Name ___________________________________ Period ________

ACTIVITY 17 – SOLVING SYSTEMS OF LINEAR EQUATIONS

LEARNING TARGETS:

LT.17.1.1 – Solve a system of linear equations by graphing.
LT.17.2.1 – Solve a system of linear equations using a table or the substitution method.
LT.17.3.1 – Use the elimination method to solve a system of linear equations.
LT.17.1.2 / LT.17.2.2 – Interpret the solution of a system of linear equations.
LT.17.3.2 – Write a system of linear equations to model a situation.
LT.17.4.1 – Explain when a system of linear equations has no solution.
LT.17.4.2 – Explain when a system of linear equations has infinitely many solutions.
LT.17.5.1 – Determine the number of solutions of a system of equations.
LT.17.5.2 – Classify a system of linear equations as independent or dependent and as consistent or inconsistent.

OPTIONAL PRACTICE: Page 271/272 #s 1 – 17

MATH TERMS
Two or more linear equations with the same variables form a **system of linear equations**. To determine the solution of a system of linear equations, you must identify all the ordered pairs that make both equations true.

EXAMPLE 1:

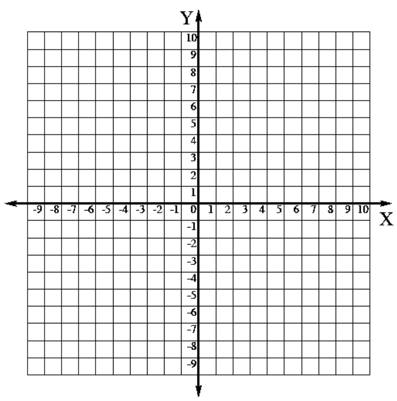
Which ordered pair is a solution to the system of equations below? $\begin{cases} 3x+2y=-8 \\ -7x+14y=56 \end{cases}$

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

If the above coordinate makes both equations true, what conclusions can we make about the above system? In other words, what are some things we now know about the system?

METHODS OF SOLVING SYSTEMS OF EQUATIONS:

$$\begin{cases} 3x + 2y = -8 \\ -7x + 14y = 56 \end{cases}$$

GRAPHING	SUBSTITUTION	ELIMINATION
One method is to graph each equation and determine the intersection point, this is called the ***graphing method***.	Another method for solving systems of equations is the ***substitution method***, in which one equation is solved for one of the variables. Then, the expression for that variable is substituted into the other equation.	Elimination is another algebraic method that may be used to solve a system of equations. Two equations can be combined to yield a third equation that is also true. The ***elimination method*** creates like terms that add to zero.
		

NOTE:

The graph of a system of linear equations does not always result in a unique intersection point. Parallel lines have graphs that do not intersect. Coincident lines have graphs that intersect infinitely many times. The three systems in the chart represent each of the following possible relationships described above.

Relationship of Lines	Sketch	Number of Solutions
two intersecting lines		one solution
two parallel lines		no solution
two coincident lines		infinitely many solutions

MATH TERMS
Objects that are coincident lie in the same place. **Coincident** lines occupy the same location in the plane and pass through the same set of ordered pairs.

EXAMPLE 2:

Solve the systems below using any method you feel most comfortable with. Once you get your solution, identify their relationship between the two lines.

$\begin{cases} 4y = -3x + 8 \\ -8y = 6x - 16 \end{cases}$	$\begin{cases} x = 3y + 2 \\ 2x - 4y = 8 \end{cases}$	$\begin{cases} -4x + 8y = 9 \\ x - 2y = -6 \end{cases}$

Systems of linear equations are classified by the relationships of their lines in two ways, by their types of lines and by the number of solutions they contain.

Types of Lines:

Systems that produce two distinct lines when graphed (intersecting or parallel) are referred to as an **independent** system.

Systems that produce coincident lines are referred to as **dependent** solutions.

Number of Solutions:

Systems that have so solutions are referred to as i**nconsistent** systems.

Systems that have at least one solution are referred to as **consistent** systems.

EXAMPLE 3:
Classify each of the systems from EXAMPLE 2.

SAT PRACTICE:

3

$$\frac{y}{x} = 4$$
$$5(x - 2) = y$$

If (x, y) is the solution to the system of equations above, what is the value of x ?

A) 2
B) 8
C) 10
D) 40

19

$$a + 3b = -10$$
$$a + b = -2$$

In the system of equations above, what is the value of a ?

ACTIVITY 18 – SOLVING SYSTEMS OF LINEAR INEQUALITIES

LEARNING TARGETS:

LT.18.1.1 – Determine whether an ordered pair is a solution of a system of linear inequalities.
LT.18.1.2 – Graph the solutions of a system of linear inequalities.
LT.18.2.1 – Identify solutions to systems of linear inequalities when the solution region is determined by parallel lines.
LT.18.2.2 – Interpret solutions of systems of linear inequalities.

OPTIONAL PRACTICE: Page 281/282 #s 1 – 13

The following is an example of a system of linear inequalities in two variables:

$$\begin{cases} x + y \le 8 \\ 4x - y > 6 \end{cases}$$

A **solution** to a system of inequalities is an ordered pair that is a solution to **BOTH** inequalities in the system. For example, (5,-2) is a solution of the system above. The **graph** of a system of inequalities is the graph of all solutions of the system.

Think back to what the graph of a linear inequality looked like from activity 15. With that in mind, what do you think these graphs will look like?

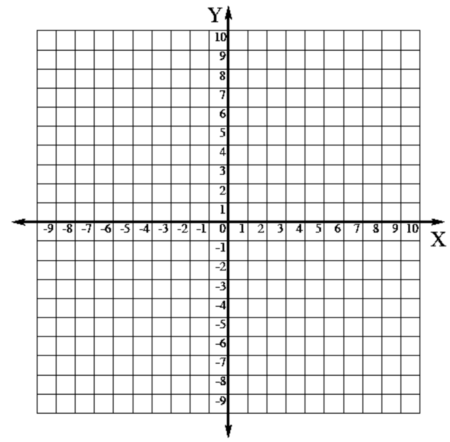
In the examples to follow, determine if the following points are solutions to the following system of linear inequalities:

$$\begin{cases} 2x + y > -5 \\ -x + y \le 3 \end{cases}$$

a) (-1,2)	b) (0,7)	c) (-5,-3)

In the examples to follow, graph each system of inequalities.

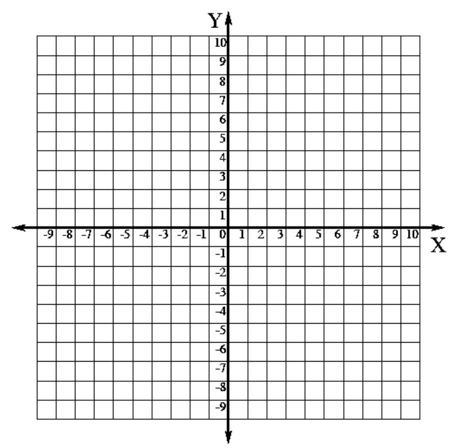
EXAMPLE 1 $\begin{cases} y > -2x - 5 \\ y \le x + 3 \end{cases}$



Give me ONE example of a Solution Point:

(______ , ______)

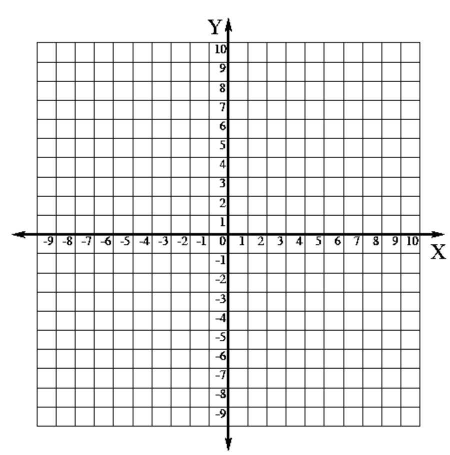
EXAMPLE 2 $\begin{cases} y < -\dfrac{1}{2}x \\ y \ge -\dfrac{1}{2}x - 4 \end{cases}$



Give me ONE example of a Solution Point:

(______ , ______)

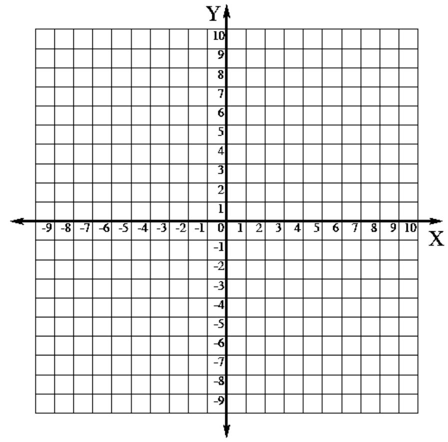
EXAMPLE 3 $\begin{cases} y > -2 \\ x < 4 \end{cases}$



Give me ONE example of a Solution Point:

(______ , ______)

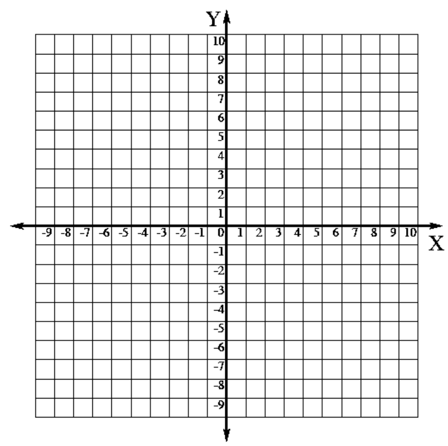
EXAMPLE 4 $\begin{cases} 2x + y > -5 \\ -x + y \le 3 \end{cases}$



Give me ONE example of a Solution Point:

(______ , ______)

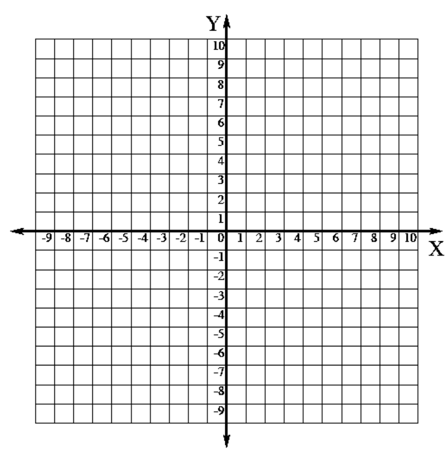
EXAMPLE 5 $\begin{cases} 3x + y < 6 \\ y \ge \dfrac{2}{3}x + 4 \end{cases}$



Give me ONE example of a Solution Point:

(______ , ______)

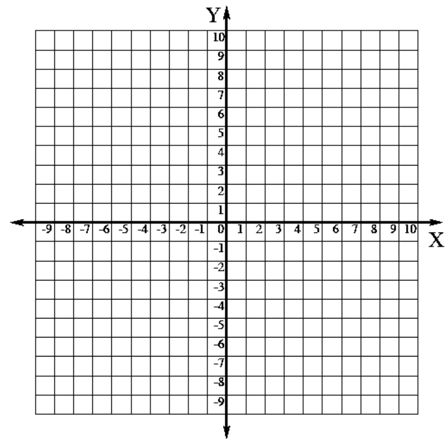
EXAMPLE 6 $\begin{cases} 5x - y > 1 \\ y < \dfrac{5}{4}x - 3 \end{cases}$



Give me ONE example of a Solution Point:

(______ , ______)

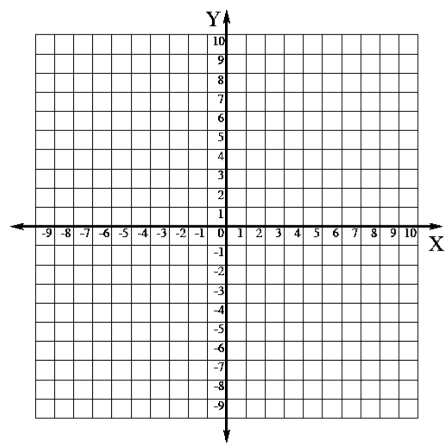
EXAMPLE 7 $\begin{cases} 4x + 2y \le 8 \\ -3x - 6y < 12 \end{cases}$



Give me ONE example of a Solution Point:

(______ , ______)

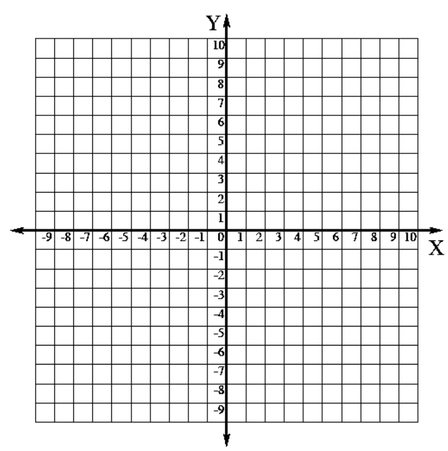
EXAMPLE 8 $\begin{cases} 2x + 3y < 6 \\ y \ge -\dfrac{2}{3}x + 4 \end{cases}$



Give me ONE example of a Solution Point:

(______ , ______)

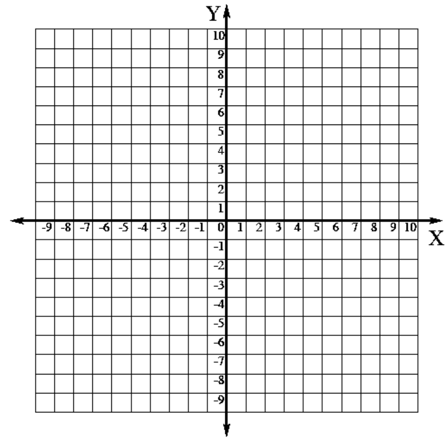
EXAMPLE 9 $\begin{cases} 6y - 36 < -9x \\ -12 + 2y \ge -3x \end{cases}$



Give me ONE example of a Solution Point:

(______ , ______)

EXAMPLE 10 $\begin{cases} 5x \geq -10 \\ 15x - 3y \geq 9 \end{cases}$

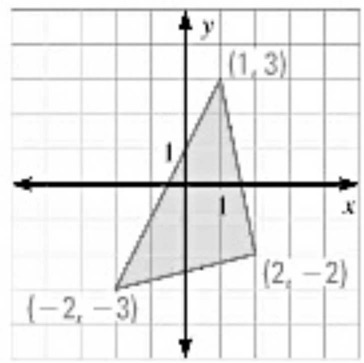


Give me ONE example of a Solution Point:

(______ , ______)

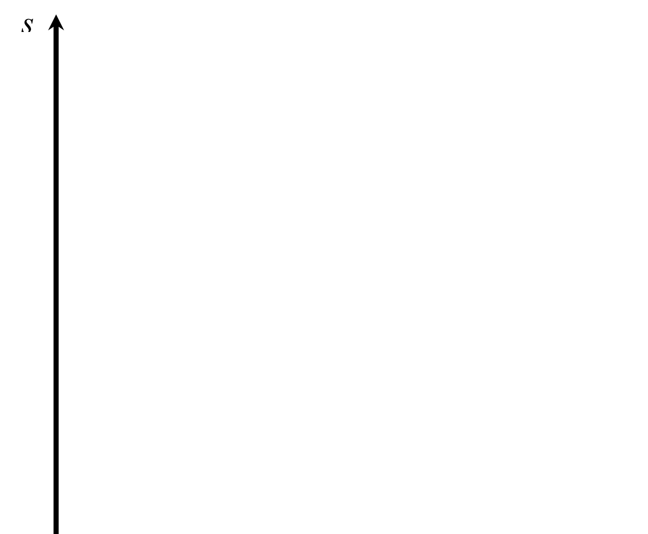
EXAMPLE 11

Write a system of linear inequalities for the shaded region.



EXAMPLE 12

Tickets for the school play cost $3 for students and $6 for adults. The drama club hopes to bring in at least $350 in sales, and the auditorium has 120 seats. Let ***a*** represent the number of adult tickets, and let ***s*** represent the number of student tickets. Write a system of inequalities representing this situation, and then show the solutions to the system of inequalities by graphing.

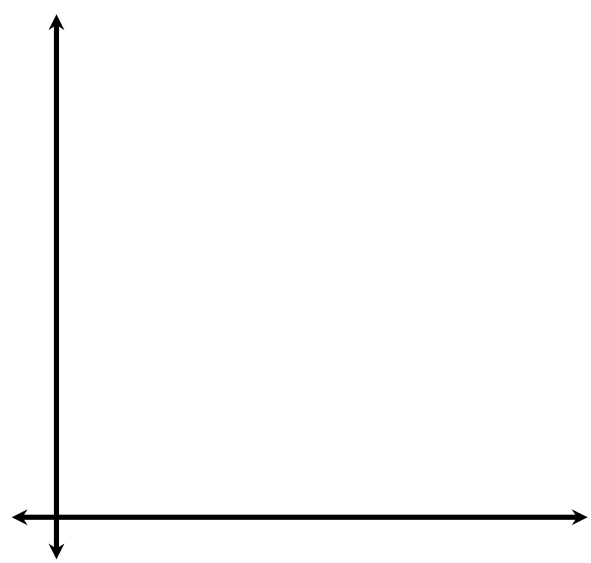


EXAMPLE 12 (CONTINUED…)

If the show sells out, what is the greatest number of student tickets that could be sold to get the desired amount of sales?

EXAMPLE 13

Connor bought used books from a Web site. The paperbacks cost \$2 each, and the hardcovers cost \$3 each. He spent no more than \$90 on the books, and he bought no more than 35 books. Write a system of inequalities to represent the situation. State what the variables represent. Then, graph the solution of the system of inequalities that you wrote.



Name two ordered pairs that are solutions. Interpret the meaning of each ordered pair in the context of the problem.

Suppose you know that Connor spent exactly \$90 and that bought exactly 35 books. What can you conclude in this case? Why?

ACTIVITY 19 – EXPONENT RULES

LEARNING TARGETS:

LT.19.1.2/LT.19.2.2/LT.19.3.2 – Simplify expressions involving exponents.

OPTIONAL PRACTICE: Page 297/298 #s 1 – 34

Property	Exponential Expression	Expanded Form	Condensed Form
PRODUCT OF POWERS	$3^5 \cdot 3^2$	$(3 \cdot 3 \cdot 3 \cdot 3 \cdot 3) \cdot (3 \cdot 3)$	3^7
	$5^3 \cdot 5^2$		
	$a^m \cdot a^n$		
When you multiply powers with the same base…			

QUOTIENT OF POWERS	$\frac{2^7}{2^3}$	$\frac{2 \cdot 2 \cdot 2 \cdot 2 \cdot 2 \cdot 2 \cdot 2}{2 \cdot 2 \cdot 2}$	
	$\frac{5^5}{5^2}$		
	$\frac{a^m}{a^n}$		
When you divide powers with the same base…			

POWER OF A POWER	$(2^3)^2$	$(2 \cdot 2 \cdot 2) \cdot (2 \cdot 2 \cdot 2)$	
	$(6^2)^4$		
	$(a^m)^n$		
When you raise a power to a power…			

POWER OF A PRODUCT	$(4x)^3$	$(4x)\cdot(4x)\cdot(4x)$	
	$(-2xy)^4$		
	$(ab)^m$		

When you raise a product to a power…

POWER OF A QUOTIENT	$\left(\frac{x}{2}\right)^3$	$\left(\frac{x}{2}\right)\cdot\left(\frac{x}{2}\right)\cdot\left(\frac{x}{2}\right)$	$\frac{x^3}{2^3}=\frac{x^3}{8}$
	$\left(\frac{3}{y}\right)^5$		
	$\left(\frac{a}{b}\right)^m$		

When you raise a quotient to a power…

ZERO POWER PROPERTY AND NEGATIVE EXPONENT PROPERTY

$3^3 =$
$3^2 =$
$3^1 =$
$3^0 =$
$3^{-1} =$
$3^{-2} =$
$3^{-3} =$

Each time you decrease the power, you are ______________________ the previous answer by the ___________________.

$a^0 =$	Any base raised to the zero power equals _____________.
$a^{-1} =$	Any base raised to a negative exponent equals its _______________________.

Simplify the following expressions using properties of exponents. Evaluate numbers raised to a power and answers should have no negative exponents.

1. $n^5n^2n =$	2. $\frac{y^5}{y^3} =$	3. $(2f^4)^3 =$	4. $\frac{t^9}{t^{-8}} =$
5. $\left(\frac{4}{x}\right)^2 =$	6. $\left(\frac{jkl}{mno}\right)^0 =$	7. $\left(\frac{4}{2x}\right)^{-1} =$	8. $\left(\frac{2}{w}\right)^{-2} =$

ACTIVITY 24 – ADDING AND SUBTRACTING POLYNOMIALS

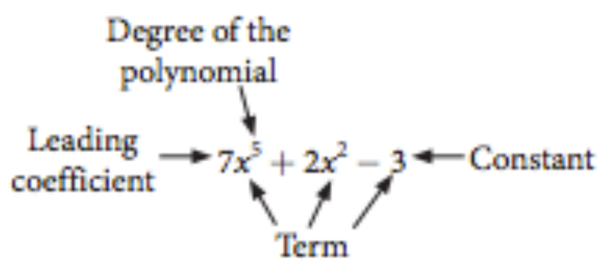
LEARNING TARGETS:

LT.24.1.1 – Identify parts of a polynomial.
LT.24.1.2 – Identify the degrees of a polynomial.
LT.24.2.2 – Add polynomials algebraically.
LT.24.3.1 – Subtract polynomials algebraically.

OPTIONAL PRACTICE: Page 367/368 #s 1 – 31

Important Vocab:

- A ***term*** is a number, variable, or the product of a number and/or variable(s).
- A ***polynomial*** is a single term or the sum/difference of two or more terns with *whole-number powers*.
- A ***coefficient*** is the numeric factor of a term.
- A ***constant term*** is a term that contains only a number. The constant term of a polynomial is a term of degree zero.
- The ***degree of a term*** is the sum of the exponents of the variables contained in the term.
- The ***degree of a polynomial*** is the greatest degree of any term in the polynomial.
- The ***standard form of a polynomial*** is a polynomial whose terms are written in descending order of degree. ***Descending order of degree*** means that the term that has the highest degree is written first, the term with next highest degree is written next, and so on.
- The ***leading coefficient*** is the coefficient of a polynomial's leading term when the polynomial is written in standard form.



- A polynomial can be classified by the number of terms it has when it is in simplest form.

Name	Number of Terms n	Examples
monomial	1	8 or $-2x$ or $3x^2$
binomial	2	$3x + 2$ or $4x^2 - 7x$
trinomial	3	$-x^2 - 3x + 9$
polynomial	$n > 3$	$9x^4 - x^3 - 3x^2 + 7x - 2$

LESSON 24-1 PRACTICE: Page 358 #s 16 – 23

16.	17.
18.	19.
20.	21.
22.	23.

LESSON 24-2 PRACTICE: Page 363 #s 12 – 18

12.	13.
14.	15.
16.	17.
18.	

LESSON 24-3 PRACTICE: Page 366 #s 6 – 12

6.	7.
8.	9.
10.	11.
12.	

ACTIVITY 25 – MULTIPLYING POLYNOMIALS

<u>LEARNING TARGETS:</u>

LT.25.1.1 – Use a graphic organizer to multiply expressions.
LT.25.1.2 – Use the Distributive Property to multiply expressions.
LT.25.2.1 – Multiply binomials.
LT.25.2.2 – Find special products of binomials.
LT.25.3.1 – Use a graphic organizer to multiply polynomials.
LT.25.3.2 – Use the Distributive Property to multiply polynomials.

OPTIONAL PRACTICE: Page 381/382 #s 1 – 29

EXAMPLE 1: Determine the product of $(2x-1)(3x+2)$.

FOIL	Distribution	Graphic Organizer

LESSON 25-1 PRACTICE: Page 375 #s 32 – 36

32.	33.
34.	35.

36.

Important Vocab:

- The product of binomials of the form $(a+b)(a-b)$ can be expanded using the special pattern $a^2 - b^2$. This pattern is what we call a ***difference of two squares***.
- The ***square of a binomial***, $(a+b)^2$ or $(a-b)^2$, also known as a ***perfect square binomial***, can also be expanded using the special pattern, $a^2 + 2ab + b^2$ or $a^2 - 2ab + b^2$.

LESSON 25-2 PRACTICE: Page 378 #s 10 – 18

10.	11.
12.	13.
14.	15.

16.	17.
18.	

NOTE: When using a graphic organizer to multiply two polynomials together, pay close attention that there are no missing consecutive terms, or else this will throw off your diagonals (like terms).

EXAMPLE 2: Determine each product.

$(2x-1)(3x^2+5x-2)$	$(2x-1)(3x^2-2)$	$(2x-1)(3x^2+5x)$

LESSON 25-3 PRACTICE: Page 380 #s 13 – 23

13.	14.
15.	16.
17.	18.

19.	20.
21.	22.
23.	