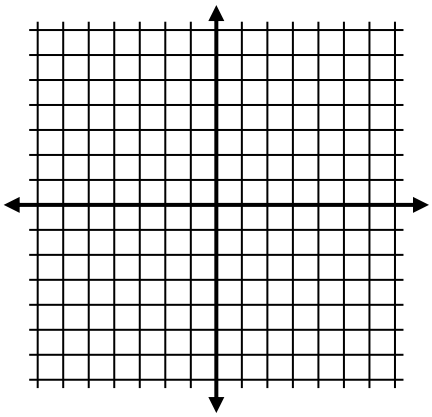
Ex: $-3x + 5y = 6$
$6x - 10y = -12$

Ex: $9x - 5y = 12$
$9x - 5y = 8$

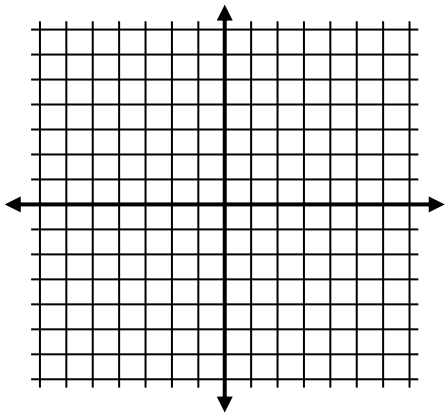
Ex: $x - 3y = -15$
$2x - 3y = -18$

Use the graphs below to show a system of equations with:

a. No solution



b. One solution



c. Infinitely many solutions