Name: _____

Algebra 1

May 18 – 22

Time Allotment: 40 minutes per day

Zoom Guided Instruction	Day/Time this Week
1st Period Ms. Steger	Monday & Wednesday, 10:00 – 10:50am
2nd Period Ms. Steger	Monday & Wednesday, 11:00 – 11:50am
3rd Period Ms. Brintnall	Monday & Wednesday, 1:00 – 1:50pm
4th Period Ms. Brintnall	Tuesday & Thursday, 10:00 – 10:50am

Student Name: _____

Teacher Name (**circle one**): Steger Brintnall

Teacher emails: Vanessa.steger@greatheartsnorthernoaks.org and melanie.brintnall@greatheartsnorthernoaks.org. Ms. Brintnall will be teaching Mrs. Chubb's Algebra 1 class for the remainder of the school. If you were in Mrs. Chubb's class, you should email Ms. Brintnall for help if needed!

Academic Honesty

I certify that I completed this assignment independently in accordance with the GHNO Academy Honor Code.

Student signature:

_____

I certify that my student completed this assignment independently in accordance with the GHNO Academy Honor Code.

Parent signature:

_____

Algebra 1
May 18 – May 22

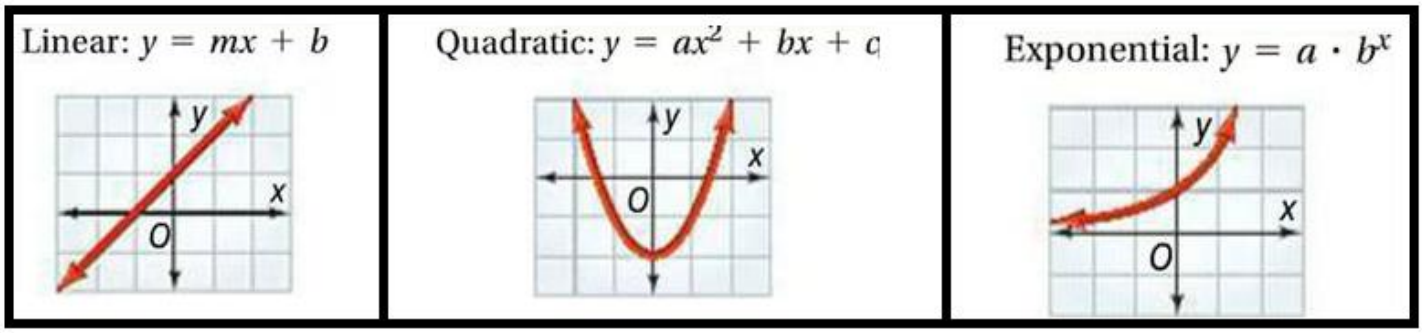
Name: _____

Packet Overview

Date	Objective(s)	Page Number
Monday, May 18	Translate between linear equations and their graphs.	3 - 7
Tuesday, May 19	Translate between slope-intercept form and standard form; solve systems of linear equations by substitution.	8 – 11
Wednesday, May 20	Solve systems of linear equations by elimination.	12 – 15
Thursday, May 21	Solve systems of linear equations by any method.	16
Friday, May 22	Find solutions to linear (1st degree) equations and systems of linear equations.	18 – 19
	Answer Key	20

Dear Algebra 1 students,

We've come to our final week of Algebra I! While we truly wish we could be experiencing this last week together in person, we are excited to return to one of the most important topics for review – linear equations. This means that by the end of this week, you will have experienced the following types of functions within the last three weeks:



Each of you has shown effort and admirable resilience while working on your Algebra packets at home. Make sure to say a sincere thank you to any parent, sibling, or friend who might have helped you along the way. We are here for you all this week, and would love to keep you seeing you in Zoom Instruction!

Have a great week,

Ms. Steger and Ms. Brintnall

Algebra 1
May 18 – May 22

Name: _____

Monday, May 18

Lesson 1 objective: Translate between linear equations and their graphs.

Bell work:
Lately, we have been talking about ***solutions*** as roots, x-intercepts, or zeros. Now, we are going to recall the definition for ***solution*** that we used earlier in the school year –

Solutions are **values that** _____ _____ _____ **true.**

Circle the letter of the choice that is NOT a solution for the given equation:

1. $5x - 3y = 5$

a) $\left(2\frac{1}{2}, 2\frac{1}{2}\right)$

b) $(1, 0)$

c) $(-2, -5)$

d) $(2, -1\frac{2}{3})$

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

a) $(0, -4)$

b) $(-12, 0)$

c) $(0, 4)$

d) $(-3, 3)$

3. $2x + y = 3$

a) $(0, -3)$

b) $(1\frac{1}{2}, 0)$

c) $(1, -5)$

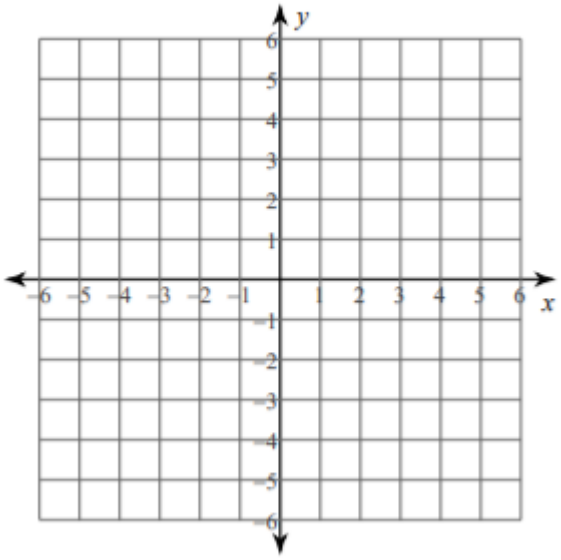
d) $(-4, 5)$

When we graph multiple solutions for a linear (1st degree) equation, we notice that the points form a ***line***. For the following, make a table of values and graph the line for each equation.

1.

x	y

1) $4x + y = 0$

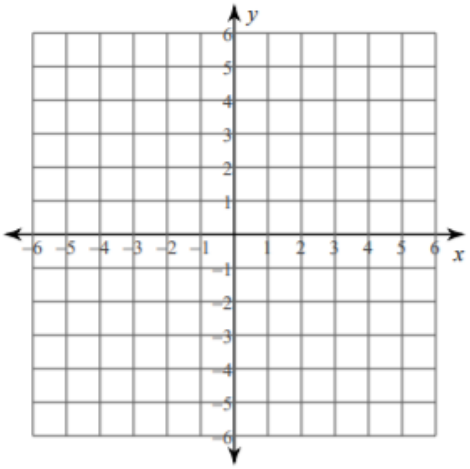


Name: _____

2.

x	*y*

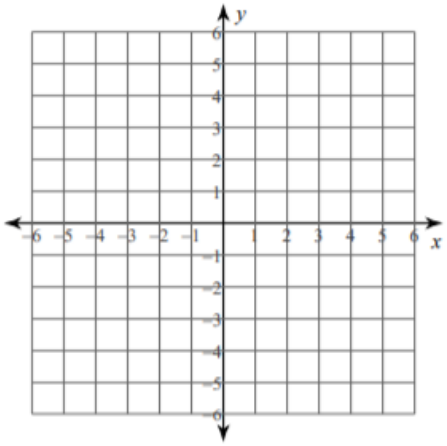
2) $10x - 3y = -15$



3.

x	*y*

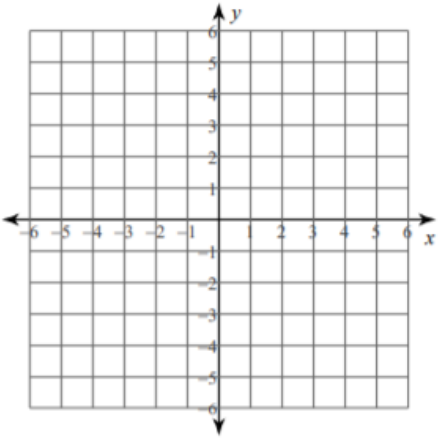
3) $x + y = -3$



4.

x	*y*

4) $x = 5$



Algebra 1
May 18 – May 22

Name: _____

We learned three main forms of lines:

	Standard Form	**Slope-Intercept Form**	**Point-Slope Form**
Formula:	$Ax + By = C$	$y = mx + b$	$y - y_1 = m(x - x_1)$
Key Characteristics:	*x* and *y* are on the same side of the equation, *A*, *B*, and *C* are integers	*y* is isolated, m is the slope, and b is the *y*-intercept	(x_1, y_1) is a point on the line, m is the slope

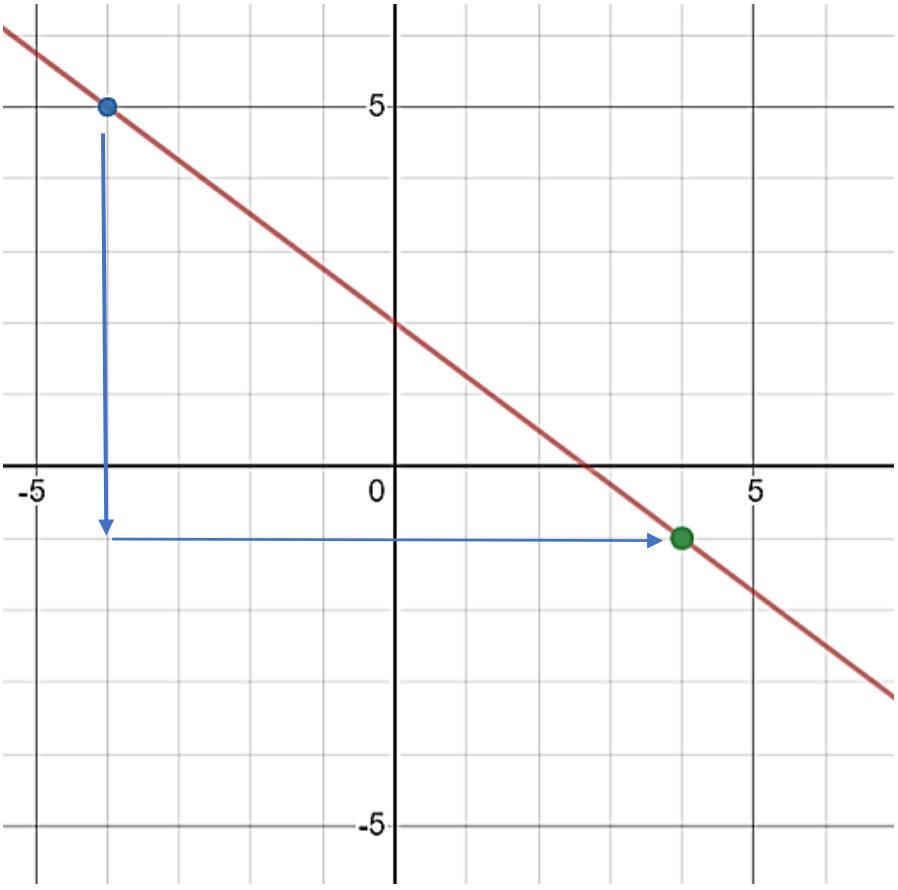
We will now practice looking at graphs and then writing the equation of the line from the graph. We can do this best using either **slope-intercept form** or **point-slope form**. Slope is a key feature of all lines. Recall slope, *m:*

$$m = \frac{\text{rise}}{\text{run}} = \frac{y_2 - y_1}{x_2 - x_1}$$

Ex. 1 Steps in the Process:

1) Identify any two points that you are CERTAIN lie on the gridlines! Do not estimate points – the *exact points MUST be on the line!*

- On this line, we see that $(-4, 5)$ and $(4, -1)$ both lie on the line.



2) Find the slope (rise over run) of the line. Remember – lines sloping downward from left to right have *negative* slope, and lines sloping upward from right to left have *positive* slope.

- We can see that the rise is -6 and the run is 8, so the slope is $-\frac{6}{8}$, which simplifies to $-\frac{3}{4}$.
- We could also choose to use the formula for slope to calculate:

$$\frac{-1 - 5}{4 - (-4)} = \frac{-6}{8} = -\frac{3}{4}$$

3) If you can clearly identify the *y*-intercept, we can write it in slope-intercept form very easily!

- Here, the *y*-intercept is $(0,2)$, so we can write the equation

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

4) Imagine we could not identify the *y*-intercept clearly. If we knew the slope and a point, we could put it in slope intercept form! Point: $(-4, 5)$, $m = -\frac{3}{4}$

So, $y - 5 = -\frac{3}{4}[x - (-4)]$, and we simplify to $y - 5 = -\frac{3}{4}(x + 4)$

We can distribute the $-\frac{3}{4}$ and add 5 to both sides to get

$y = -\frac{3}{4}x + 2$, the slope intercept form of the line!

Algebra 1
May 18 – May 22

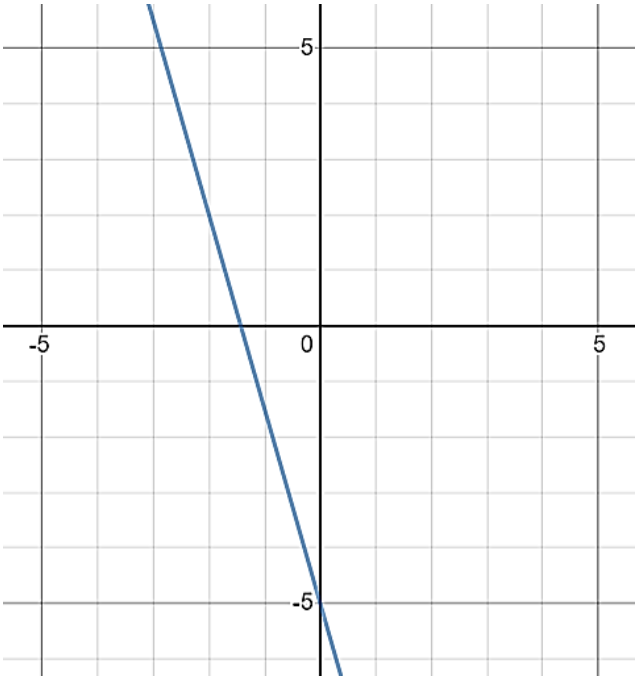
Name: _____

Try to write out the formulas for each form of the line from memory. Then, check your work with the formulas on the previous page:

	Standard Form	**Slope-Intercept Form**	**Point-Slope Form**
Formula:			

Write the equation for each line in slope intercept form. If you cannot clearly determine the *y*-intercept, start with point-slope form and then isolate *y* to put it in slope-intercept form.

5.

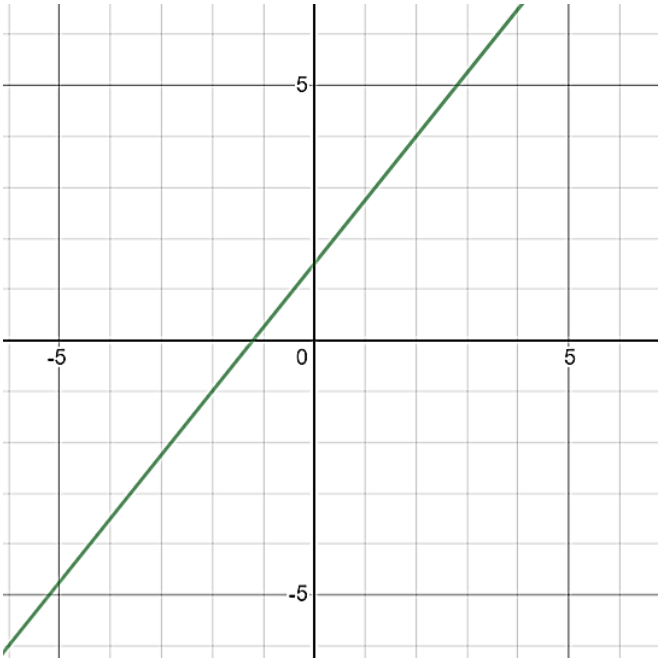


m = _____

Equation:

Final Equation in Slope-Intercept Form:

6.



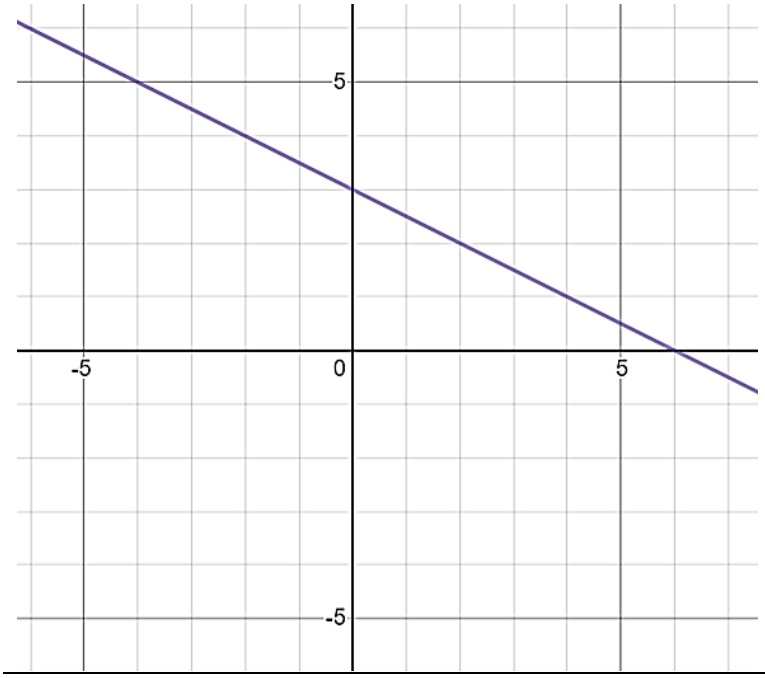
m = _____

Equation:

Final Equation in Slope-Intercept Form:

Name: _____

7.

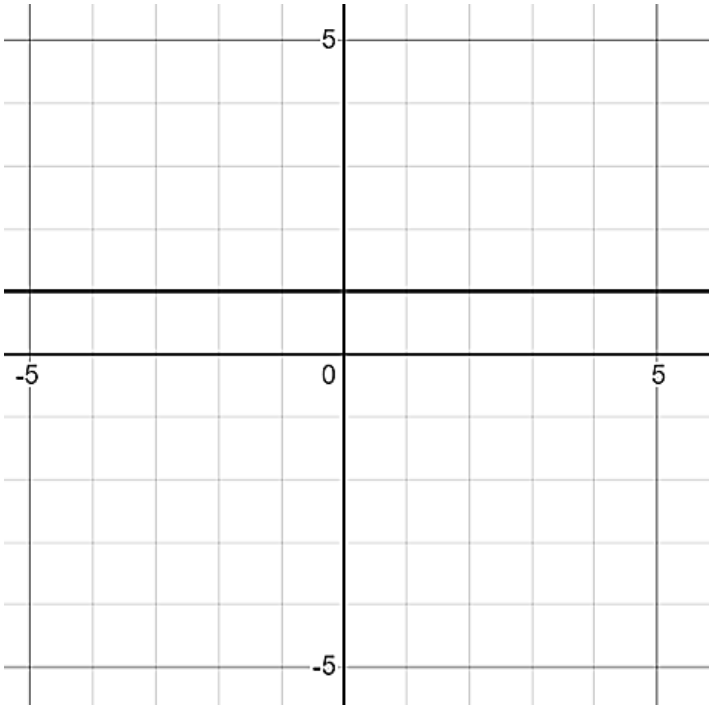


m = _____

Equation:

Final Equation in Slope-Intercept Form:

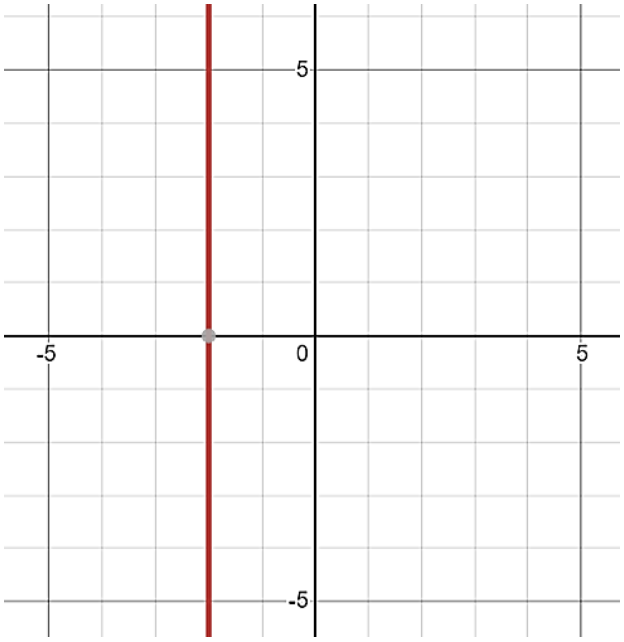
8.



m = _____

Equation:

9.



m = _____

Equation:

Check your answers with those in the back of the packet. You are now finished with Monday's work!

Algebra 1
May 18 – May 22

Name: _____

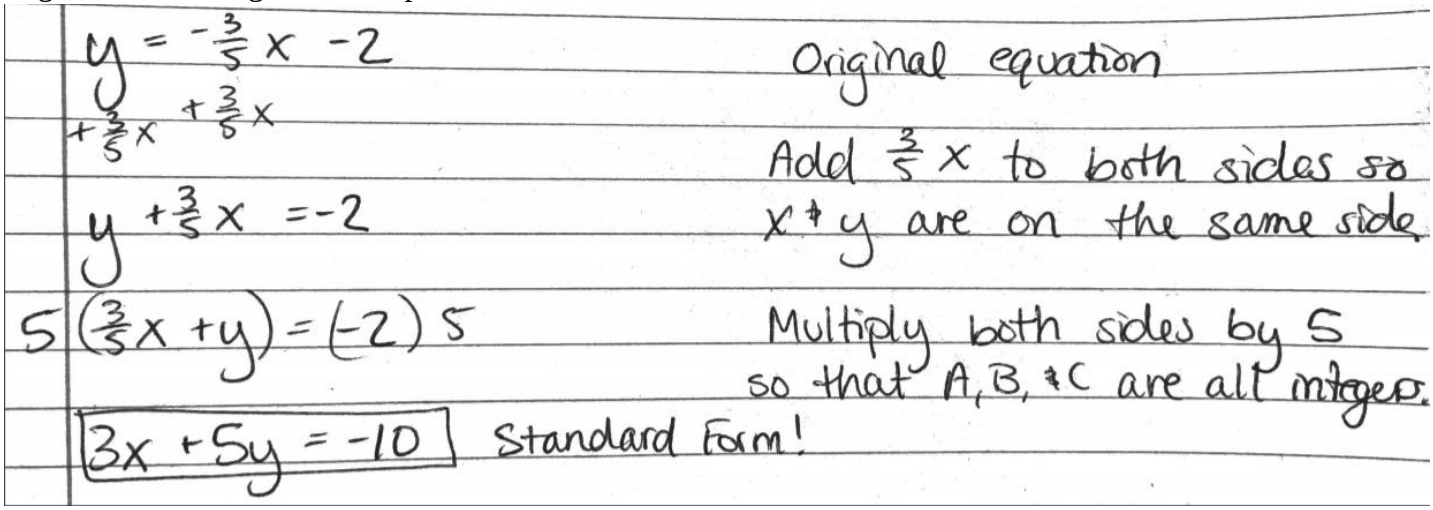
Tuesday, May 19

Lesson 2 objective: Translate between slope-intercept form and standard form; solve systems of linear equations by substitution

Bell work: We can translate between one form of a line to another to see the same line written in different ways. **Translate the following equations into slope-intercept form.** HINT: *Isolate y using equal sign highway.*

1. $x - 2y = -6$
2. $2x + 3y = 5$
3. $6x - 4y = 8$

We can also take equations in slope-intercept form and translate them into standard form. Remember that the key characteristics of standard form are that *x* and *y* are on the same side of the equation and *A*, *B*, and *C* are integers. Read through the example below:



Now, let's look at our three slope-intercept form equations from yesterday. Change each into ***standard form!***

4. $y = -\frac{7}{2}x - 5$
5. $y = \frac{5}{4}x + \frac{3}{2}$
6. $y = -\frac{1}{2}x + 3$

7. Think back to our study of parallel lines. What do we know about the slopes of parallel lines?

_____

Using your knowledge of lines, answer the following multiple-choice questions. Some strategies to help you:

- Can you write the lines in a different form?
- Can you identify the slope of the lines?
- Can you see if a given point is a *solution* to the equations given?
- If given an *x* or *y* intercept, write them out as ordered pairs. This will give you a better sense of what point you are working with.

8. Which of the following is parallel to $y = -4x + 2$ and an ***x-intercept*** of 1?
   a. $y = -4x + 8$
   b. $y = -4x - 2$
   c. $y = -4x + 2$
   d. $y = -4x + 4$

9. Which of the following has a slope of -2 and passes through the point $(2, 1)$?
   e. $y = -\frac{1}{2}x - 4$
   f. $y = -2x - 5$
   g. $y = -2x + 5$
   h. $y = -2x + 1$

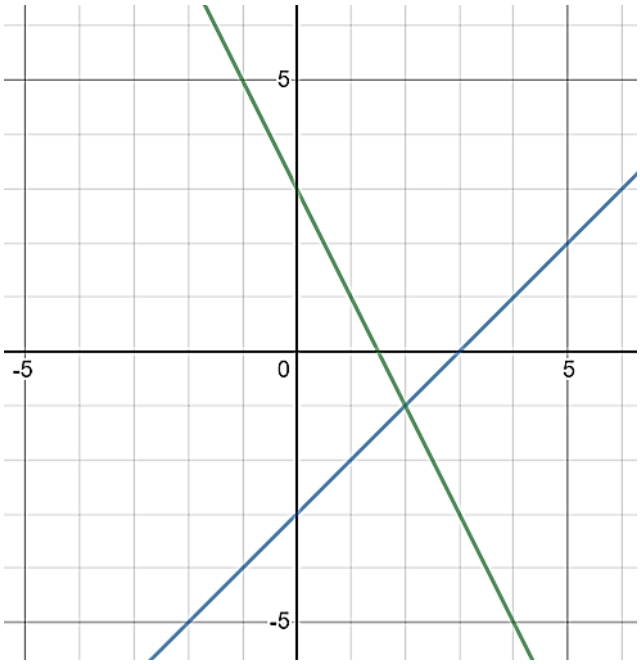
10. Which of the following has a slope of 4 and has an ***x-intercept*** of -2?
   i. $y = 4x + 8$
   j. $y = 4x - 8$
   k. $y = -4x + 2$
   l. $y = 4x - 2$

11. Which of the following has a slope of $\frac{1}{3}$ and a y-intercept of 6?
   m. $y = \frac{1}{3}x + 2$
   n. $y = \frac{1}{3}x + 6$
   o. $y = \frac{1}{3}x - 6$
   p. $y = \frac{1}{3}x - 2$

Check your answers and EMAIL US if you don't understand a question! 😊

Algebra 1
May 18 – May 22
Name: _____
Systems of Linear Equations

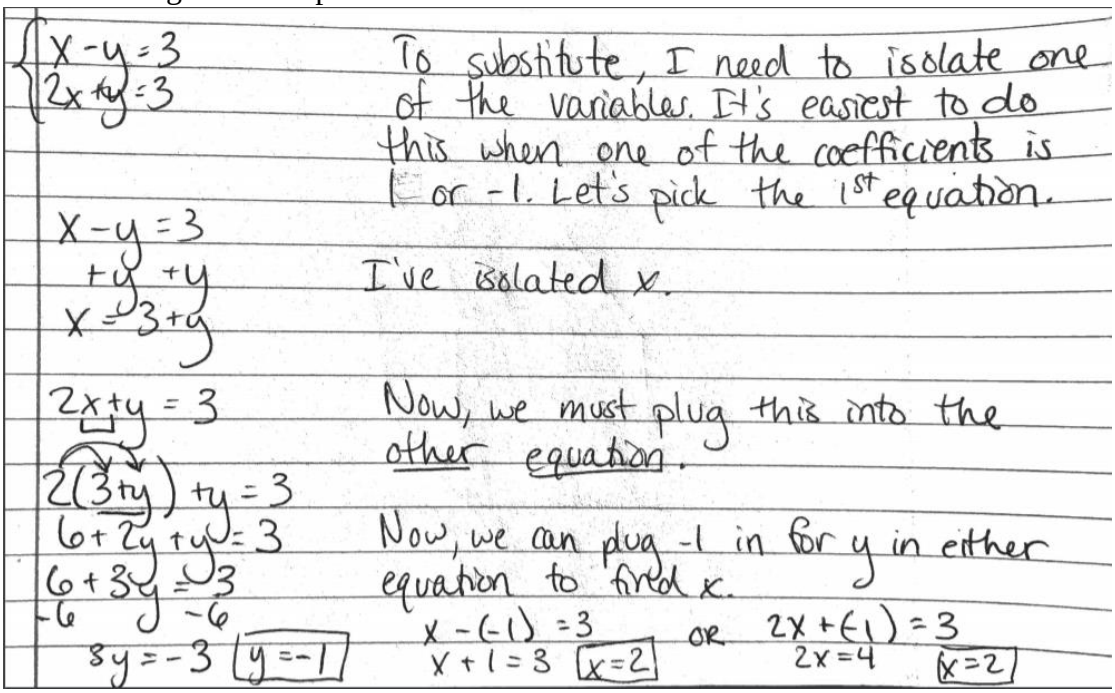
Recall that a *system of equations* is two or more equations in the same variables. A line represents *the infinite number of solutions to a two-variable equation.* Look at the system below. Write the equation for each line in standard form. Then, give the *solution of the system (the value that makes BOTH statements true)*



Green Line (the line with the negative slope)	**Blue Line (the line with the positive slope)**
m = _____	m = _____
Equation in slope-intercept form:	Equation in slope-intercept form:
Equation in standard form:	Equation in standard form:

Solution to the system: (___, ____)

While we can clearly see the solution as the intersection of the two lines on the graph, we can also use the *substitution method* to find that solution algebraically. This method requires us to know the equations for the line. Read through these steps:



NOTE:
Once we arrive at the solution, we have to write it as an ordered pair. So, the final answer here is $(2, -1)$, just like it was when we looked at the graph!

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Name: _____

Now, look at the same system. Isolate a variable in the second equation and continue the process to find the solution. Verify that this is truly the solution by ***plugging the solution into BOTH equations and determining whether it makes BOTH STATEMENTS TRUE!***

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

Solve the following equations using the substitution method. The odd solutions are given in the answer key. To check the even problems, plug your answer into **both equations** to determine whether it makes BOTH statements true. If you cannot find your mistake, EMAIL US with a picture of your work so we can help you!

12. $y = 2x$
$5x - y = 30$

13. $x = y + 2$
$2y + x = 17$

14. $3x + 1 = y$
$2x + 3y = 25$

15. $3x + 2y = 11$
$x - 2 = -4y$

You have finished your work for Tuesday!

Algebra 1
May 18 – May 22

Name: _____

Wednesday, May 20

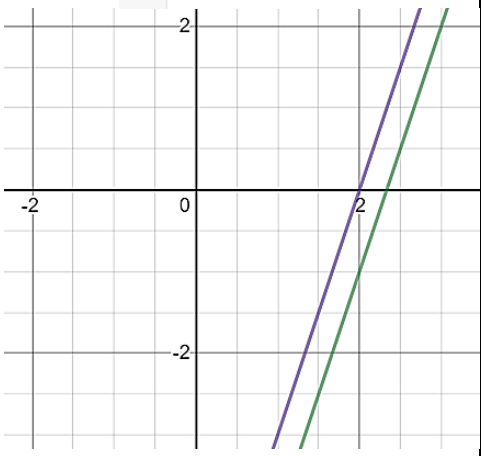
Lesson 3 Objective: Solve systems of linear equations by elimination.

Bell work: Recall the three possibilities when we encounter a system of linear equations. They could have ***one solution***, ***no solution***, or ***infinitely many solutions*.** Identify which option is true of the following systems:

1.

$y = 3x - 7$

$6x - 2y = 12$



a) one solution

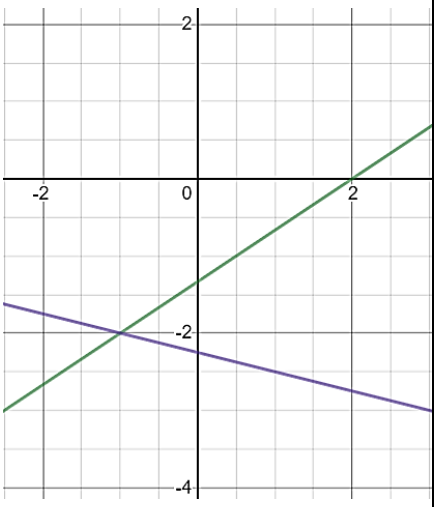
b) no solution

c) infinitely many solutions

2.

$2x - 3y = 4$

$x + 4y = -9$



a) one solution

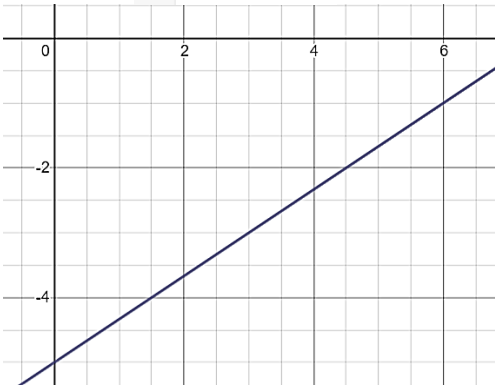
b) no solution

c) infinitely many solutions

3.

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

$4x - 6y = 30$



a) one solution

b) no solution

c) infinitely many solutions

4. Take the first system of linear equations and try to solve using substitution.

$y = 3x - 7$

$6x - 2y = 12$

Describe the result:

_____

_____

_____

_____

5. Take the third system of linear equations and try to solve using substitution.

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

$4x - 6y = 30$

Describe the result:

_____

_____

_____

_____

Algebra 1
May 18 – May 22

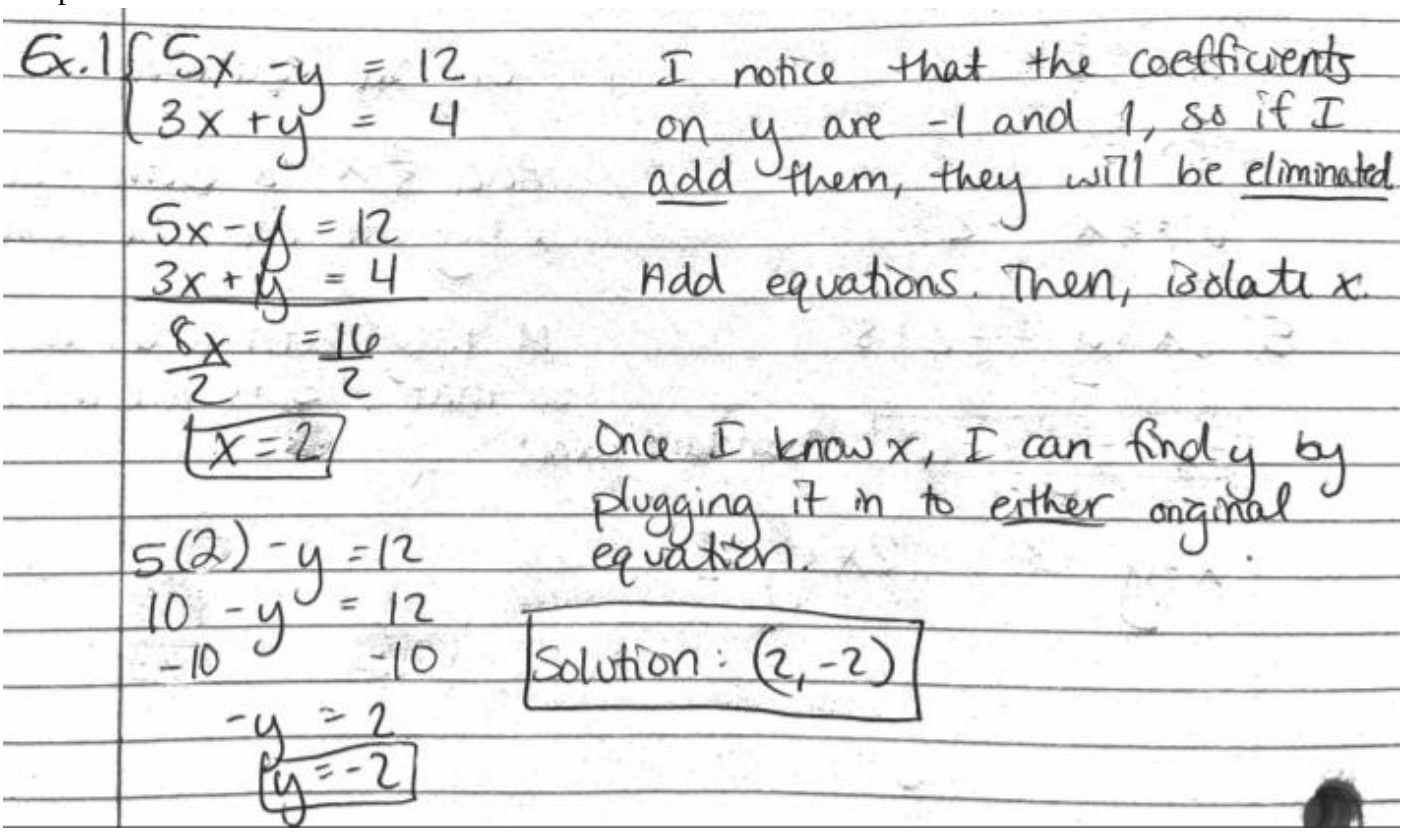
Name: _____

Solve these systems of linear equations using substitution. Then, plug in plug your answer into *both equations* to determine whether it makes BOTH statements true. If you cannot find your mistake, EMAIL US with a picture of your work so we can help you!

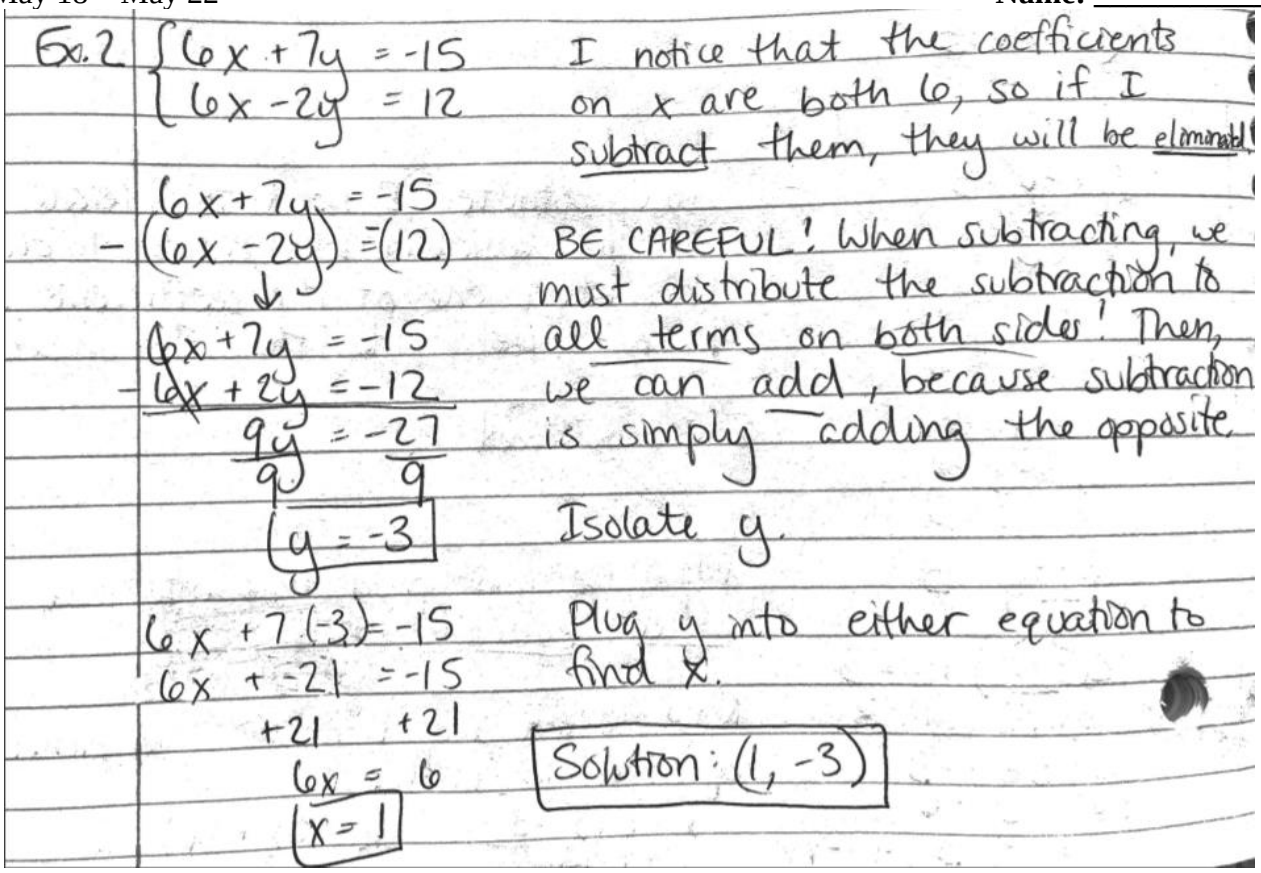
6. $3n + 5m = 7$
   $m - 4n = 6$

7. $2x + 3y = 0$
   $x + 5 = 6y$

We have looked at the graphing and substitution methods for solving systems of linear equations. Now, we will review our third method of solving systems: ***Elimination*** or ***The Addition-or-Subtraction Method***
NOTE: This is particularly helpful when we notice matching or opposite coefficients. Review the following examples:



Name: _____



Now, practice solving the following systems using the elimination/addition-or-subtraction method:

1) $-4x - 2y = -12$
$4x + 8y = -24$

2) $4x + 8y = 20$
$-4x + 2y = -30$

3) $x - y = 11$
$2x + y = 19$

4) $-6x + 5y = 1$
$6x + 4y = -10$

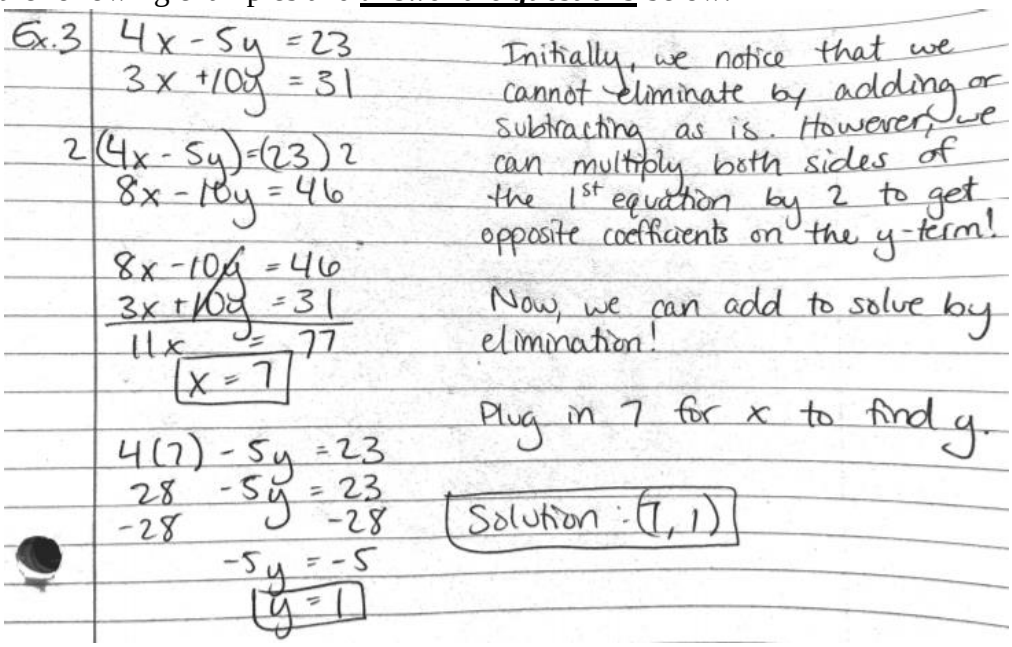
5) $-2x - 9y = -25$
$-4x - 9y = -23$

6) $8x + y = -16$
$-3x + y = -5$

Check your answers!

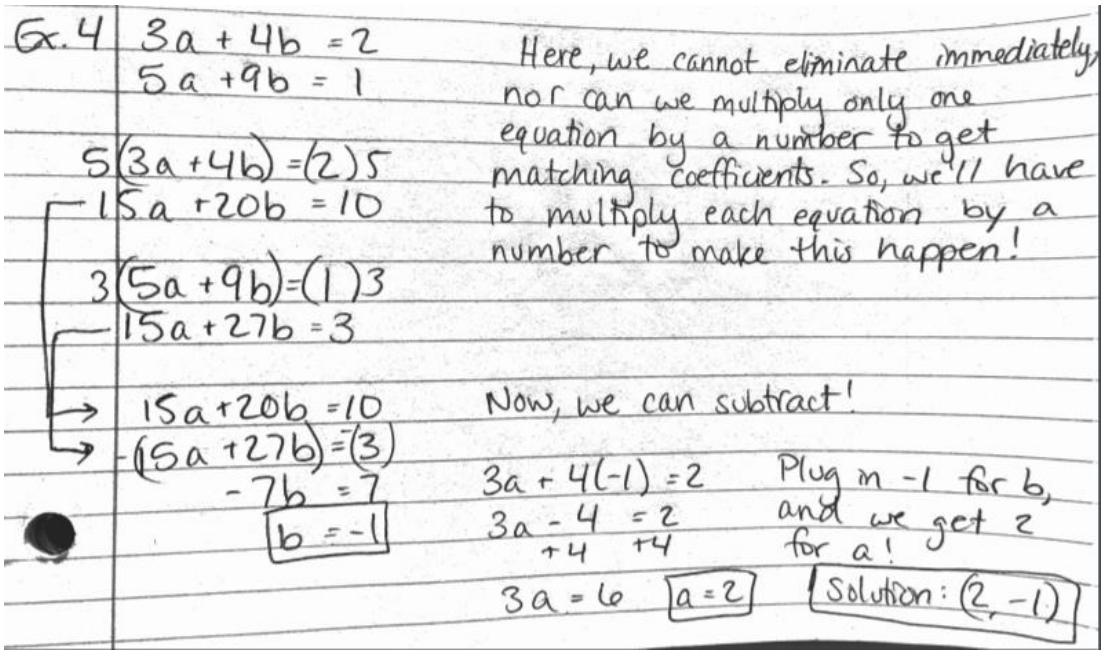
Algebra 1
May 18 – May 22 **Name:** _____

Sometimes, we do not automatically have matching coefficients, so we cannot eliminate terms immediately. However, we can sometimes ***multiply*** both sides by a helpful number so that we CAN add/subtract to eliminate a term! Review the following examples and ***answer the questions*** below:



1) What number did we multiply the first equation by? _____

2) Why did we do this? Explain. _____
_____



1) What number did we multiply the first equation by? _____ The second equation? _____

2) Why did we do this? Explain. _____
_____

You have now completed Wednesday's work!

Algebra 1
May 18 – May 22

Name: _____

Thursday, May 7

Lesson 4 Objective: Solve systems of linear equations by any method.

Bell work: Review Ex. 4 on the previous page What number did we multiply the 1st equation by? ____ The 2nd equation? ____

Write 1-2 sentences describing why we did this multiplication: _____

_____

_____

What other multiplication could we have done to eliminate one of the terms successfully?

a) Multiply the first equation by 3 and the second equation by 5.
b) Multiply the first equation by 9 and the second equation by 4.
c) Multiply the first equation by 4 and the second equation by 9.

Explain your choice in 1-2 complete sentences:

_____

_____

_____

_____

Solve the following equations using the elimination method with multiplication:

9) $5x + y = 9$
$10x - 7y = -18$

10) $-4x + 9y = 9$
$x - 3y = -6$

11) $-3x + 7y = -16$
$-9x + 5y = 16$

12) $-7x + y = -19$
$-2x + 3y = -19$

Algebra 1
May 18 – May 22

Name: _____

Friday, May 22

Lesson 5 Objective: Find solutions to linear (1st degree) equations and systems of linear equations.

It is here – our last day of Algebra 1 packets! It is hard to believe that the last time we were together in person was Friday March 6th. We (Ms. Brintnall and Ms. Steger) are just SO PROUD of each of you for your work this quarter. It is not easy to be suddenly thrown into remote learning during a pandemic. You are part of truly historic times, and now you can tell your children and grandchildren that you *learned how to solve quadratic equations and about exponential functions at home!!!* WOW.

Our last minor assessment is no secret – in fact, we are going to tell you EXACTLY what to review in this packet for about 20 minutes before diving into it. Though there are not new problems to do today, you might want to get out a piece of loose-leaf and re-do any problems that you do not immediately know how to do as you review:

- ☐ I know how to accurately graph a line using a table of values (like on page 4 of this packet).
- ☐ I know how to find the slope of a line both from its graph and from two given points (like on page 5 of this packet).
- ☐ I know how to write an equation in slope-intercept form of a line given its graph (like on page 6 of this packet).
- ☐ I know how to translate between Standard Form and slope-intercept form (like on page 8 of this packet).
- ☐ I know how to solve a system of equations with substitution (like on page 11 of this packet).
- ☐ I know how to tell if a system has one, none, or infinitely many solutions to a system (like on page 12 of this packet).
- ☐ I know how to solve a system using elimination (also called the addition-subtraction method) like on page 16 of this packet.

Okay, now that you've reviewed, you are READY!

Minor Assessment (Quiz)

Please read these boxes carefully before starting on the minor assessment.

- ☐ I understand that I am NOT allowed to use this packet or any other materials during my quiz.
- ☐ I understand that while Ms. Steger and Ms. Brintnall estimate that the quiz will take 20 minutes, it is okay to spend the time I need.
- ☐ I understand that I am NOT allowed to ask a parent, family member, or friend for help during my quiz.
- ☐ I understand that I am NOT allowed to use the internet or any other resource to help with my quiz.
- ☐ I understand that **I am NOT able to use a calculator this quiz.**

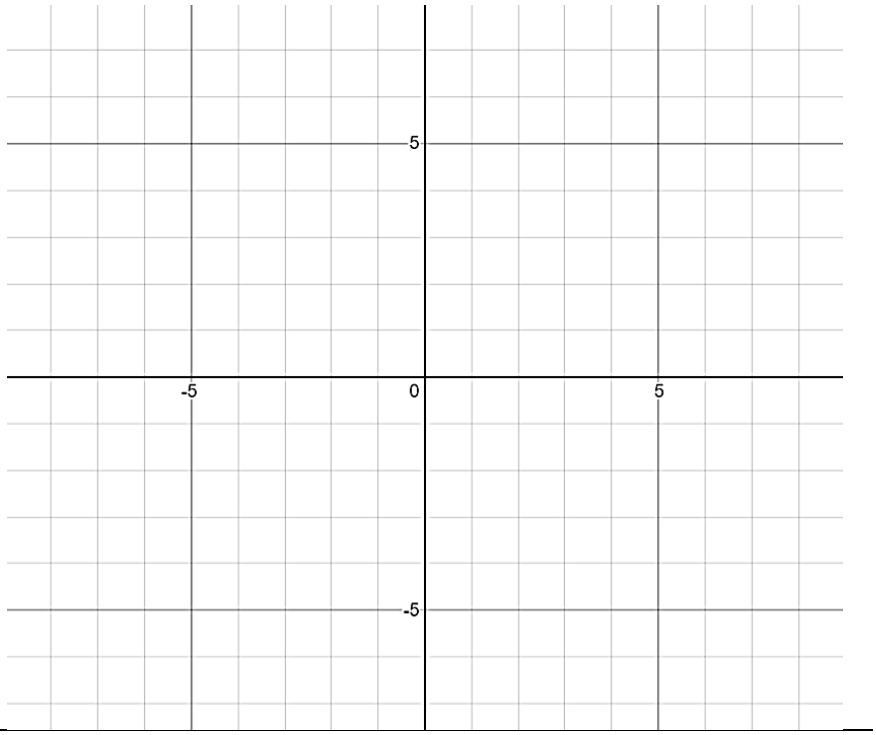
Algebra 1
May 18 – May 22

Name: _____

Week 9 Minor Assessment

1. Make a table of values and graph $2x - y = -4$

x	y

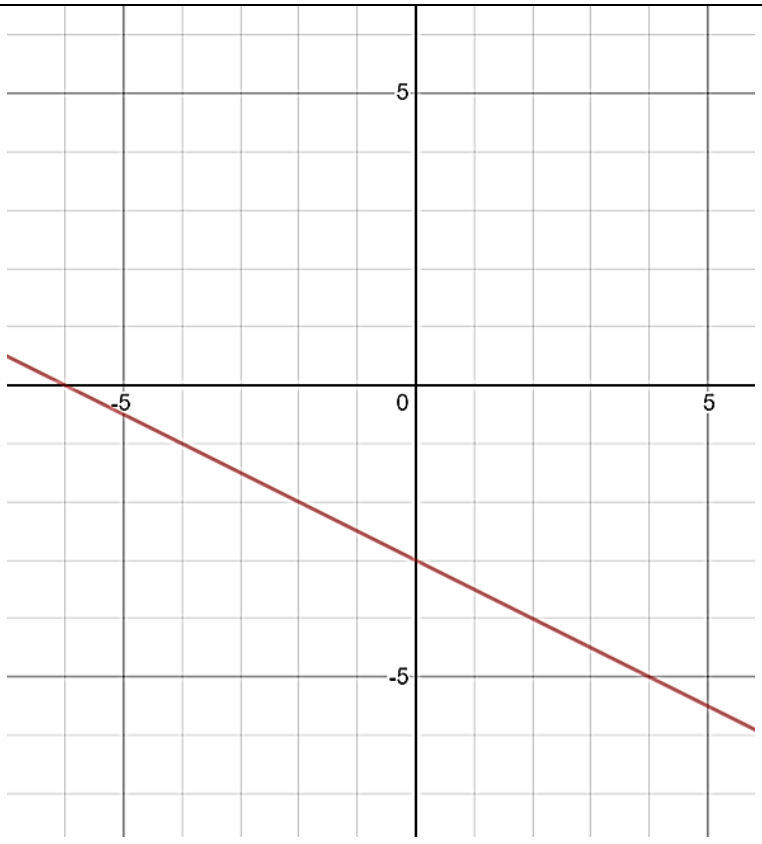


2. Look at your graph above and identify the following:

m = _____ x-intercept: (_____, _____) y-intercept: (_____, _____)

3. Look at the graph to the right. Find the slope and y-intercept.

m = _____ y-intercept: (_____, _____)



Find the equation in ***slope-intercept form***:

$y =$

Find the equation in ***standard form***:

4. Solve this system using SUBSTITUION! Careful here – DON'T start solving using elimination. We specifically want to see how you isolate one of the variables to start. Choose strategically! One of the variables is the easiest to isolate.

$3x - 4y = 6$
$2x + y = -7$

Solution to the system:

(_____, _____)

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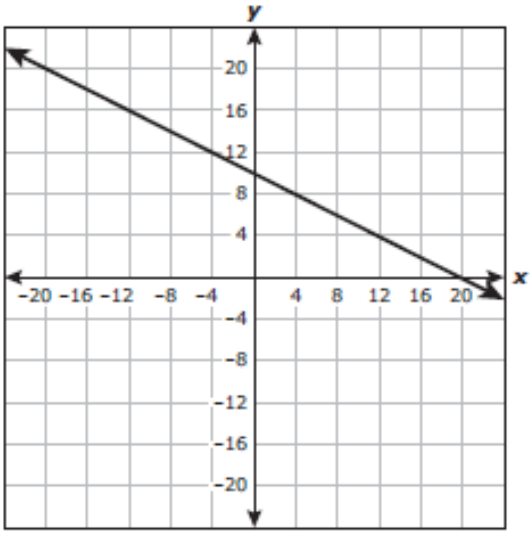
5. The line graphed on the grid represents the first of two equations in a system of linear equations.



If the graph of the second equation in the system passes through the points (–12, 20) and (4, 12), which statement is true?

A The only solution to the system is (10, 5).

B The only solution to the system is (0, 14).

C The system has no solution.

D The system has an infinite number of solutions.

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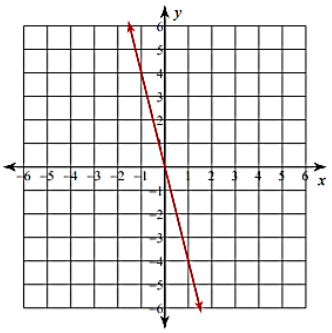
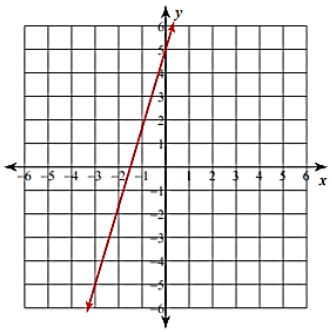
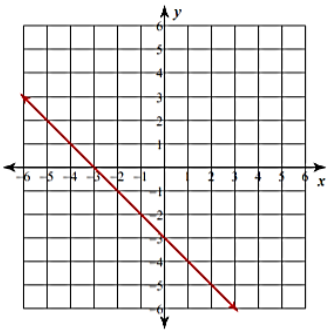
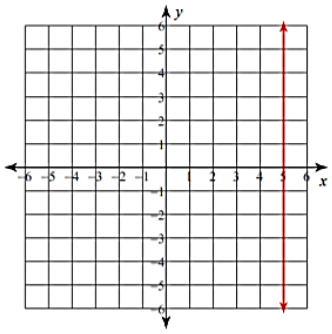
6. Solve this system using ELIMINATION! (this method is also called the addition-subtraction method).

$4x + 15y = 10$
$3x + 10y = 5$

Solution to the system:

(_____, _____)

Answer Key for the Daily Work

Lesson 1 (Monday)	***Solutions*** are values that make a statement true! BW: 1. D 2. A 3. B 1) $4x + y = 0$  2) $10x - 3y = -15$  3) $x + y = -3$  4) $x = 5$  5. $m = -\frac{7}{2};\ y = -\frac{7}{2}x - 5$ 6. $m = \frac{5}{4};\ y = \frac{5}{4}x + \frac{3}{2}$ 7. $m = -\frac{1}{2}; y = -\frac{1}{2}x + 3$ 8. $m = 0; y = 1$ 9. m is undefined (no slope); $x = -2$
Lesson 2 Tuesday	1. $y = \frac{1}{2}x + 3$ 2. $y = -\frac{2}{3}x + \frac{5}{3}$ 3. $y = \frac{3}{2}x - 2$ 4. $7x + 2y = -10$ 5. $-5x + 4y = 6$ 6. $x + 2y = 6$ 7. Parallel lines have the same slope. 8. D 9. G 10. I 11. N Graph: Blue Line: $x - y = 3$; Green Line: $2x + y = 3$; Solution: (2, -1) 13. (7, 5) 15. (2, -1) **Check 12, 14, and 16 on your own by making sure your answer makes both original statements true and EMAIL US if you are getting something wrong and cannot find your mistake!**
Lesson 3 Wednesday	1. B 2. A 3. C 4. When solving with substitution, we will get an answer that is never true. 5. When solving with substitution, we will get an answer that is always true. 6. $(2, -1)$ 7. $\left(-1, \frac{2}{3}\right)$ Practice: 1. $(6, -6)$ 2. $(7, -1)$ 3. $(10, -1)$ 4. $(-1, -1)$ 5. $(-1, 3)$ 6. $(-1, -8)$ Answers to the questions about Ex. 3-4 can be found by carefully reading the examples.
Lesson 4 Thursday	BW: B 9. (1,4) 10. (9,5) 11. $(-4, -4)$ 12. $(2, -5)$