Foundations of Math

CHAPTER 3 PACKET

NAME:

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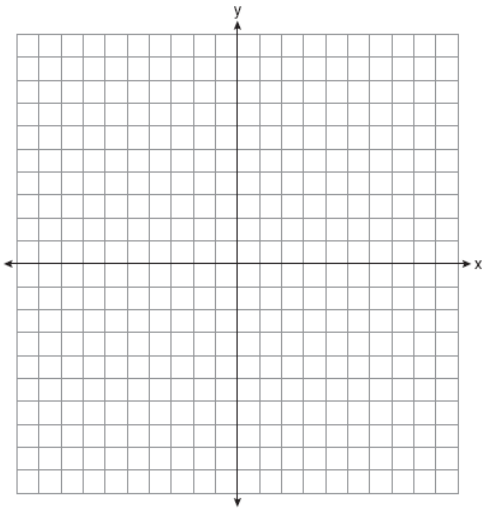
Name_____ Notes #43

SOLVING SYSTEMS OF LINEAR EQUATIONS BY GRAPHING

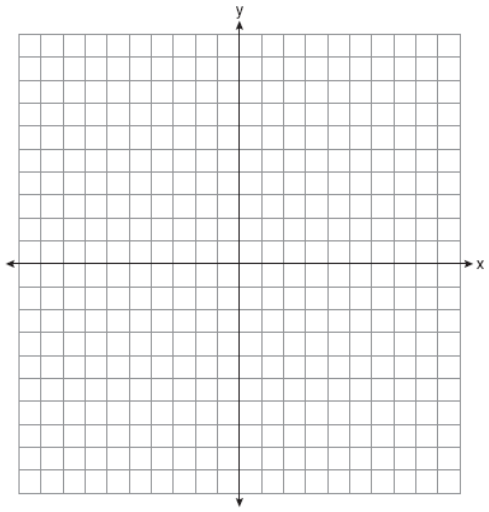
1. $x + y = 1$



Point in the Solution:

Algebraic Proof:

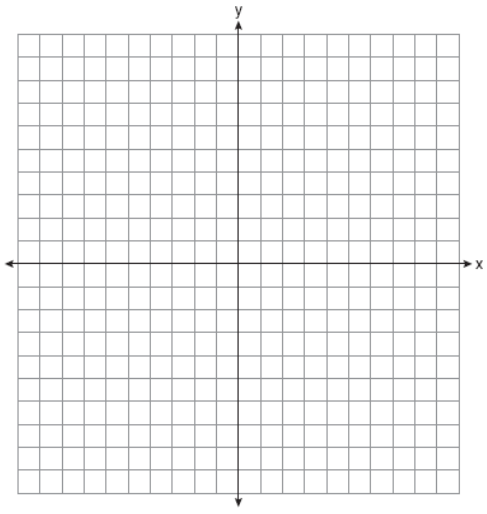
2. $x + 3y = 9$



Point in the Solution:

Algebraic Proof:

Now, plot both of these graphs on the SAME coordinate grid.



Name a point that is in the solution of BOTH graphs:

Hint: it must fall on BOTH lines.

Point:

When we graph, the **solution** to a **systems of linear equation** is always a_____

It is where the lines _____

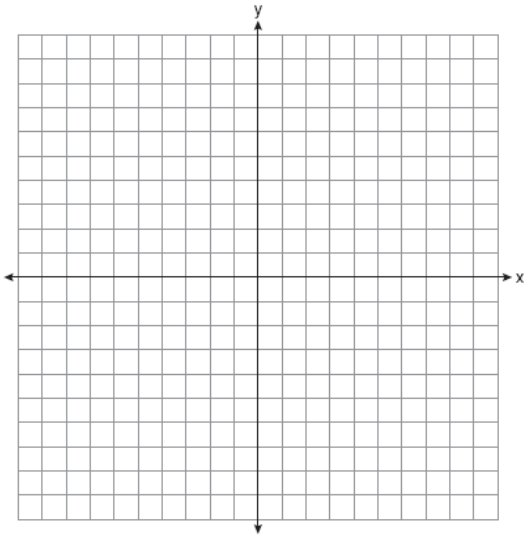
To solve a system of linear equations,

1. Get each equation into _____ form
2. Graph each equation on the _____ coordinate grid
3. Find and label the _____
4. Check your work by _____ the point to BOTH equations and verifying both sides are _____

Solve this system of linear equations:

$\begin{cases} x + 2y = 8 \\ x - 2y = 4 \end{cases}$

$x + 2y = 8$	$x - 2y = 4$
m= b=	m= b=

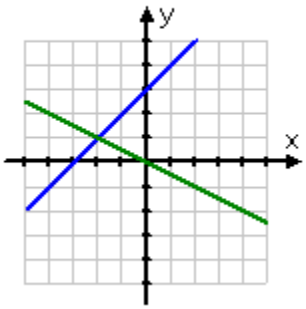
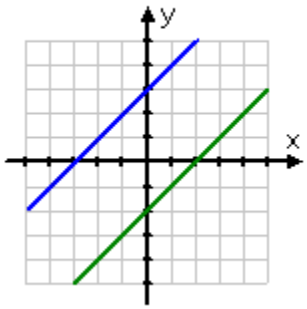
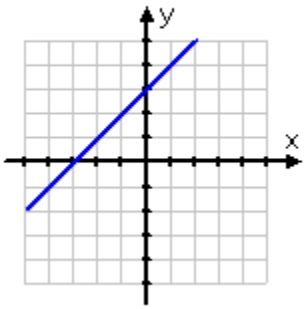


Solution:

Check Solution:

$x + 2y = 8$	$x - 2y = 4$

We will see 3 cases when we graph systems of equations

Case 1	Case 2	Case 3
		
One Solution The graphs intersect **one** time. ****DIFFERENT SLOPE****	***NO Solutions***. Parallel Lines never cross, so there are no solutions. ****SAME SLOPE****	***Infinite Solutions*** The SAME LINE is being graphed twice. ****SAME SLOPE AND SAME Y-INTERCEPT****

CALCULATORS ARE OUR FRIEND

Using a Graph:

1. You **MUST** solve each equation for y first
2. Hit the "**Y=**" key at the very top left of your calculator
3. Plug in your equations
4. Hit **GRAPH (**If you cannot see both lines you may need to change your window)
5. Hit **2nd→TRACE→Intersect (**choice 5**)**
6. Move the blinking cursor as close to the intersection point as possible
7. Hit **ENTER** 3 times
8. The x and y values of the intersection will be at the **bottom of the screen**. Make a coordinate with them. Remember: **(x,y)**

Solve the following problem by using your calculator:

$$\begin{cases} -4x + 2y = -4 \\ 2y = 6x - 10 \end{cases}$$

First, solve for y in each equation:

Second, follow the steps above.

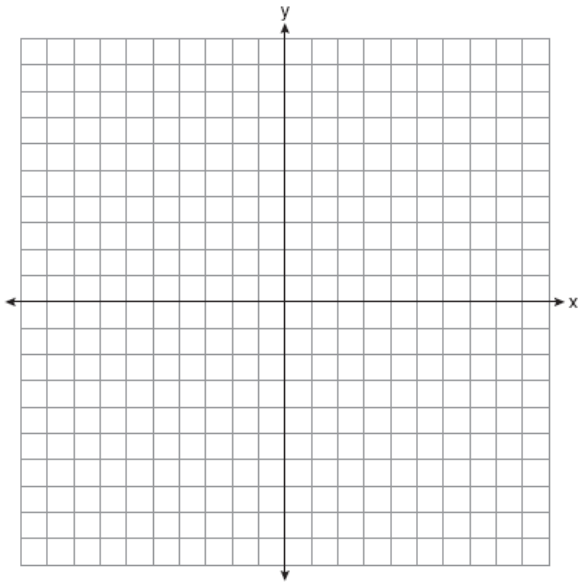
$-4x + 2y = -4$	$2y = 6x - 10$

Solution:

Solve this system of linear equations GRAPHICALLY and verify your answer algebraically.

$$\begin{cases} 4x - 6y = 12 \\ 2x + 2y = 6 \end{cases}$$

$4x - 6y = 12$	$2x + 2y = 6$
m= b=	m= b=



Solution:

Check Solution:

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

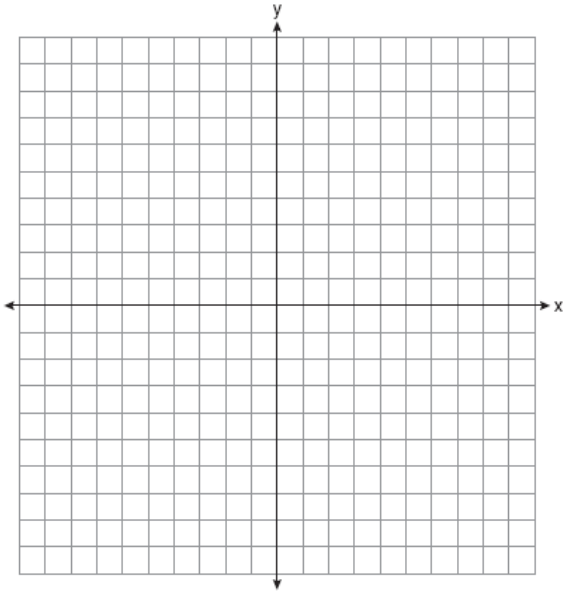
Name:_____ Notes #44

Solving Systems of Linear Equations by Substitution

Solve the following system of equations graphically:

$y = 3x - 2$

$x + y = 6$



Solution: _____

A second way to solve linear equations would be to use a method called _____.

_____ is when you replace a _____ with something that it

_____.

Steps to Solve using Substitution:

1. Solve one of your equations for either x or y.
2. Plug your solved equation into the other equation.
   (Replace the letter with what that letter equals)
3. Solve for the variable.
4. Plug your answer into the other equation to find the second variable.
5. Write your answer as an ordered pair. (x, y)

Example 1: Solve the system of equations algebraically.

$y = 3x - 2$
$x + y = 6$

Solution: _____

Example 2:

$y = x - 1$

$4y = 3x + 3$

Solution: _____

Example 3:

$2x + 5y = -12$

$y = 2x$

Solution: _____

Example 4:

$y = 3x - 7$

$2x + 3y = 12$

Solution: _____

Example 5:

$y - x = 4$

$y + 2x = -2$

Solution: _____

Name:_____ Notes #45

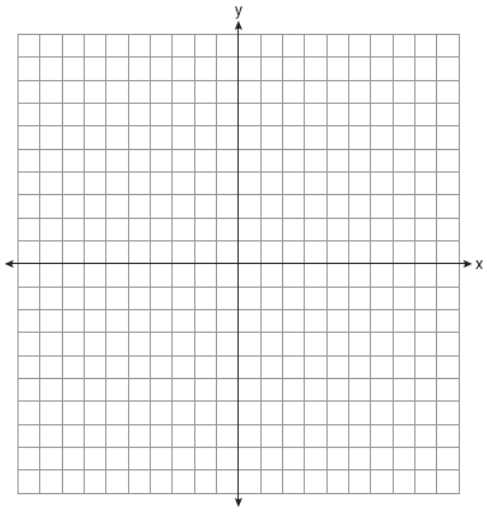
Solving Systems by Graphing and Substitution

Solve the following systems of equations algebraically.

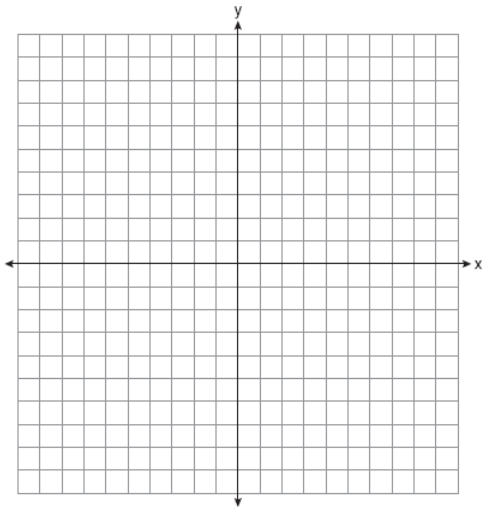
1. $y = 6x - 11$ $-2x - 3y = -7$	2. $y = x - 1$ $2x - 3y = -1$
3. $-4x + y = 6$ $-5x - y = 21$	4. $x + 3y = 1$ $-3x - 3y = -15$

Solve the following systems of equations graphically.

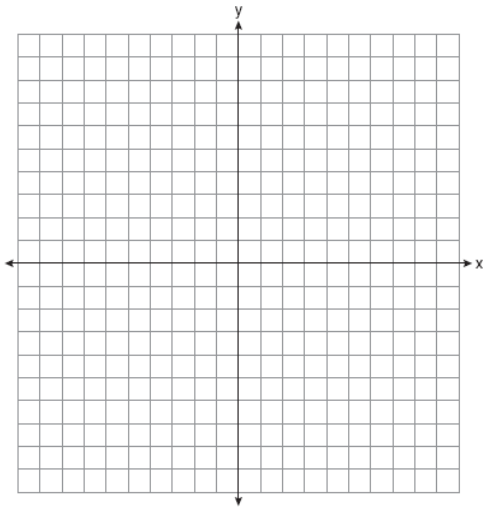
5. $y = -\frac{5}{3}x + 3$
$y = \frac{1}{3}x - 3$



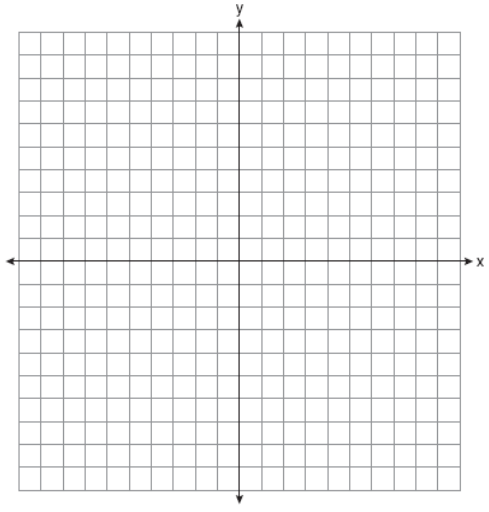
6. $y = 4x + 3$
$y = -x - 2$



7. $y = -\frac{1}{2}x - 1$
$y = \frac{1}{4}x - 4$



8. $y = -1$
$y = -\frac{5}{2}x + 4$



Name:_____ Notes #46

Solving Systems of Linear Equations using Elimination

Review: Solve the following system of linear equations using algebraically (substitution)

$y = x + 1$
$3y = 2x + 5$

Another way to solve ALGEBRAICALLY is by using _____.

_____ requires _____ a variable by using the _____.

An additive inverse takes a number or variable to _____.

Number	Additive Inverse
3	
$2x$	
$-5y$	

Elimination Method:

Our goal is to _____ one variable in order to solve for the other variable.

Example 1:

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

If none of our variables can be eliminated because they don't match up, we must use _____ in order to get them to match up.

Example 2:

$2x + 3y = 6$

$3x + 5y = 15$

Example 3:

$5x - 2y = 8$

$3x - 7y = -1$

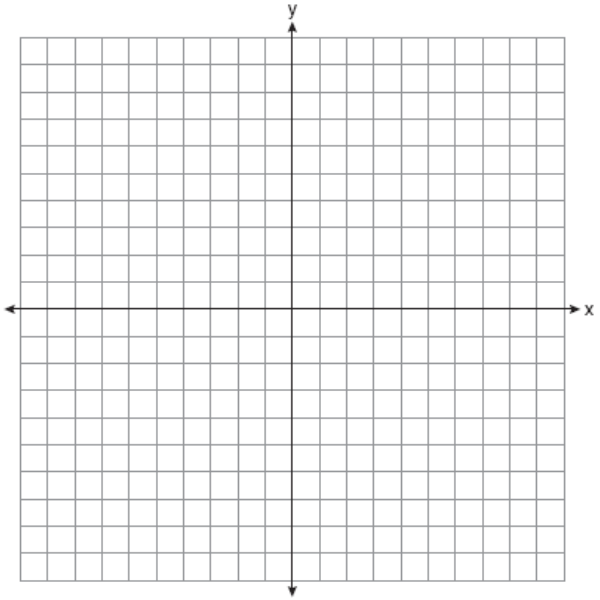
Name_____ Notes #47

SOLVING SYSTEMS OF EQUATIONS USING ALL THREE METHODS

Example 1:

a) Solve this system of equations ***graphically***.

$$\begin{cases} 2x + 2y = 16 \\ 3x - y = 4 \end{cases}$$



Solution_____

b) Solve this system of equations using ***substitution:***

$2x + 2y = 16$

$3x - y = 4$

Solution_____

c) Solve this system of equations using ***elimination:***

$2x + 2y = 16$

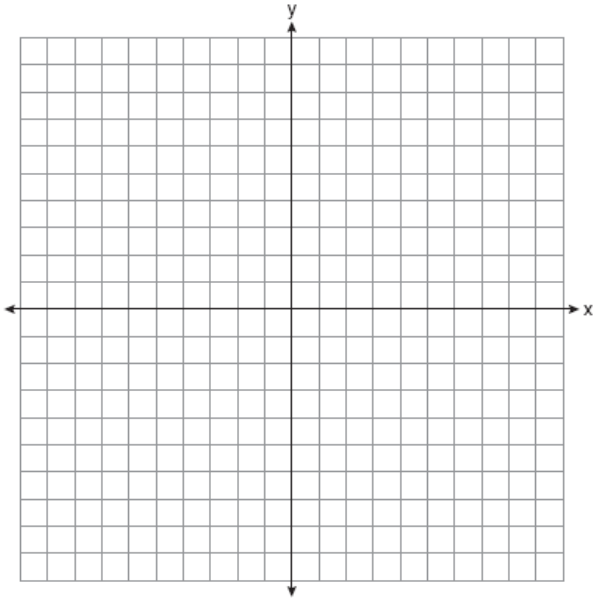
$3x - y = 4$

Solution_____

Example 2:

a) Solve this system of equations ***graphically***.

$$\begin{cases} y = 3x - 2 \\ 3y = -3x - 18 \end{cases}$$



Solution_____

b) Solve this system of equations using ***substitution:***

$$\begin{cases} y = 3x - 2 \\ 3y = -3x - 18 \end{cases}$$

Solution_____

c) Solve this system of equations using ***elimination:***

$$\begin{cases} y = 3x - 2 \\ 3y = -3x - 18 \end{cases}$$

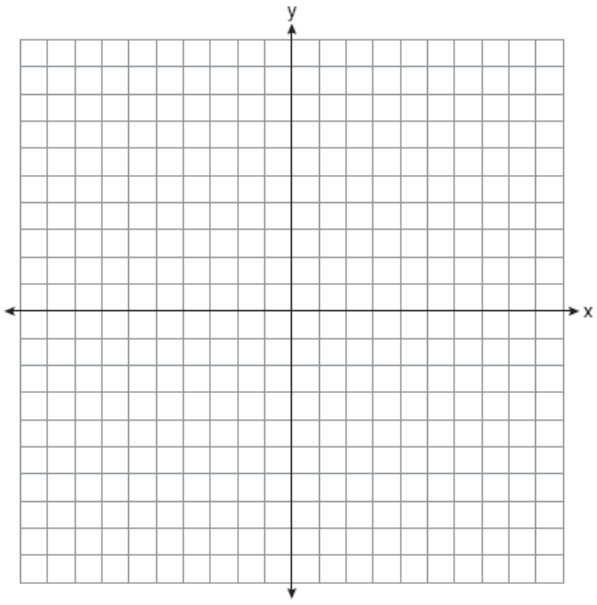
Solution_____

Special Case #1

Example 3:

a) Solve this system of equations ***graphically***.

$$\begin{cases} y = 3x - 2 \\ 3y = 9x - 12 \end{cases}$$



Solution_____

b) Solve this system of equations using ***substitution:***

$$\begin{cases} y = 3x - 2 \\ 3y = 9x - 12 \end{cases}$$

Solution_____

c) Solve this system of equations using ***elimination:***

$$\begin{cases} y = 3x - 2 \\ 3y = 9x - 12 \end{cases}$$

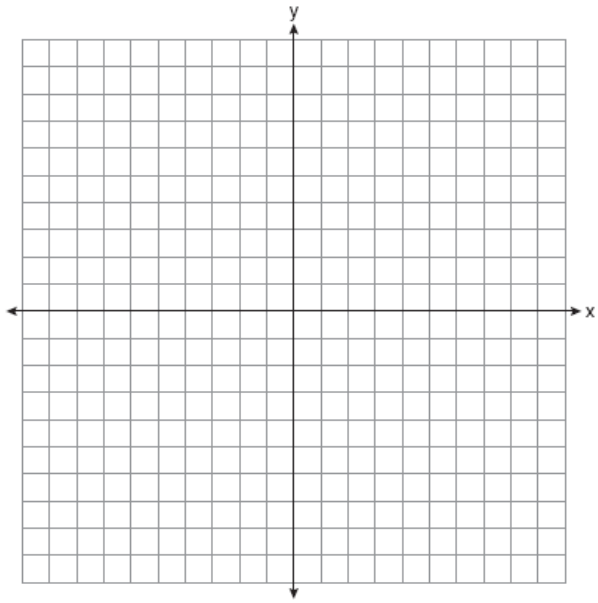
Solution_____

Special Case #2

Example 4:

a) Solve this system of equations ***graphically***.

$$\begin{cases} 2x + 2y = 10 \\ 4y = -4x + 20 \end{cases}$$



Solution_____

b) Solve this system of equations using ***substitution:***

$$\begin{cases} 2x + 2y = 10 \\ 4y = -4x + 20 \end{cases}$$

Solution_____

c) Solve this system of equations using ***elimination:***

$$\begin{cases} 2x + 2y = 10 \\ 4y = -4x + 20 \end{cases}$$

Solution_____

Name:_____ Notes #48

Systems of Equations Word Problems

Steps to follow…

1. Set up _____ to identify the variables.
2. Write the system of equations that represent the given situation.
3. Use one of the algebraic mathods to solve for each _____.
    a. _____
    b. _____
4. Write a _____ statement or sentence.

Example 1:

At a lunch counter, three bags of chips and one can of Pepsi cost $2.75. Two bags of chips and one can of Pepsi cost $2.00. Find the cost of one bag of chips and the cost of one can of Pepsi.

Example 2:

Ky and David went to the mall for lunch. Ky ordered three slices of pizza and two Cokes. David ordered two sliced of pizza and three Cokes. Ky's bill was $6.00. David's bill was $5.25. Find the cost of each slice of pizza and each Coke.

Example 3:

The owner of Regal Cinemas Movie Theater was counting money from a day's ticket sales. He sold 150 adult and children's tickets during that day. Adult tickets cost $7.50 each and children's tickets cost $4.75 each. If the total amount of money made from the day was $891.25, how many of each type of ticket were sold?

Example 4:

The city of Buffalo ordered a total of 100 baseballs and bats for the summer baseball camp. Baseballs cost $4.50 each, and bats cost $20.00 each. The total purchase cost the town $1380. How many of each item were ordered?

Example 5:

If the sum of two numbers is 14 and the difference between the two numbers is 8, what are the two numbers?

Name:_____ Notes #48.5

SYSTEMS OF EQUATIONS WORD PROBLEMS DAY 2

1) The sum of two numbers is 18, the difference of these two numbers is 4. What are the two numbers?

2) Hemely has two part time jobs. At one job, she works as a cashier and makes $8 per hour. At the second job, she works as a tutor and makes $12 per hour. One week she worked 30 hours and made $268. How many hours did she spend at each job?

3) Find two numbers such that the sum of the first and three times the second is 5 and the sum of second and two times the first is 8.

4) The admission fee at a small fair is $1.50 for children and $4.00 for adults. On a certain day, 2200 people enter the fair and $5050 is collected. How many children and how many adults attended?

5) Cedar Point is a popular field trip destination. This year the senior class at Maritime Charter School and the senior class at Tapestry Charter School both planned trips there. The senior class at Maritime rented and filled 8 vans and 8 buses with 240 students. Tapestry rented and filled 4 vans and 1 bus with 54 students. Every van had the same number of students in it as did the buses. Find the number of students in each van and in each bus.

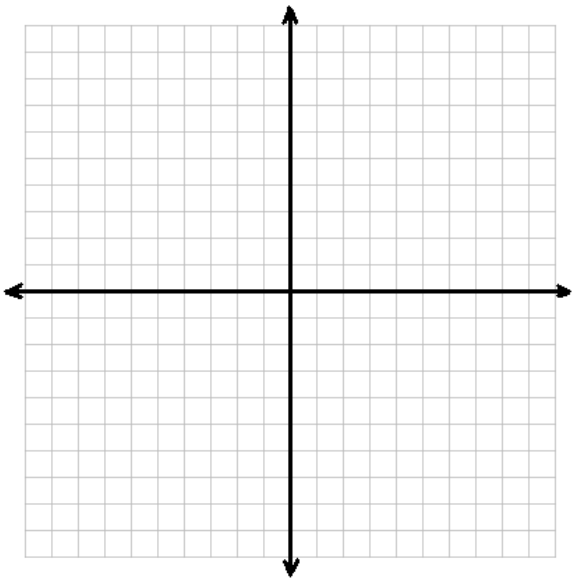
If bus rentals cost $190 and van rentals cost $100. How much did Maritime spend on rentals? If they had reorganized to use 10 busses and 3 vans, how much money would they save?

Name_____ Notes #49

SYSTEMS OF INEQUALITIES

Solve the system of equations ***graphically***:

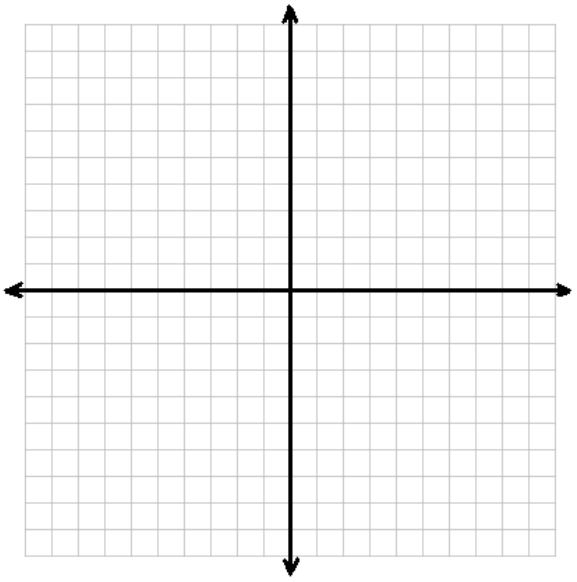
1) $\begin{cases} y = 3x - 4 \\ y = -2x + 6 \end{cases}$



Solution_____

2) Graph the inequality given below

$y < 4x - 7$



Remember the 4 things we need to know to graph!

m=

b=

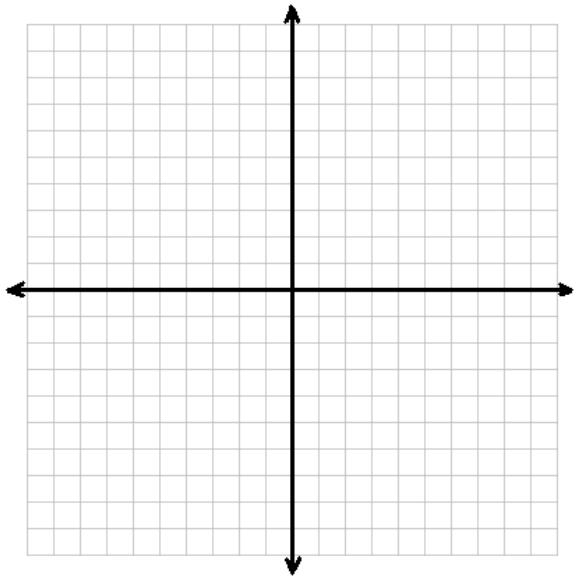
Line=

Shade=

- A system of inequalities is _____ or more inequalities.
- A solution to a system of inequalities is where the _____.
- We mark where the solution is by drawing a big _____.

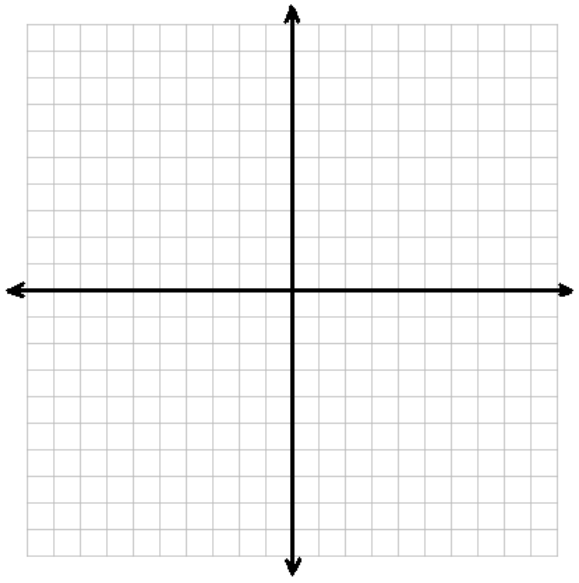
Solve the following systems of equations graphically. Then, name a point in the solution set.

3) $\begin{cases} y > 3x - 4 \\ y \leq -2x + 5 \end{cases}$



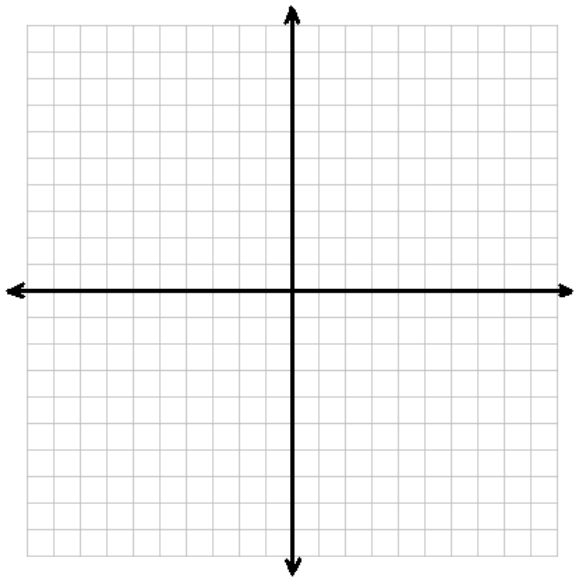
Name a point in the solution set:_____

4) $\begin{cases} y \leq \frac{1}{2}x + 1 \\ y > -x - 2 \end{cases}$



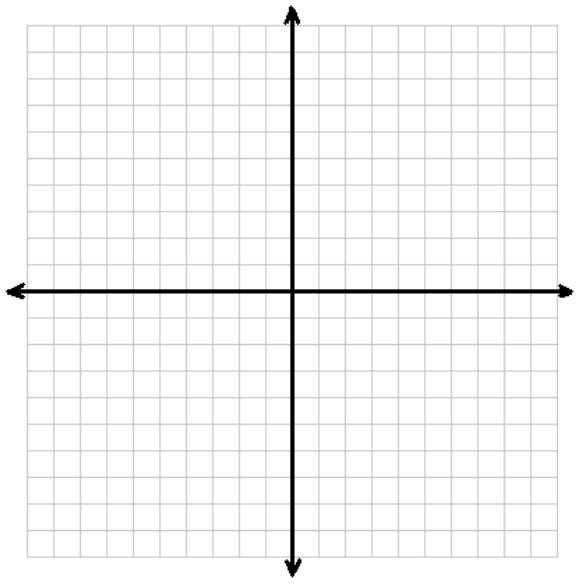
Name a point in the solution set:_____

5) $\begin{cases} y + 3x > -4 \\ y < x + 4 \end{cases}$



Name a point in the solution set:_____

6) $\begin{cases} y - 3x > -4 \\ 2y + x \leq 4 \end{cases}$

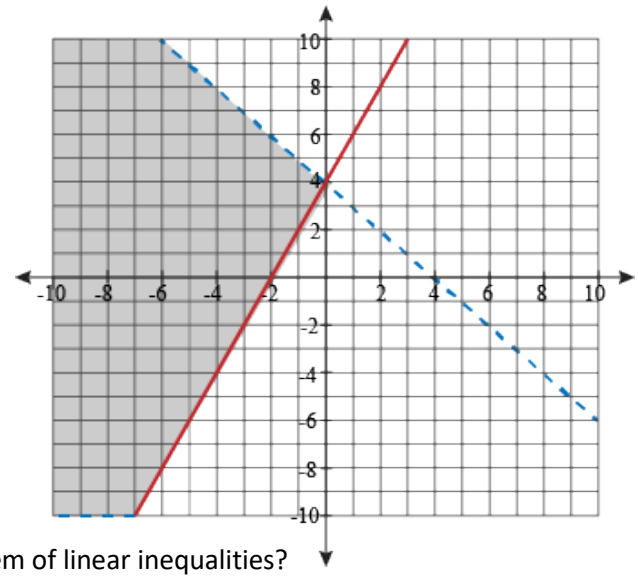


Name a point in the solution set:_____

Name:_____ Notes #50

SYSTEMS OF INEQUALITIES DAY 2

1) Which coordinate point is in the solution set for the system of inequalities shown in the accompanying graph?

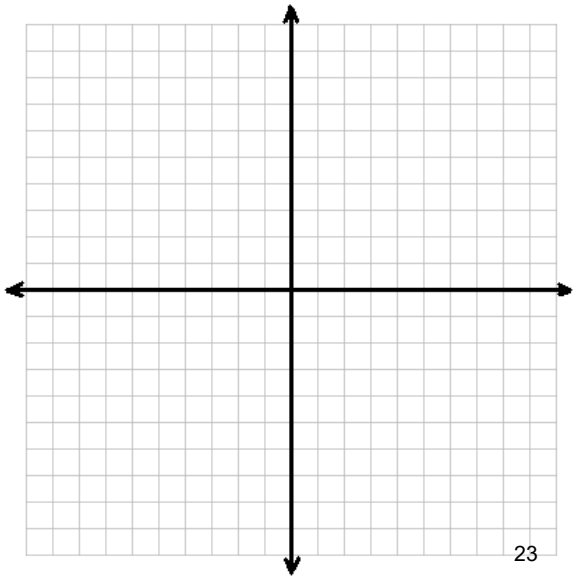


a. $(3,1)$
b. $(2,2)$
c. $(1,-1)$
d. $(-2,2)$

2) Which ordered pair is in the solution of the following system of linear inequalities?

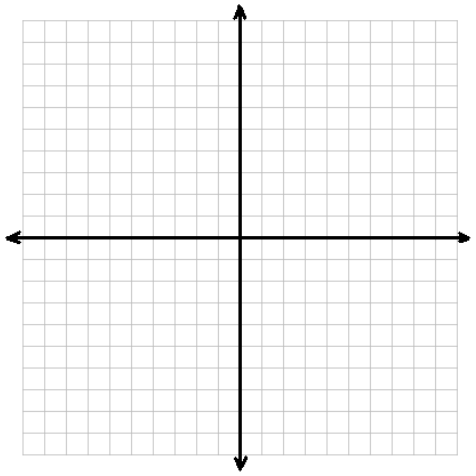
$$y < 2x + 2$$
$$y \geq -x - 1$$

a. $(0,3)$
b. $(2,0)$
c. $(-1,0)$
d. $(-1,-4)$

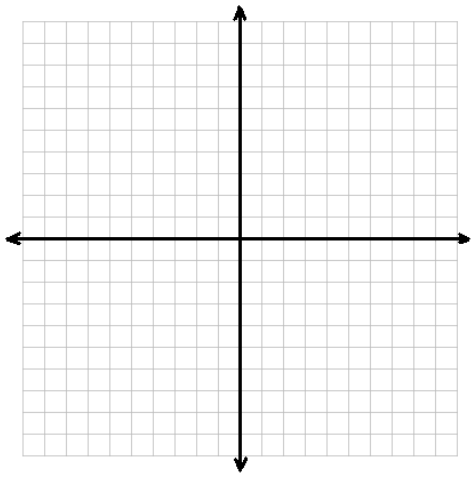


Graph the following system of inequalities and name one point in the solution.

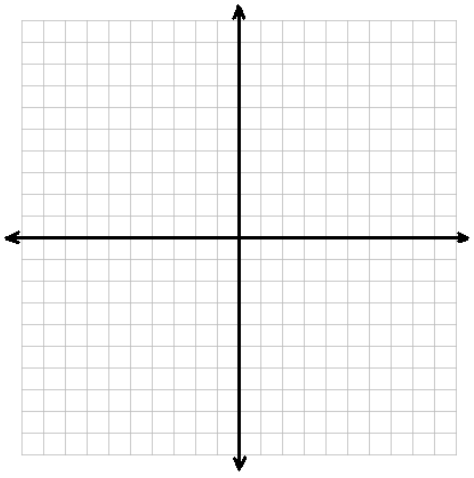
3) $y < 2x + 1$
$y \geq -\frac{1}{2}x$



4) $3x + 2y < 4$
$-2x + 3y \geq -9$



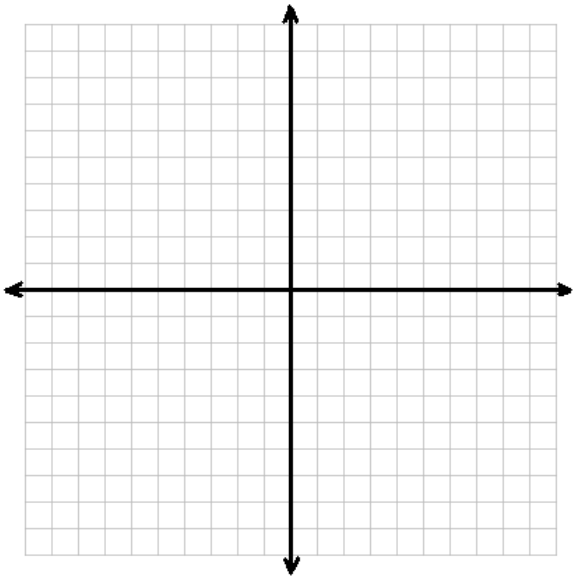
5) $y > x - 2$
$2y > -5x + 6$



Name_____ Homework 50

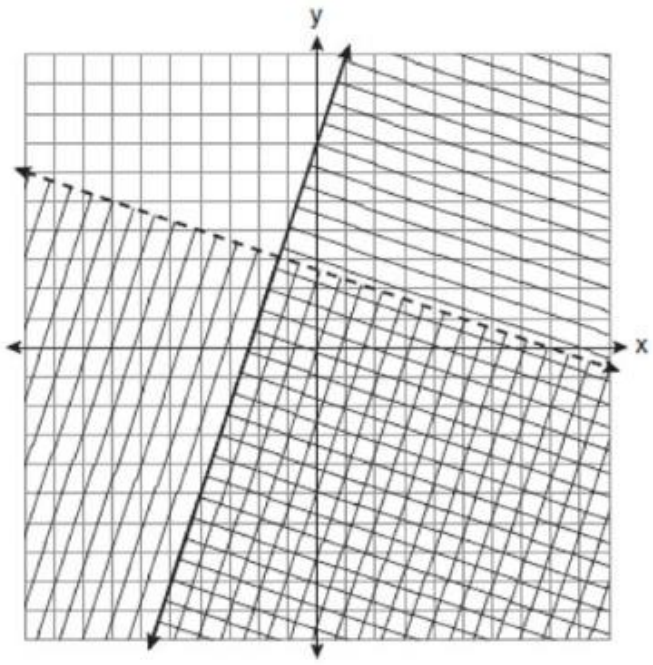
Name a point in the solution set:_____

1. $\begin{cases} y < \frac{1}{4}x + 3 \\ y \geq 5x - 5 \end{cases}$



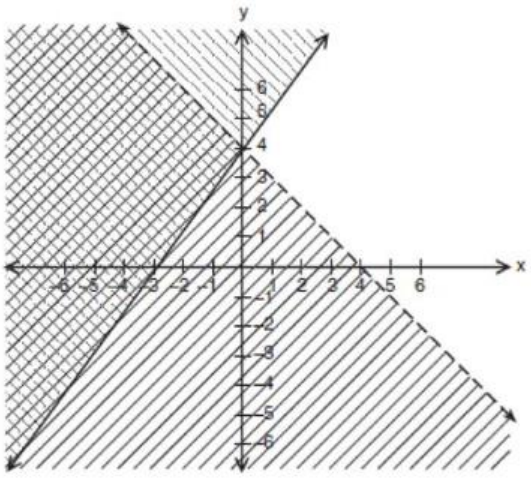
Name a point in the solution set:_____

2. Which ordered pair is in the solution set of the system of linear inequalities graphed below?



1) $(1, -4)$
2) $(-5, 7)$
3) $(5, 3)$
4) $(-7, -2)$

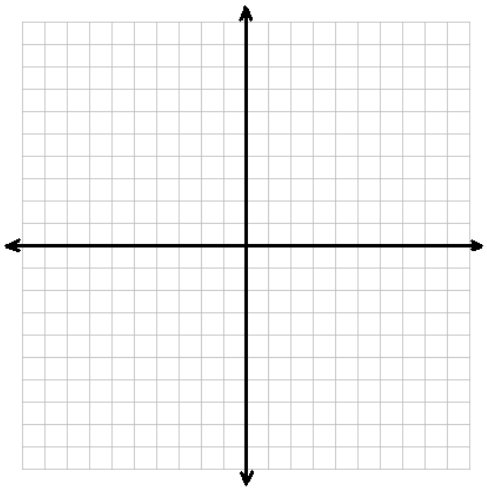
3. Which point is in the solution set of the system of inequalities shown in the accompanying graph?



1) $(0,4)$
2) $(2,4)$
3) $(-4,1)$
4) $(4,-1)$

4. Solve the system of equations graphically

$$x + y = 3$$
$$2x - y = -9$$

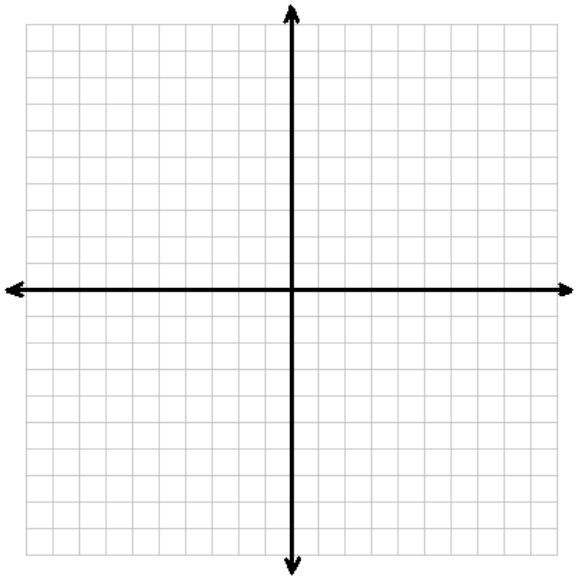


5. The admission fee at a small fair is \$1.50 for children and \$4.00 for adults. On a certain day, 2200 people attended the fair and \$5800.00 was collected. How many children and how many adults attended the fair?

Name_____ Homework 49

Name a point in the solution set:_____

1. $\begin{cases} y < \frac{1}{4}x + 3 \\ y \geq 5x - 5 \end{cases}$



Name a point in the solution set:_____

Name:_____ Homework 48.5

1) The school that Gina goes to is selling tickets to a choral performance. On the first day of ticket sales the school sold 3 senior citizen tickets and 1 child ticket for a total of $38. The school took in $52 on the second day by selling 3 senior citizen tickets and 2 child tickets. Find the price of a senior citizen ticket and the price of a child ticket.

2) The difference of two numbers is 3. Their sum is 13. Find the numbers.

Name:_____ Homework 48

1) A customer at a clothing store bought three t-shirts and one hat for $50. A week later at the same prices, a customer bought two t-shirts and two hats for $40. Find the price of a t-shirt and the price of a hat.

2) At a new luxury McDonalds, four cooks and one waiter earned $300 for one day of work. The next day, working the same number of hours, two cooks and three waiters earned $400. How much does a cook and how much does a waiter earn each day?

Name:_____ Homework 46

Solve the following using either Elimination or Substitution. On the line, tell me which method you chose.

1) $10x - 4y = 44$
$2x + 4y = 4$

Solve using _____

Solution:_____

2) $y = 2x$
$x + y = 21$

Solve using _____

Solution:_____

3) $y = x + 1$
$x + y = 9$

Solve using _____

Solution:_____

4) $3x + y = 16$
$2x + y = 11$

Solve using _____

Solution:_____

Name:_____ Homework 45

Solve the following systems of equations using substitution:

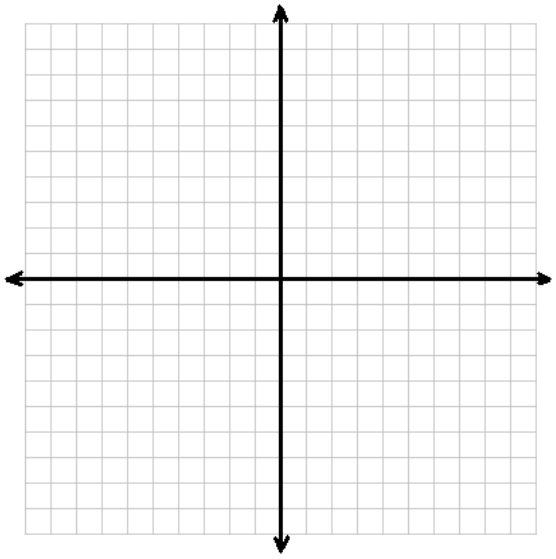
1) $y = -5x - 17$
$-3x - 3y = 3$

2) $y = 5x - 7$
$-3x - 2y = -12$

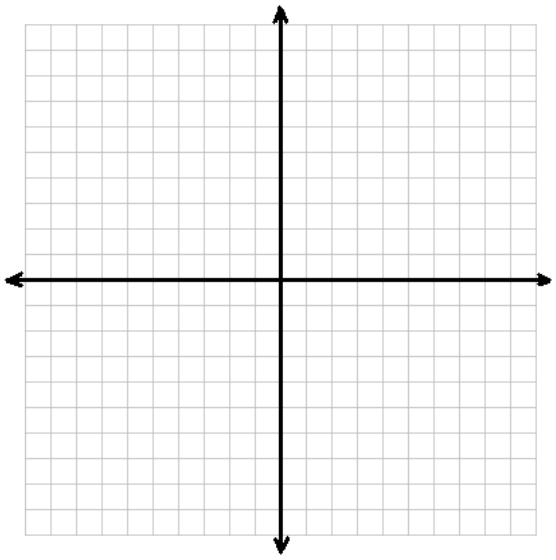
3) $-5x + y = -2$
$-3x + 6y = -12$

Solve the following systems of equations graphically:

4) $y = 3x - 4$
$y = -\frac{1}{2}x + 3$



5) $y = -2x + 2$
$y = -2x - 2$



Name_____ Homework 44

1. Solve this system of linear equations by using substitution.

$$\begin{cases} y = x + 4 \\ -6x + 2y = 4 \end{cases}$$

2. Solve this system of linear equations by using substitution.

$$\begin{cases} x + y = 5 \\ x + 2y = 4 \end{cases}$$

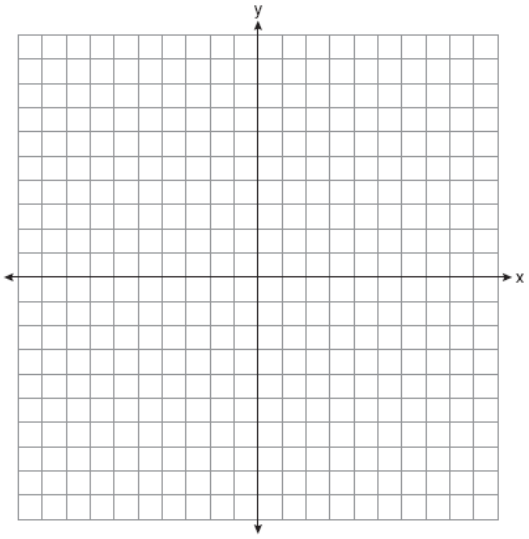
3. Solve this system of linear equations by using substitution.

$$\begin{cases} y = 3x - 6 \\ -2x + 2y = 8 \end{cases}$$

Name_____ Homework 43

1. Solve this system of linear equations GRAPHICALLY and verify your answer algebraically.

$$\begin{cases} 3y = 3x + 12 \\ -6x + 2y = 4 \end{cases}$$



$3y = 3x + 12$	$-6x + 2y = 4$
m=	m=
b=	b=

Solution:

Check Solution:

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