Name: _____ Teacher: _____ Per: ____

Unit 1	Unit 2	Unit 3	Unit 4	Unit 5	**Unit 6**	Unit 7	Unit 8	Unit 9	Unit 10

– Unit 6 –
[Systems of Equations]
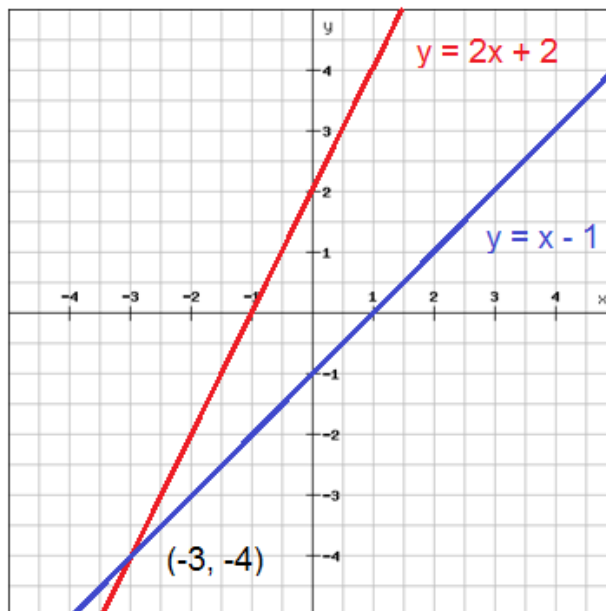
To be a Successful Algebra class, TIGERs will show…

#TENACITY during our practice, have…

- ☐ I attempt all practice
- ☐ I attempt all homework
- ☐ I never give up when I don't understand

#INTEGRITY as we help others with their work, maintain a…

- ☐ I always check my answers
- ☐ I correct my work, I never just copy answers
- ☐ I explain answers, I never just give them

#GO-FOR-IT attitude, continually…

- ☐ I write down all notes, even if I'm confused
- ☐ I remain positive about my goals
- ☐ I treat each day as a chance to reset

#ENCOURAGE each other to succeed as a team, and always…

- ☐ I offer help when I understand the material
- ☐ I push my teammates to reach their goals
- ☐ I never let my teammates give up

#REACH-OUT and ask for help when we need it!

- ☐ I ask my questions during homework check
- ☐ I ask my teammates for help during practice
- ☐ I attend enrichment/tutorials when I need to

Unit Calendar

MONDAY	TUESDAY	WEDNESDAY	THURSDAY	FRIDAY
January 5 **Student Holiday**	6 Solving by Graphing	7 Solving by Graphing	8 Solving by Substitution	9 **QUIZ**
12 Solving by Elimination	13 Solving by Elimination	14 Practice Day **QUIZ**	15 Review	16 **TEST**
19 **Student Holiday**	20 Applications of Systems	21 Applications of Systems	22 Systems of Inequalities	23 **QUIZ**

Essential Questions

➢ Which method should I use to solve the system? Why is this method preferred?

➢ How do I know how many solution a system will have?

➢ What does the solution mean in terms of the situation?

➢ How can systems of equations be used to solve real life situations?

Critical Vocabulary

- System of Equations

- System of Inequalities

- Graphing Method

- Substitution Method

- Elimination Method

- Solution

- No Solution

- Infinitely Many Solutions

Solve by Graphing

System of Equations: *When you have _____ _____ ____ equation.*
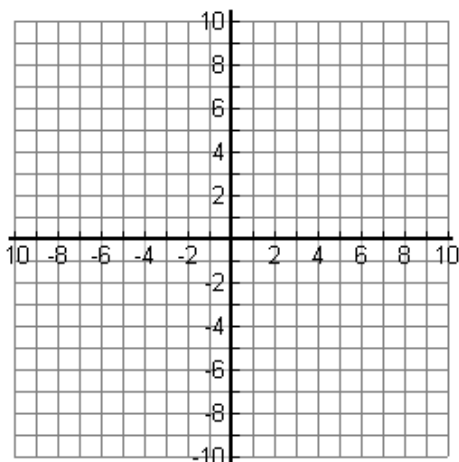*(In Algebra 1, we will only work with systems of ____ equations)*

Solution: *Where the lines _____, written as an _____ _____ .*

Examples:

What is the solution to this system of equations:

$$y = x + 2$$

$$y = 2x - 1$$

Solution: (,   )

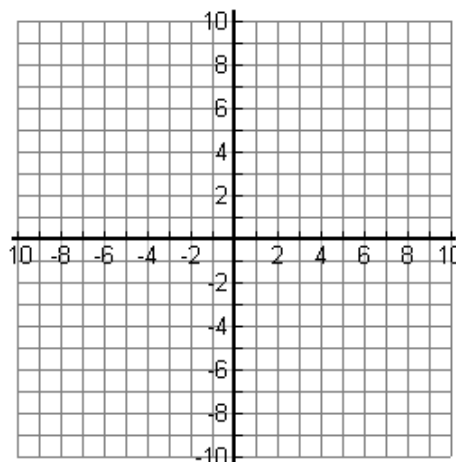
What is the solution to this system of equations:

$$y = 3$$

$$y = -2x + 3$$

Solution: (,   )

What is the solution to this system of equations:

x	$y = x + 7$	$y = -4x - 3$
-5	17	2
-4	13	3
-3	9	4
-2	5	5
-1	1	6
0	-3	7
1	-7	8

Solution: (,   )

Which ordered pair is a solution to this system of equations:

$$7x + 2y = -5$$

$$3x + 2y = -17$$

A. (1, -6)
B. (3, -13)
C. (-3, -4)

Practice:

What is the solution to this system of equations:

x	$y = \dfrac{2}{3}x - 2$	$y = 4$
3	0	4
6	2	4
9	4	4
12	6	4
x	$y = \dfrac{2}{3}x - 2$	$y = 4$

Solution: (,   )

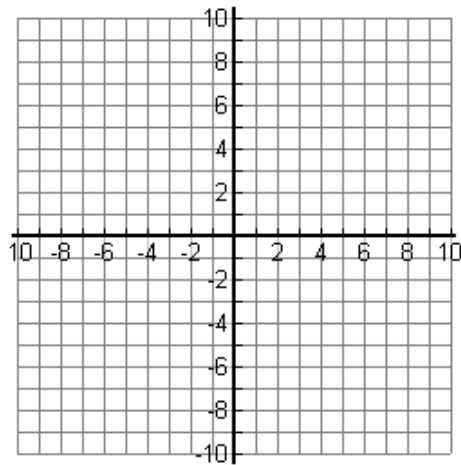
Which ordered pair is a solution to this system of equations:

$$x = -2y - 3$$

$$x + 3y = -7$$

A.   (-5, 4)
B.   (3, 2)
C.   (5, -4)
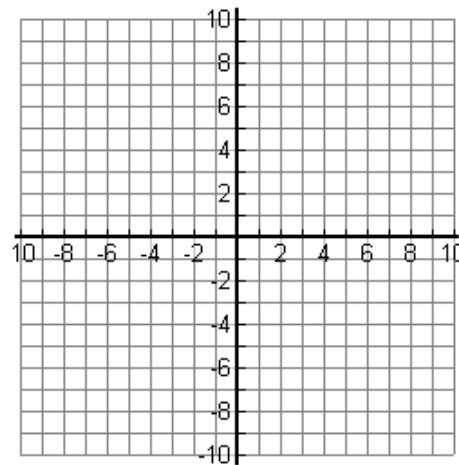

What is the solution to this system of equations:

$$x = 9 \qquad\qquad y = -1/3x + 1$$

Solution: (,   )

What is the solution to this system of equations:
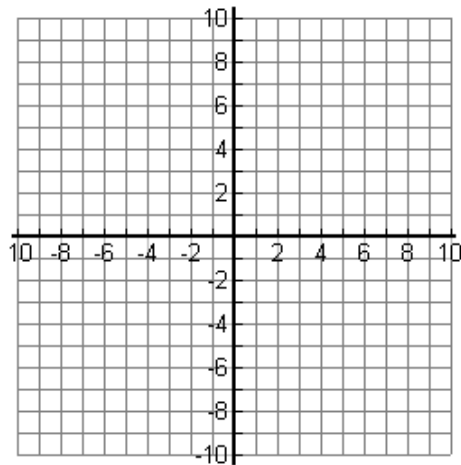
$$y = 2 \qquad\qquad y = -\frac{1}{2}x - 2$$

Solution: (,   )

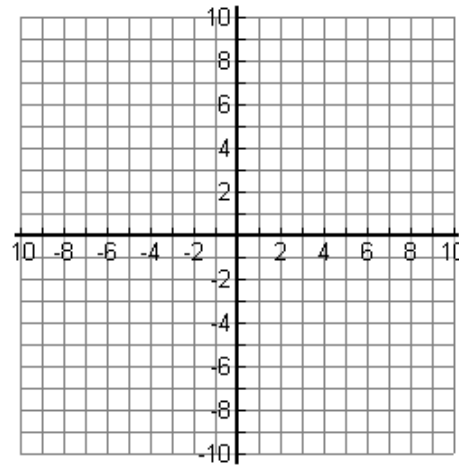What is the solution to this system of equations:

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

Solution: (,   )

What is the solution to this system of equations:

$$y = 3x - 8 \qquad\qquad y = -x + 4$$

Solution: (,   )

Solve by Graphing cont…

System of Equations Solutions:
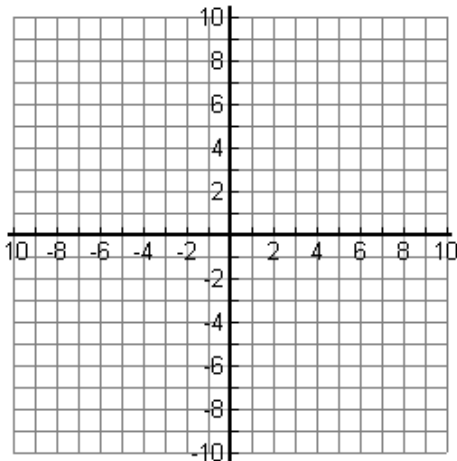
One Solution   *No Solution*   *Infinitely Many Solutions*

Examples:
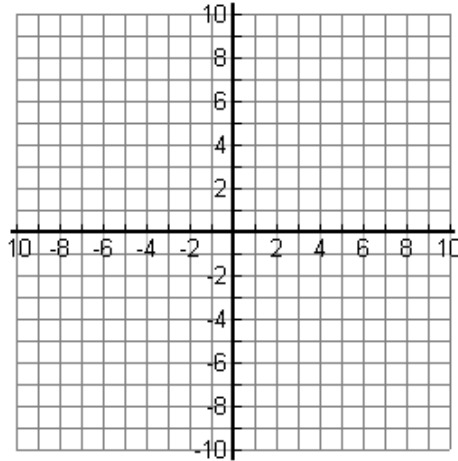
What is the solution to this system of equations:	What is the solution to this system of equations:	What is the solution to this system of equations:
$3x + y = 1$ $\qquad x - y = 7$	$y = 2x - 3$ $\qquad 4x - 2y = 6$	$3y = 2x - 6$ $\qquad 2x - 3y = -3$
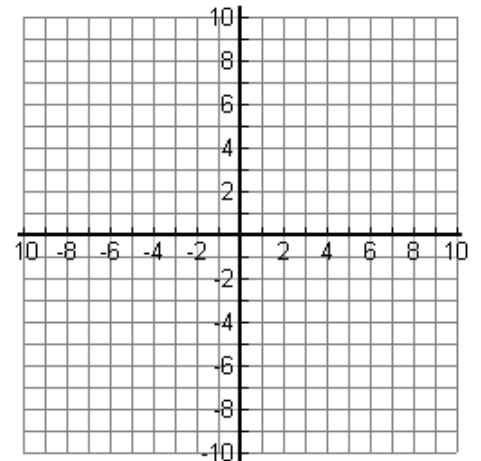
Solution:

Solution:

Solution:

Practice:

What is the solution to this system of equations:	What is the solution to this system of equations:	What is the solution to this system of equations:

$y = -x + 6 \qquad 3y - x = 6$
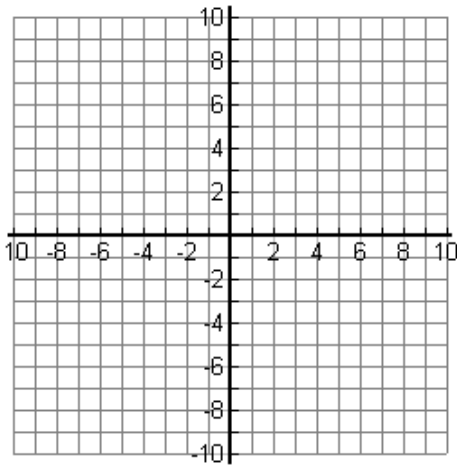
$-3x + y = 4 \qquad y = 3x - 6$
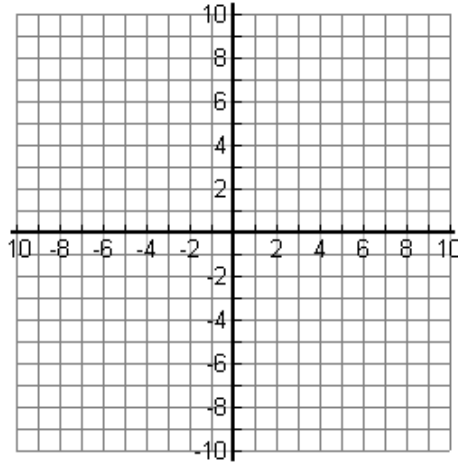
$y = -2x + 3 \qquad 2y = -4x + 6$
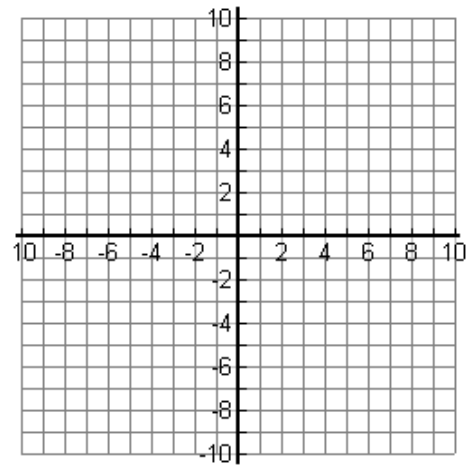
Solution:

Solution:

Solution:

What is the solution to this system of equations:

x	$y = -x + 4$	$y = -\dfrac{3}{5}x + 2$
-5	9	5
0	4	2
5	-1	-1
10	-6	-4
15	-11	-7
20	-16	-10
25	-21	-13

Solution:

What is the solution to this system of equations:

x	$y = 2x + 4$	$y = 2x - 1$
-3	-2	-7
-2	0	-5
-1	2	-3
0	4	-1
1	6	1
2	8	3
3	10	5

Solution:

Solve by Substitution

System of Equations Solutions:

One Solution   *No Solution*   *Infinitely Many Solutions*

Solving with Graphing:
- *y=mx+b form*
- *graph*

Solving by Substitution:
- *Solve one equation for " y= " or " x= "*
- *Plug it into the other equation and solve*
- *Plug in your answer to find the other variable*

Examples:

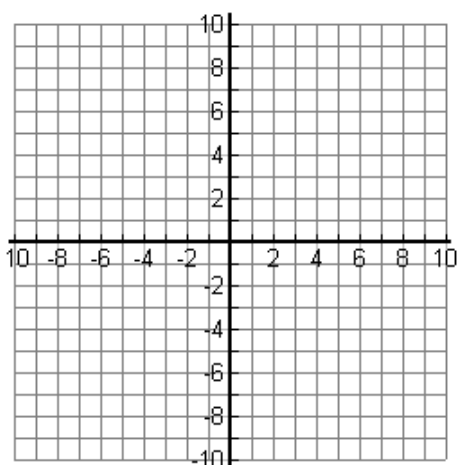|		
What is the solution to this system of equations: First, let's solve by graphing: $y = 3x - 8 \qquad x + y = 4$	Now let's solve with Substitution: Solution:	What is the solution to this system of equations: $2x - y = 8 \qquad x = -y + 1$ Solution:
 Solution:	What is the solution to this system of equations: $3y - x = -6 \qquad x = 3y - 3$ Solution:	What is the solution to this system of equations: $y = 2x - 1 \qquad 6x - 3y = 3$ Solution:

Practice: *Use Substitution Method*

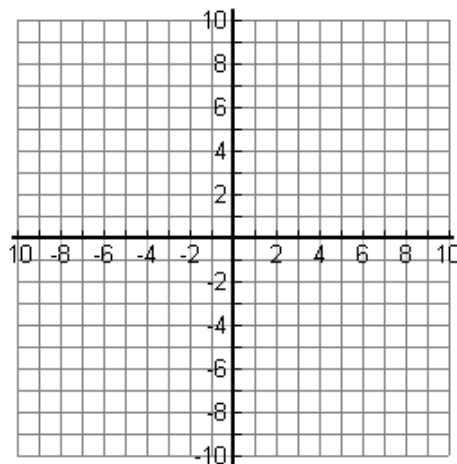|	
What is the solution to this system of equations: $2x + y = 2 \qquad x = y + 4$ Solution:	What is the solution to this system of equations: $x - y = 6 \qquad y = -2x - 9$ Solution:
What is the solution to this system of equations: $4x + 2y = 2 \qquad y = -2x + 6$ Solution:	What is the solution to this system of equations: $y = 2x + 1 \qquad y = x + 3$ Solution:

What is the solution to this system of equations:

Solve with Substitution:

$6x + 3y = 18 \qquad y = -2x + 3$

Solve **AGAIN** by Graphing:

$$6x + 3y = 18 \qquad y = -2x + 3$$

Solution:

Solve by Elimination

System of Equations Solutions:

One Solution   *No Solution*   *Infinitely Many Solutions*

Solving by Elimination:
- *Make sure both equations have a variable with the _____ number , _____ sign*
- *Combine the equations to eliminate one variable and solve*
- *Plug in your answer to find the other variable*

Examples:

What is the solution to this system of equations: $x + y = 8$ $x - y = 4$ Solution:	What is the solution to this system of equations: $2x + 3y = 13$ $x - 3y = 2$ Solution:
What is the solution to this system of equations: $x - 3y = 7$ $x + 2y = 2$ Solution:	What is the solution to this system of equations: $5s + 2t = 6$ $9s + 2t = 22$ Solution:

Practice: *Use Elimination Method*

What is the solution to this system of equations: $$x + y = 1$$ $$-x + 2y = -7$$ Solution:	What is the solution to this system of equations: $$-5x + 3y = 6$$ $$3x - 3y = 12$$ Solution:
What is the solution to this system of equations: $$3x - 7y = 6$$ $$2x + 7y = 4$$ Solution:	What is the solution to this system of equations: $$2m - 5n = -6$$ $$2m - 7n = -14$$ Solution:
What is the solution to this system of equations: $$3r - 5s = -35$$ $$2r - 5s = -30$$ Solution:	What is the solution to this system of equations: $$-7x - 3y = 1$$ $$12x + 3y = 9$$ Solution:

Solve by Elimination cont...

Solving by Elimination:

- *Make sure both equations have a variable with the SAME NUMBER, OPPOSITE SIGN*
- *Combine the equations to eliminate one variable and solve*
- *Plug in your answer to find the other variable*

Examples:

What is the solution to this system of equations: $5x + y = 4$ $7x - 3y = 10$ Solution:	What is the solution to this system of equations: $-2m + 5n = 6$ $-4m + 10n = 14$ Solution:
What is the solution to this system of equations: $-4s + 8t = -12$ $5s - 10t = 15$ Solution:	What is the solution to this system of equations: $4x - 7y = 10$ $3x + 2y = -7$ Solution:

Practice: *Use Elimination Method*

What is the solution to this system of equations: $3x - 2y = 19$ $5x + 4y = 17$ Solution:	What is the solution to this system of equations: $1r - 5s = -6$ $-4r + 20s = 24$ Solution:
What is the solution to this system of equations: $4x + 2y = 6$ $6x + 3y = 11$ Solution:	What is the solution to this system of equations: $4x + 3y = 19$ $3x - 4y = 8$ Solution:
What is the solution to this system of equations: $8x - 3y = -11$ $2x - 5y = 27$ Solution:	What is the solution to this system of equations: $-7x - 3y = -5$ $12x + 3y = 15$ Solution:

Solve by Graphing Calculator

Solving by Graphing Calculator:

- *Both equations solved for* **y = mx + b**
- *Calculator On (You can press* **ON** *to return to the* **HOME SCREEN** *at any time)*
- *Press* **NEW DOCUMENT**, *select* **NO** *TO SAVE CHANGES, select* **GRAPH**
- *Type in 1st equation* **f1(x) =** _____ **, ENTER**
- *Press* **TAB**
- *Type in 2nd equation* **f2(x) =** _____**, ENTER**
- *Press* **CTR** *then* **T** *to bring up the table.*
    - *Sometimes you need to scroll to the right once to better read the table.*
- *Locate the intersection.*

Examples:

What is the solution to this system of equations:	What is the solution to this system of equations:
$y = \frac{2}{3}x + 1$ $y = 4x + 21$	$y = -\frac{3}{5}x + 40$ $y = x + 16$
Solution:	Solution:

What is the solution to this system of equations:

$$2x + 5y = 9 \qquad 6y + 20 = 2x$$

Solution:

Practice:

What is the solution to this system of equations: $y = 3x - 8$ $y = -x + 4$ Solution:	What is the solution to this system of equations: $y = -2x + 5$ $y = -0.5x + 2$ Solution:

What is the solution to this system of equations:

$$3x + 7y = 11 \qquad\qquad y = -\tfrac{1}{2}x + 1$$

Solution:

What is the solution to this system of equations:

$$y = -2x - 4 \qquad\qquad 2x + y = 6$$

Solution:

What is the solution to this system of equations:

$$2y - 4x = 2 \qquad\qquad 4x + y = -11$$

Solution:

What is the solution to this system of equations:

$$2y - 6x = 8 \qquad\qquad -3x + y = 4$$

Solution:

Systems of Equations: Applications

Application Problems:

- *Write 2 equations to represent the problem*
- *Solve the system (Graphing OR Substitution OR Elimination)*
- *Answer the question being asked*

Examples:

Brenda drove three times as far as Jan. Brenda drove 24 more miles than Jan. How far did each of them drive?	There are 12 people on the jury. There are 4 more men than women. How many men were there?
Shelly and Jim sold tickets to the basketball game. Good seats were $5 each and poor seats cost only $2 each. If 210 people attended and paid $660, how many people bought good seats?	A music store receives shipments of recorders and harmonicas. A shipment of 5 recorders and 4 harmonicas costs $62. A shipment of 10 recorders and 3 harmonicas costs $84. Find the cost of a recorder.

Practice:

There are 12 people on the jury. There are 4 more men than women. How many men were there?	Lyn has twice as much money as Jo. Together they have $63. How much money does each have?
For their play, a school charges different amount for adults and students. On the first day, they sold 3 student and 1 adult ticket for $38. The next day thy made $52 by selling 3 student and 2 adult tickets. Find the price of a student ticket.	2 different schools rented buses and vans to transport their athletes to an event. The first school used 1 van and 6 buses to transport 327 students. The second school used 4 vans and 12 buses to carry 780 students. Each van and bus were full and carried the same number of students. How many students could fit on one van and on one bus?
State College has 620 students. There are 20 more women than men. How many women are there?	Lisa walked 8 km more than Tim. Lisa walked twice as far as Tim. How far did each walk?

Systems of Equations: Applications cont…

Application Problems:

- *Write 2 equations to represent the problem*
- *Solve the system (Graphing OR Substitution OR Elimination)*
- *Answer the question being asked*

Examples:

The length of a rectangle is 5 more than twice the width. The perimeter is 130 in. What are the dimensions of the rectangle? What is the area?

Phil has 50 coins that are nickels and dimes worth $4.15. How many dimes does he have?

Joy has $4.45 in quarters and dimes. She has 8 more quarters than dimes. How many coins of each type does she have?

Practice:

A rectangle has a perimeter of 18 cm. Its length is 5 cm more than its width. Find the dimensions.	Bruce has $5.15 in dimes and quarters. He has 8 more quarters than dimes. How many quarters does he have?
There were 40 dimes and quarters in the drawer. Peggy counted them and found that their total value was $4.75. How many coins of each type were there?	Tickets for the senior play cost $4.00 for adults and $2.00 for students. This year there were 600 tickets sold, and the class made $1900. How many of each type ticket were sold?
The perimeter of a rectangular garden is 46 feet. The length of the garden is 5 feet less than three times the width. Find the **area** of the garden.	### *CHALLENGE:* Three pens and two notebooks cost $8.25. Two pens and three notebooks cost $8.00. How much would two pens and two notebooks cost?

Systems of Inequalities

<	>	≤	≥
"Less Than"	*"Greater Than"*	*"Less Than or Equal to"*	*"Greater Than or Equal to"*
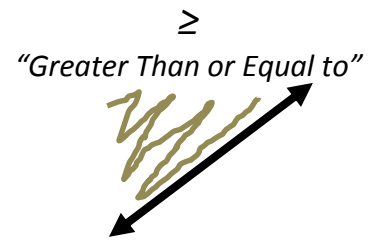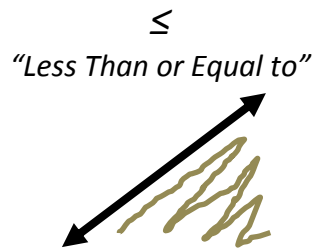
Solution to a **System of Inequalities** *is where the shaded areas* _____.
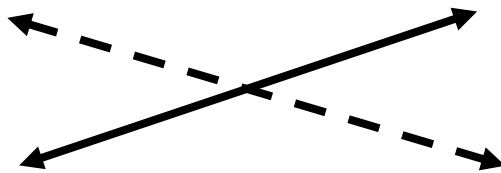
Examples:

Graph the system of inequalities	Graph the system of inequalities	Are the following ordered pairs solutions to this system of inequalities?
$$y > \frac{1}{2}x + 3$$ $$y > 3$$	$$y < x$$ $$y \geq -2x + 3$$	$$y < -5x + 2$$ $$y > -x - 2$$
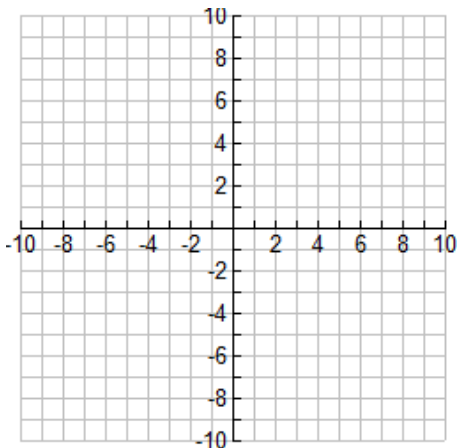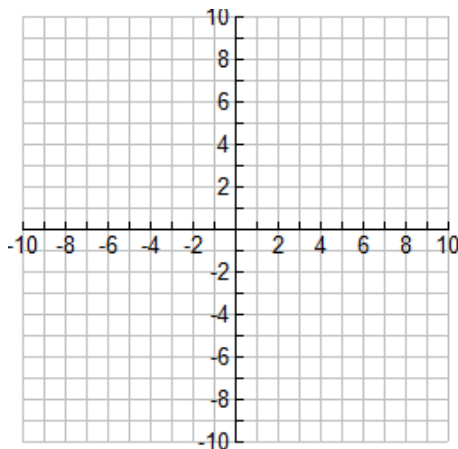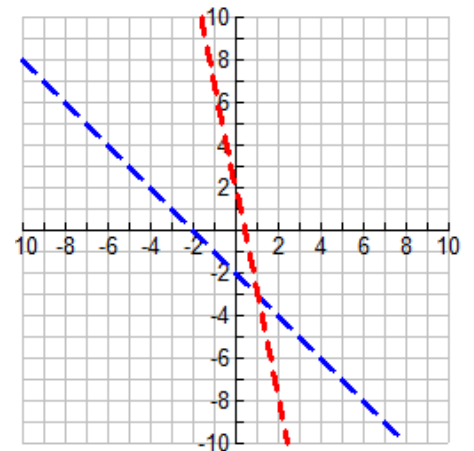
(-2,-2) _____

(-1,1) _____

(0,-2) _____

Practice:
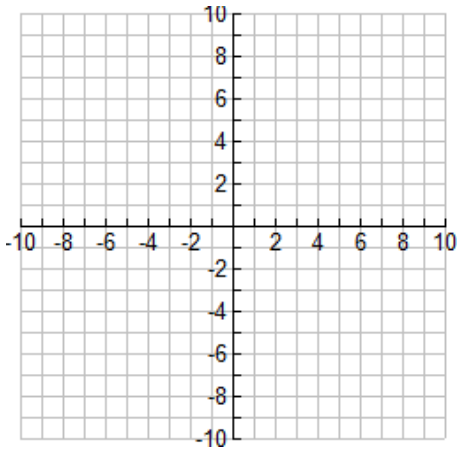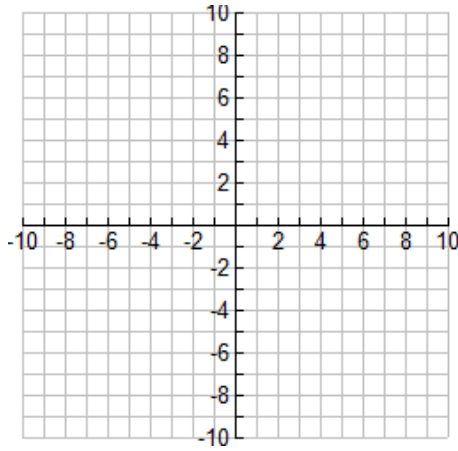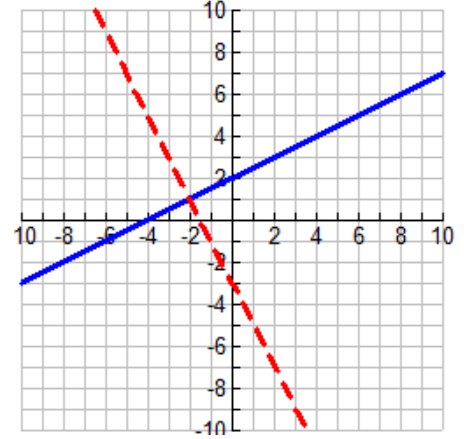
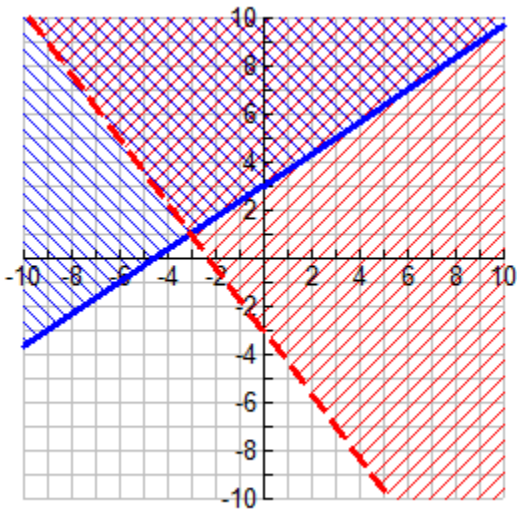| Graph the system of inequalities	Graph the system of inequalities	Are the following ordered pairs solutions to this system of inequalities?
$y \geq -3$ $y < 2x - 1$	$x \leq -3$ $y < \dfrac{5}{3}x + 2$	$y \leq \dfrac{1}{2}x + 2$ $y < -2x - 3$
		  (-3,-1) _____ (0,0) _____ (-4,0) _____

Challenge:

Write the system of inequalities that is graphed below:

Systems of Equations: Summary

TIGER Tim went to a burger shop on 2 different days. The first day he ordered 3 hamburgers, x, and 1 order of cheese fries, y, for $10. The second day he ordered 2 burgers and 1 order of cheese fries for $8. Write a system of equations and solve using the various methods below:
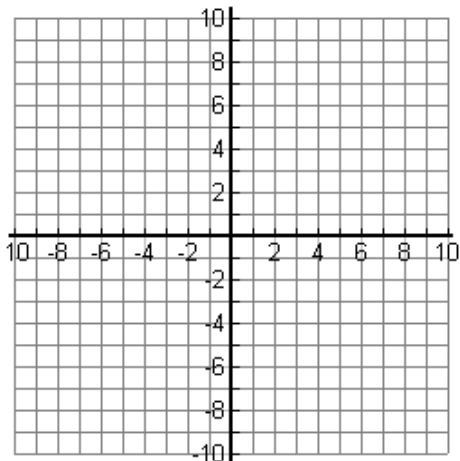
Elimination Method:

Substitution Method:

Equation:

Solve by graphing:

Equation:

Solve by filling in a table:

X	Y$_1$ =	Y$_2$ =
0		
1		
2		
3		
4		

Practice:

Mrs. Travis wants to deliver balloons to a friend. One company, Balloons to Go, charges $1.25 per balloon plus $6 for delivery. Another company, Balloons and More, charges $1.95 per balloon and $2 for delivery.

Write two equations to describe the 2 companies:

Company 1:   y = _____

Company 2:   y = _____

What is the minimum number of balloons needed to be ordered for the first company to be cheaper?

Number of balloons: _____

X	$Y_1 =$	$Y_2 =$
1		
2		
3		
4		
5		
6		
7		
8		

Solve using Substitution Method:

$$2x + y = 2$$
$$x = y + 4$$

Solve using Elimination Method:

3x + 6y = 6

x + 2y = 3

Write the 2 equations that would solve this problem:

State College has 620 students. There are 20 more women than men. How many women are there?

Equation:

Equation:

Write the 2 equations that would solve this problem:

Shelly and Jim sold tickets to the basketball game. Good seats were $5 each and poor seats cost only $2 each. If 210 people attended and paid $660, how many people bought good seats?

Equation:

Equation:

Write the 2 equations that would solve this problem:

Bruce has $5.15 in dimes and quarters. He has 8 more quarters than dimes. How many quarters does he have?

Equation:

Equation:

Write the 2 equations that would solve this problem:

The perimeter of a rectangular garden is 46 feet. The length of the garden is 5 feet less than three times the width. What are the dimensions of the rectangle?

Equation:

Equation: