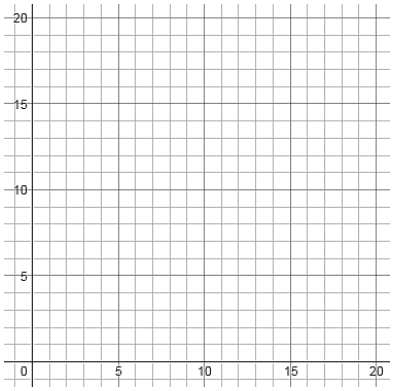
Honors 1 Name: _____

Chapter 6 Notes

6.1 – Solve Linear Systems by Graphing



Lead-In: A pair of friends want to start up a poster company. It will cost them 6 thousand dollars for initial materials and then 1 thousand dollars per month for regular expenses. What is their cost equation?

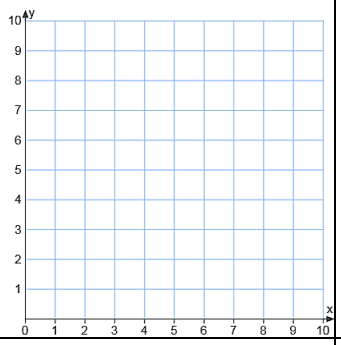
They estimate once they get going they will earn 2 thousand dollars per month in revenue. What is their revenue equation?

How many months will it take for the company to break even?

Example: Solve by graphing (that is, find where the lines intersect).

$x + y = 10$

$y = x + 2$



A solution to a linear system (or system of equations) is

_____

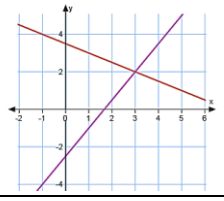
_____

_____.

Example: Verify the point of intersection is a solution to the linear system.

$x + 2y = 7$

$3x - 2y = 5$



Steps for Solving a Linear System by Graphing

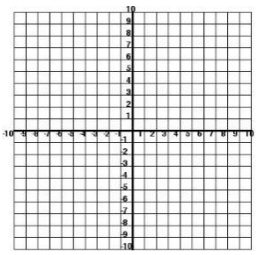
1. Solve for y (if needed, otherwise use intercepts)
2. Graph each equation
3. Find the point of intersection

Verify the coordinates of the point of intersection satisfy the equation to both lines.

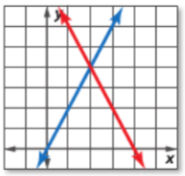
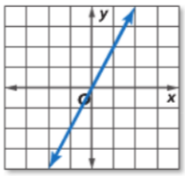
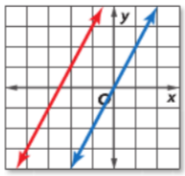
Example: Solve the system

$-x + y = -7$

$x + 4y = -8$



When you graph two lines, there are ____ possibilities:

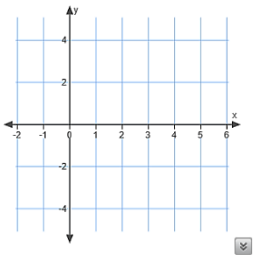
Number of Solutions			
Terminology	consistent and independent	consistent and dependent	inconsistent
Graph			

Writing an Equation to Solve by Graphing:

Write two equations to solve when the number of girls playing soccer will equal the number in track.

High School Sport	Number of Girls Participating in 2008 (thousands)	Average rate of increase (thousands per year)
soccer	345	8
track and field	458	3

6.2 – Solve Linear Systems by Substitution



Lead-In: Solve by graphing.

$x + 2y = 6$

$3x - 2y = 5$

As seen above, graphing can be a problem when: _____, so we need another tool or method. To lead us towards that method, try to solve the following riddle.

Example: I have a riddle for you. George and Sally are giraffes.

Hint 1) Their combined height is 19.5 feet, and...

Hint 2) George is twice as tall as Sally.

How tall are each of them?

Steps to Solving a System of Equations by Substitution

1.
2.
3.

Example: Solve the following system of equations by substitution.

$y = 2x - 6$

$4x + 6y = 4$

Example: Solve the following system of equations by substitution.

$x - y = 2$

$x + 4y = 17$

Example: How many pounds of sunflower seeds and raisins can be purchased?

The debate team plans to make and sell trail mix. They can spend $34.

Item	Cost Per Pound
sunflower seeds	$4.00
raisins	$1.50

The pounds of raisins in the mix are to be 3 times the pounds of sunflower seeds.

6.3 – Solve Linear Systems by Adding or Subtracting

Add the two equations. What is the sum? What happened?

$3x + y = 4$ $\qquad$ $5x + 2y = 23$

$2x - y = 6$ $\qquad$ $7x - 2y = 13$

HOW DOES THAT WORK???

Say I want to solve the following system of equations.

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

Example: solve the following system of equations: $2x + 3y = 11$ $-2x + 5y = 13$	Example: solve the following system of equations: $4x + 3y = 2$ $5x + 3y = -2$

Steps to Solving a System of Equations by Adding or Subtracting to Eliminate

1.
2.
3.

Example: Note, before you use elimination first line up the variables. Use this suggestion to solve the system:

$8x - 4y = -4$

$4y = 3x + 14$

6.4 – Solve Linear Systems by Elimination

Example: solve the system by elimination. What do you notice is different from the previous lesson?

$3x - 2y = 10$

$5x + 4y = 24$

Steps to Solving a System of Equations by Elimination (Multiplying First)

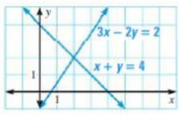
1.
2.
3.
4.
5.

Example: solve the system by elimination. $6x + 5y = 19$ $2x + 3y = 5$	**Example**: solve the system by elimination. $-3x - 4y = 27$ $5x - 6y = -7$

Example : 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?

CONCEPT SUMMARY *For Your Notebook*

Methods for Solving Linear Systems

Method	Example	When to Use
Table	x | $y = 2x$ | $y = 3x - 1$ 0 | 0 | −1 1 | 2 | 2 2 | 4 | 5	When x-values are integers, so that equal values can be seen in the table
Graphing		When you want to see the lines that the equations represent
Substitution	$y = 4 - 2x$ $4x + 2y = 8$	When one equation is already solved for x or y
Addition	$4x + 7y = 15$ $6x - 7y = 5$	When the coefficients of one variable are opposites
Subtraction	$3x + 5y = -13$ $3x + y = -5$	When the coefficients of one variable are the same
Multiplication (p. 451)	$9x + 2y = 38$ $3x - 5y = 7$	When no corresponding coefficients are the same or opposites

6.5 – Applying Our Knowledge on Systems of Equations

Method	The Best Time to Use
Graphing	
Substitution	
Elimination Using Addition	
Elimination Using Subtraction	
Elimination Using Multiplication	

Organize the equations by the best method to solve

Graphing

$y = 2x - 3$ $\quad 3x - 4y = 8$ $\quad y = 2x - 8$ $\quad 3x - 4y = -10$

$y = 3x + 4$ $\quad 2x + 4y = -12$ $\quad 3x + 4y = 12$ $\quad 5x + 5y = -2$

Substitution

$y = 5$
$3x + 2y = 9$

$y = \frac{1}{2}x - 5$
$y = -2x + 3$

Elimination

Example: Determine the best method and solve.

$4x - 4y = 8$

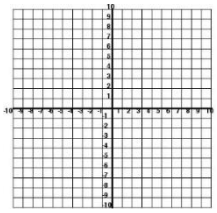
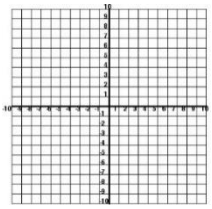
$-8x + y = 19$

Example: To raise money for a field trip, the French club sold pizza and subs at a basketball game. They sold 11 more subs than pizzas and earned a total of $233. Write and solve a system of equations and interpret the solution in context.

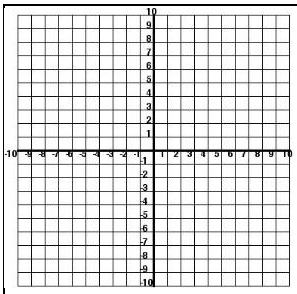
Item	Selling Price
pizza	$5.00
sub	$3.00

6.6 – Solve Systems of Linear Inequalities

Lead-In: Graph the following inequalities separately.

$y > -x - 2$	$y \leq 3x + 6$
	

Example: Graph the following. That is, we only want points that make BOTH statements true.



$y > -x - 2$ **and** $y \leq 3x + 6$.

Which of the following are solutions to BOTH:

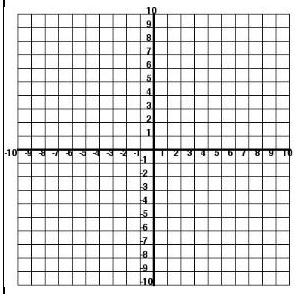
a.) (0,0)

b.) (-2,0)

c.) (1,-2.9999)

d.) (-1,3)

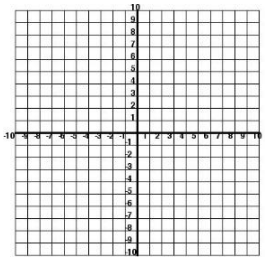
$y < x - 4$ **and** $y \geq -x + 3$



Step 1: Graph each inequality's boundary line.

Step 2: Shade in the region that satisfies both inequalities (the overlapping region).

Example: Graph $y + x > 1$ **and** $-x - y > -3$.

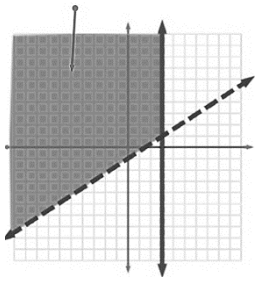


Step 1: Solve for y.

Step 2: Graph each inequality's boundary line.

Step 3: Shade in the region that satisfies both inequalities (the overlapping region).

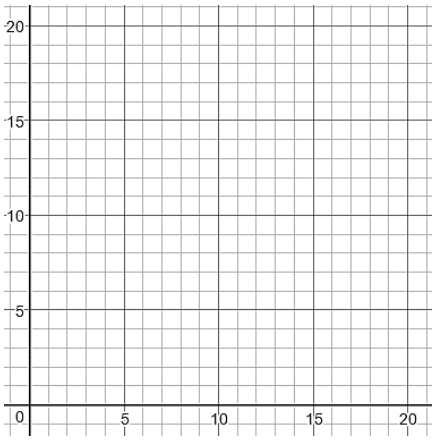
Example: Write the inequality that would produce the following graph.



Applying Systems of Linear Inequalities to the Real World

A manufacturer makes wooden desks and chairs. Desks take 2.5 hours to assemble, chairs 2 hours and each worker can't work more than 40 hours per week. Desks sell for $250, chairs for $100 and each worker should produce at least $2000 in sales each week.

a) Define the variables, write the system, and then graph it.



b) What are possible solutions?