NOTES: What do you know about solving systems of equations?

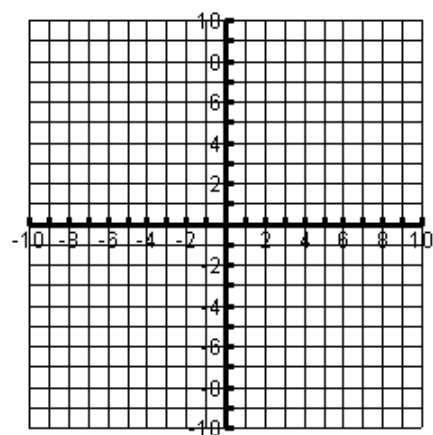| 1. What is a system of equations?	2. Three possible solutions for a system of equations:	3. Three ways to solve a system of equations:

4. Solve by graphing:

$x + y = 10$

$x - y = 4$

5. Solve by substitution:
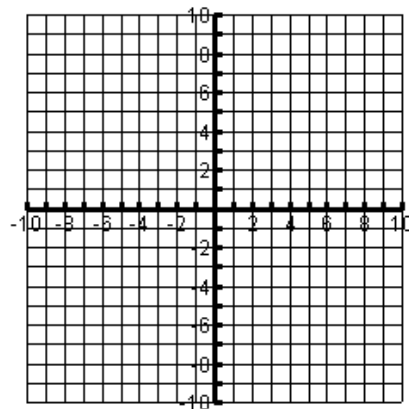
$3x + y = -9$

$-3x - 2y = 12$

6. Solve by elimination:

$2x + 4y = -4$

$3x + 5y = -3$

7. Solve by graphing:

$y > \frac{2}{3}x + 2$

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

Method 1: Graphing

- Solve each equation for y.
- Enter the first equation into Y_1.
- Enter the second equation into Y_2.
- Use the **INTERSECT** option to find where the two graphs intersect (the answer).
  2nd TRACE (CALC) #5 intersect
  Move spider close to the intersection.
  Hit **ENTER** 3 times.

EX1: Solve $4x - 6y = 12$
$\qquad 2x + 2y = 6$

EX2: There are 25 bikes and trikes at the park. The bikes and trikes have 60 wheels in all. How many bikes and trikes are in the park?

You try!! Solve by graphing. (You can do these by hand or with a calculator!)

1. $-3x + 2y = 8$
   $x + 2y = -8$

2. $-2x + 4y = 6$
   $4x - 8y = 12$

3. $2x - y = 3$
   $6x - 3y = 9$

4. $y = (x + 3)^2$
   $y = -2x + 9$

5. $9y - x = 41$
   $y = |x + 1|$

6. $y + 6 = |x + 5|$
   $\frac{1-y}{3} = \left|\frac{1}{4}x\right|$

Method 2: Substitution

- Solve one of the equations for either $x =$ or $y =$
- Replace this value in the other equation
- Solve this new equation
- Place this numerical value into either of the ORIGINAL equations in order to solve for the other variable
- Write solution as a POINT

EX3: $2x - 3y = -2$
$4x + y = 24$

EX4: $x + 3y = -9$
$5x + 8y = 11$

EX5: Jake's Surf Shop rents surfboards for $6.00 plus $3.00 per hour. Rita's rents them for $9.00 plus $2.50 per hour.
a. After how many hours of surfing will the rental fee be the same for both surf shops?

b. You only want to surf for 2 hours; which surf shop should you go to?

You try!! Solve using substitution.

1. $x - 2y = 13$
$3x + 2y = 15$

2. $4x + 5y = -14$
$8x + 10y = -20$

<u>Method 3: Elimination</u>

Basic Goal: Add the two equations together so that the x or y is eliminated.
- Arrange equations so variables, equal signs, and constants line up vertically.
- Multiply one or both equations by a value so that one variable in the 1st equation has the opposite coefficient in the other equation.
- Add the two equations.
- Solve for the remaining variable.
- Substitute solution from step 4 into either equation and solve for the remaining variable.

EX6: $x - 2y = 12$
$5y = 6x - 23$

EX7: A jar filled with nickels and quarters contains a total of 55 coins. The value of all the coins in the jar is $6.95. How many quarters are in the jar?

You try!! Solve using elimination.
1. $2x + 8y = 6$
$-5x - 20y = -15$

2. $5x + 4y = -14$
$3x + 6y = 6$

3. The Algebra 2 classes took 60 minutes to answer a combination of 20 multiple-choice and extended-response questions. The class took 2 minutes to answer each multiple choice question and 6 minutes to answer each extended-response question. How many of each type of questions was on the test?