



Honors Algebra 1
Required Summer Assignment
May 2024

Dear Incoming Honors Algebra I students and families,

We are so excited to have you in our class next year. To ensure you have a productive and successful year, we are providing you with summer homework that will help you solidify your foundational skills for Honors Algebra I. Listed below are a set of skills you are expected to know coming into the course. They are 7th and 8th grade standards. **We recommend you complete one standard every other day in the month of July.**

All of the questions should be answered without the use of technology. This includes calculators, Desmos, any type of photo math or application that does the math for you.

Please show all work on a piece of notebook paper as needed. Put a box around your answer and be neat and organized.

A video link for each standard is provided at the top of each standard page in case you need help remembering!

Calendar	July 11: Standard 6	July 22: Standard 12
July 1 : Standard 1	July 13: Standard 7	July 24: Standard 13
July 3: Standard 2	July 15: Standard 8	July 26: Standard 14
July 5: Standard 3	July 17: Standard 9	July 28: Standard 15
July 7: Standard 4	July 19: Standard 10	
July 9: Standard 5	July 21: Standard 11	

Bring your summer homework to turn in on the first day of school, Monday August 12th. It will be collected during your first class period.

A test over these standards will be given in class during the first week of school. We will analyze the tests for strengths and weaknesses and work on remediating any standards.

Have a wonderful summer and we look forward to meeting you in August!

Sincerely,

Kim Childress

Michael Karp

Teacher Contact

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Mr. Karp (michael.karp@popeprep.org)

Algebra I Prerequisites

1. Computation with rational numbers -this includes fractions and decimals as well as integers (positive and negative numbers)
2. Order of Operations and evaluating expressions
3. Simplifying expressions by distributing and combining like terms
4. Solving Multi-step Equations
5. Write expressions and equations given a verbal phrase
6. Ratios and Proportions
7. Understanding that the slope is a constant rate of change
8. Identifying independent and dependent variables
9. Slope algebraically and graphically (slope is the rate of change)
10. Writing equations of lines given two points
11. Writing equations of lines given a point and a slope (point-Slope)
12. Write and graph an equation of line given slope and y-intercept
13. Graph from standard form using x and y intercepts or $m = -A/B$ and $b = C/B$
14. Finding the x-intercept and y-intercept of a line and explain in context
15. Basic systems of equations (all three forms- graphing, substitution, elimination)

Standard 1: I can add, subtract, multiple, and divide rational numbers without a calculator.

<p>↻ 1. Evaluate the expression shown below and write your answer as a fraction in simplest form.</p> $\frac{5}{2} \cdot \left(\frac{7}{6} - \frac{4}{15} \right)$	<p>6. Evaluate the expression shown below and write your answer as a fraction in simplest form.</p> $\frac{-\frac{1}{8}}{-\frac{3}{20}} - \frac{5}{3}$
<p>2. Evaluate the expression shown below and write your answer as a fraction in simplest form.</p> $\frac{\frac{\frac{8}{3}}{\frac{12}{5}} - \frac{1}{15}}$	<p>7. Evaluate the expression shown below and write your answer as a fraction in simplest form.</p> $\frac{1}{3} \cdot \left(\frac{5}{3} - \frac{12}{5} \right)$
<p>3. Evaluate the expression shown below and write your answer as a fraction in simplest form.</p> $\frac{\frac{1}{5}}{-\frac{6}{35}} + \frac{11}{7}$	<p>8. Evaluate the expression shown below and write your answer as a fraction in simplest form.</p> $\left(\frac{1}{6} + \frac{7}{12} \right) \div \frac{4}{9}$
<p>4. Evaluate the expression shown below and write your answer as a fraction in simplest form.</p> $\frac{\frac{\frac{12}{11} - \frac{1}{2}}{\frac{1}{5}}}$	<p>9. Evaluate the expression shown below and write your answer as a fraction in simplest form.</p> $\left(\frac{7}{9} - \frac{5}{6} \right) \div \frac{1}{12}$
<p>5. Evaluate the expression shown below and write your answer as a fraction in simplest form.</p> $-\frac{3}{2} \div -\frac{9}{10} \cdot -\frac{11}{6}$	<p>10. Evaluate the expression shown below and write your answer as a fraction in simplest form.</p> $\frac{\frac{1}{4}}{\frac{11}{10} - \frac{5}{6}}$

Standard 2: I can use order of operations and evaluate expressions.

<https://www.youtube.com/watch?v=hqPFoTxU-kA>

Evaluate the following expressions for $u = -4$, $v = -8$, and $w = 11$.

i) $w + 5 - v$

ii) $(-u) - w + (-20)$

iii) $u + 13$

$p^2m \div 4$; use $m = 4$, and $p = 7$

$m + p \div 5$; use $m = 1$, and $p = 5$

$y - (z + z^2)$; use $y = 10$ and $z = -2$

$2k + 8n + 3$ use $k = 3$ and $n = -7$

$3 + 7(-4n - 2s)$ use $s = -8$ and $n = 6$

$3 + \left(\frac{x+y}{y} - 3\right)^2$; use $x = 10$ and $y = 2$

Standard 3: I can simplify expressions by distributing and combining like terms and exponent rules.

<https://www.youtube.com/watch?v=mR0PbJBEBQc>

Simplify each expression below:

$2h^2 - 7h + 2h^2 - h + 6 + 4h - 9h$	$8x^4 - 7x^3 + 4x^4 + 2y^3 - 7xy + 3y^3 + 12xy$
$2m + m - 3$	$7(-7d - 9) - 8d$
$5(-4h + 4) + 7(-3h + 3)$	$8t - 3(t - 10)$
Use exponents to condense the expression below. $y \cdot y \cdot y \cdot x \cdot x \cdot y \cdot x \cdot y$	Use exponents to condense the expression below. $y \cdot y \cdot y \cdot z \cdot x \cdot y \cdot z \cdot y \cdot x$

Standard 4: I can write expressions and equations from a verbal phrase or sentence.

<https://www.youtube.com/watch?v=QQw8iswm62k>

Twice the difference of 2 and a number.	Eight times the square of a number.
The quotient of a number and 7.	One-half of the sum of h and 7
The quotient of 7 and d decreased by 9	Nine times a number decreased by four
One less than the product of four and a number is 11.	Five less than twice a number is 7.
The sum of 3 and the product of 4 and a number is 21.	18 is the result of 5 less than the quotient of x and 7.

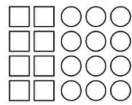
Standard 5: I can solve multi-step equations.

<https://www.youtube.com/watch?v=uSc9AvGM-po>

<p>1. Solve for x.</p> $4(-3x - 4) - 2x + 1 = -1$	<p>6. Solve for x. Express your answer as a proper or improper fraction in simplest terms.</p> $\frac{1}{4}x - \frac{2}{3} = \frac{1}{3}$
<p>2. Solve for x.</p> $2(-3x + 2) + 5x + 1 = -3$	<p>7. Solve for y. Express your answer as a proper or improper fraction in simplest terms.</p> $-\frac{1}{3} = \frac{3}{8}y - \frac{3}{4}$
<p>3. Solve for x.</p> $3(-2x + 1) + 5x + 2 = 3$	<p>8. Solve for b. Express your answer as a proper or improper fraction in simplest terms.</p> $-\frac{3}{4} - \frac{1}{3}b = -\frac{1}{6}$
<p>4. Solve for x.</p> $-4(-2x + 1) - 3x + 2 = -27$	<p>9. Solve for x:</p> $-3x - (3x + 4) = -1 + 2.5(-3x - 5.1)$
<p>5. Solve for b. Express your answer as a proper or improper fraction in simplest terms.</p> $-\frac{2}{3} + \frac{1}{6}b = -\frac{4}{7}$	<p>10. Solve for x:</p> $8.9 = -2(-3x + 5.2) - x$

Standard 6: Ratios and Proportions

1. Find the ratio of squares to total shapes in the diagram below.



Unsimplified ratio of squares to total shapes:

☐ = ☐

For every 2 squares there are _____ total shapes,
therefore the simplified ratio of squares to total shapes is
_____ : _____.

6. A bookstore sells 6 books for \$57. Which table represents the relationship between number of books and the total price?

A

Books	Cost
6	\$57
7	\$66.50
8	\$76

B

Books	Cost
6	\$57
12	\$63
18	\$69

C

Books	Cost
1	\$9.50
11	\$19.50
21	\$29.50

D

Books	Cost
1	\$9.50
2	\$10.50
3	\$11.50

2. Find the ratio of triangles to circles in the diagram below.



Unsimplified ratio of triangles to circles:

10

For every 2 triangles there are _____ circles, therefore
the simplified ratio of triangles to circles is
_____ : _____.

7. One week, Brayden earned \$504.00 at his job when he worked for 21 hours. If he is paid the same hourly wage, how much would he make the next week if he worked 22 hours?

3. In art class students are mixing black and white paint to make gray paint. Jin mixes 3 cups of black paint and 5 cups of white paint. Kayla mixes 10 cups of black paint and 15 cups of white paint. Whose gray paint will be darker?

- A. Jin's gray paint will be darker.
- B. Kayla's gray paint will be darker.
- C. The two gray paints will be equally dark.

8. Landon's car used 7 gallons to travel 259 miles. How many gallons of gas would he need to travel 740 miles?

4. In art class students are mixing black and white paint to make gray paint. Serenity mixes 14 cups of black paint and 9 cups of white paint. Jamar mixes 5 cups of black paint and 3 cups of white paint. Whose gray paint will be lighter?

- A. Serenity's gray paint will be lighter.
- B. Jamar's gray paint will be lighter.
- C. The two gray paints will be equally light.

9. A dressmaker needs to cut 4-inch pieces of ribbon from rolls of ribbon that are 9 feet in length. How many 4-inch pieces can the dressmaker cut from 15 of these rolls of ribbon?

- (a) How many **inches** of ribbon does the dressmaker have, in total?
- (b) How many 4-inch pieces are there in that many inches?

5. The ratio of students to adults on a field trip is 3 to 2. Which table correctly represents this ratio?

A

Students	Adults
6	4
12	8
15	10

B

Students	Adults
6	4
8	6
10	8

C

Students	Adults
3	2
6	6
12	10

D

Students	Adults
3	2
6	5
12	11

10. There are 204 calories in three ounces of a certain ice cream. How many calories are there in one pound?

$$1 \text{ pound} = 16 \text{ ounces}$$

- (a) How many **ounces** will you need to find the number of calories for?
- (b) How many calories are there in that many ounces?

Standard 7: I can recognize slope as a constant rate of change and identify proportional and nonproportional tables, graphs, and equations.

<https://www.youtube.com/watch?v=3ULZbnia2cA>

Find the unit rate of change for the given table

Number of Balloons	Total Cost of Balloons (in Dollars)
2	6
4	12
6	18
8	24

Find the unit rate of change for the given table

Number of Lawns	Total Earned (in Dollars)
3	25.50
5	42.50
7	59.50
9	76.50

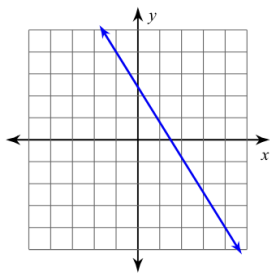
Find the unit rate of change for the given table

Number of Raffle Tickets	Total Cost of Raffle Tickets (in Dollars)
2	1
4	2
8	4
10	5

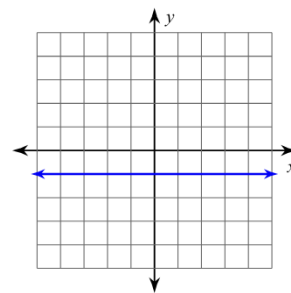
Does the following table represent a proportional relationship? Justify your answer

# of Hours	Cost of Service Call
2	100
3	125
5	175
8	250

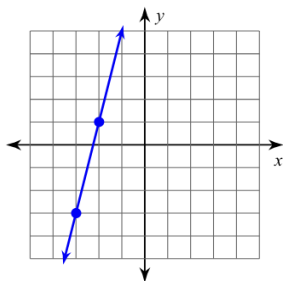
What is the slope of the following line?



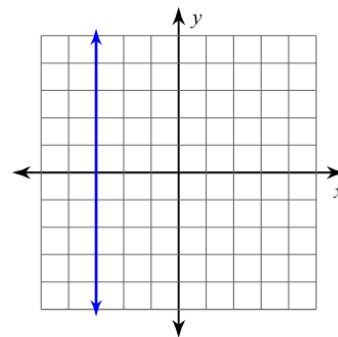
What is the slope of the following line?



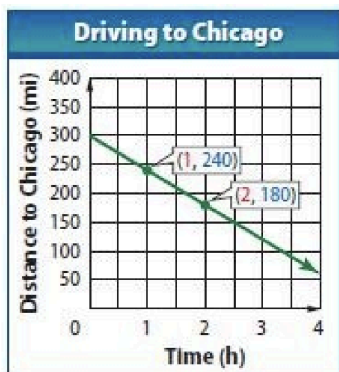
What is the slope of the following line?



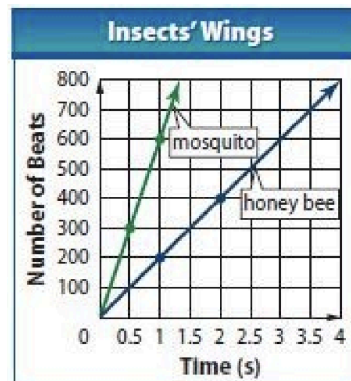
What is the slope of the following line?



What is the constant rate of change for the following linear function?



What is the difference in the constant rate of change between mosquitoes and honey bees in the following graph?



Standard 8: I can identify the independent (input) and dependent variables (output).

<https://www.youtube.com/watch?v=dsrJBWxwUyY>

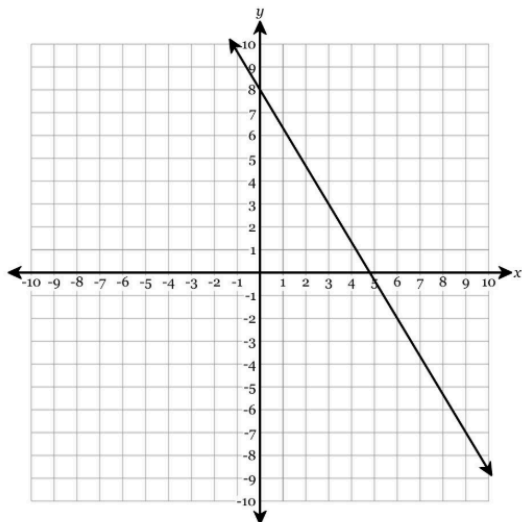
Identify the independent and the dependent variable in each scenario.

- 1) The older John gets, the taller he is.
- 2) The more gallons of milk I have, the more cups of milk I have.
- 3) In the United States House of representatives, the number of Representatives from a state is calculated based on its population.
- 4) The number of seats in a movie theater determines how many tickets can be sold.
- 5) As a plane descends, the more time that passes, the lower the plane's altitude is.
- 6) It costs \$0.99 for a music download. The more music I download, the more money I spend.
- 7) The more tickets I sell, the more money I have.
- 8) Judah brings reusable shopping bags from home whenever he goes to the grocery store. The number of bags he brings is based on how many products are on his shopping list.
- 9) At a deli counter, the price of a customer's order is based on its weight.
- 10) Vera and Elizabeth are going hiking and are trying to figure out how many snacks they should bring with them on the hike. The longer they plan to hike, the more snacks they should bring.

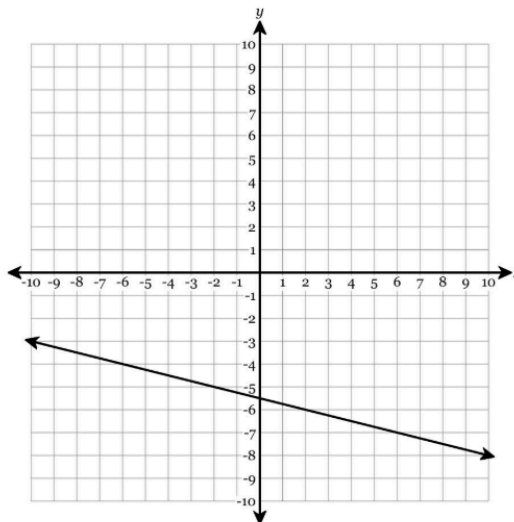
Linear equations review: https://www.youtube.com/watch?v=Ft2_QtXAnh8

Standard 9: I can find the slope of a line algebraically and graphically.

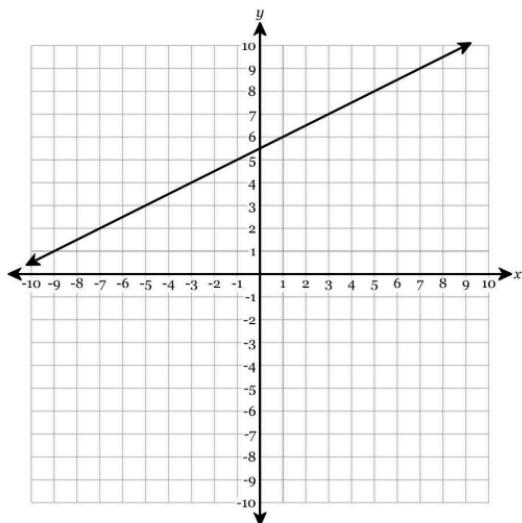
1. Draw a line representing the "rise" and a line representing the "run" of the line. State the slope of the line in simplest form.



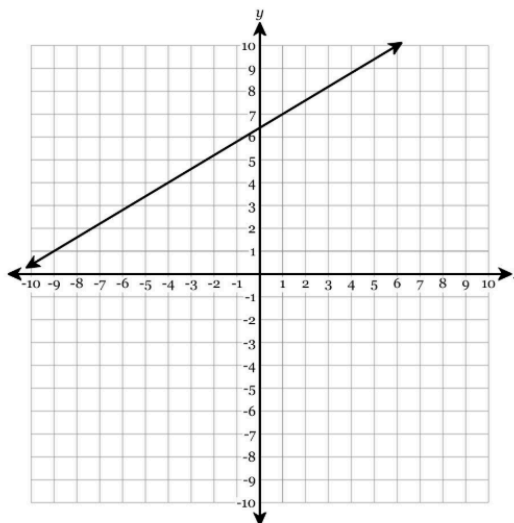
3. Draw a line representing the "rise" and a line representing the "run" of the line. State the slope of the line in simplest form.



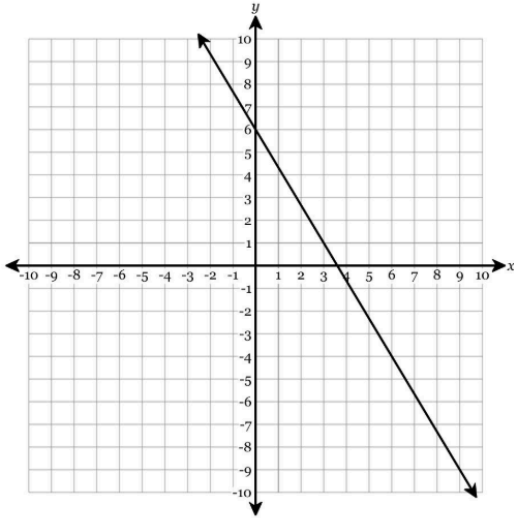
2. Draw a line representing the "rise" and a line representing the "run" of the line. State the slope of the line in simplest form.



4. Draw a line representing the "rise" and a line representing the "run" of the line. State the slope of the line in simplest form.



5. Draw a line representing the "rise" and a line representing the "run" of the line. State the slope of the line in simplest form.



6. What is the slope of the line that passes through the points $(-8, 9)$ and $(-5, 21)$? Write your answer in *simplest form*.
7. What is the slope of the line that passes through the points $(-5, 4)$ and $(-1, -12)$? Write your answer in *simplest form*.
8. What is the slope of the line that passes through the points $(5, -6)$ and $(4, -6)$? Write your answer in *simplest form*.
9. What is the slope of the line that passes through the points $(-5, 4)$ and $(-5, 6)$? Write your answer in *simplest form*.
10. What is the slope of the line that passes through the points $(-7, -4)$ and $(-4, -5)$? Write your answer in *simplest form*.

Standard 10: I can write equations of lines given two points.

1. Write and equation of a line that passes through the points $(5, 3)$ and $(2, -3)$.	3. Write and equation of a line that passes through the points $(-9, 2)$ and $(-9, -6)$.
2. Write and equation of a line that passes through the points $(7, 7)$ and $(-2, 7)$.	4. Write and equation of a line that passes through the points $(-3, -7)$ and $(6, -8)$.

Standard 11: I can write equations of lines given a point and the slope.

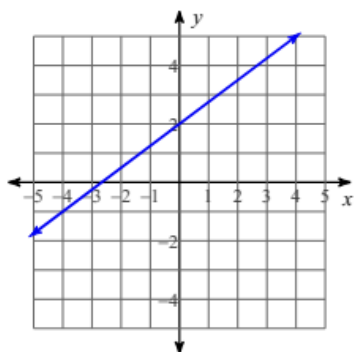
1. What is the equation of the line that passes through the point $(7, -3)$ and has a slope of -1 ?	3. What is the equation of the line that passes through the point $(8, -7)$ and has a slope of 0 ?
2. What is the equation of the line that passes through the point $(-4, 4)$ and has an undefined slope?	4. What is the equation of the line that passes through the point $(-8, 7)$ and has a slope of -1 ?

Standard 12: I can write an equation of a line given the slope and y-intercept.

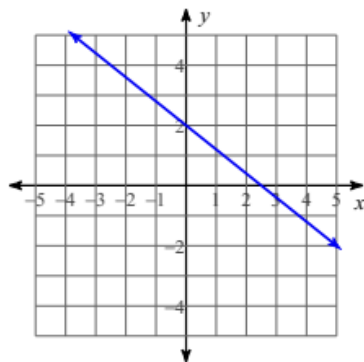
I can Graph an equation of a line given the slope and y-intercept.

Write the slope-intercept form of the line given the graph.

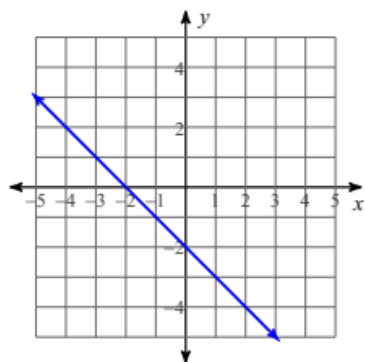
1)



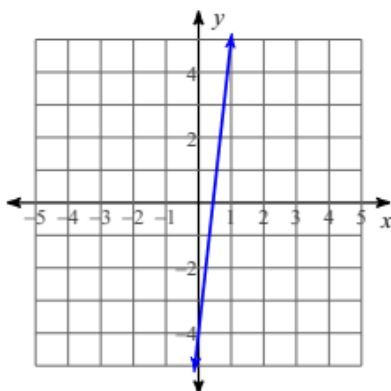
2)



3)



4)



$$y = mx + b$$

y: dependent/responding variable

x: independent/controlled variable

m: coefficient (of x) or rate, when x is increasing by 1

b: y-intercept or starting value (when x is 0, y is ____)

Write the equation of a line in slope-intercept form given the tables below.

X	Y
0	3
1	7
2	11
3	15

What is the rate?

What is the starting value?

Write the equation:

X	Y
0	-4
1	-2
2	0
3	2

What is the rate?

What is the starting value?

Write the equation:

X	Y
0	30
1	28
2	26
3	24

What is the rate?

What is the starting value?

Write the equation:

X	Y
0	0
1	6
2	12
3	18

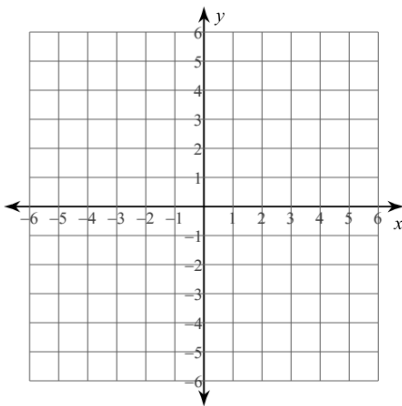
What is the rate?

What is the starting value?

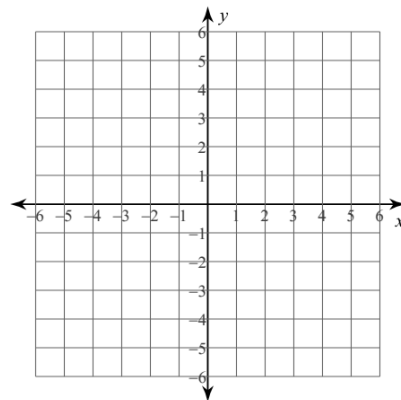
Write the equation:

Graph the line on the graph provided for #1-6.

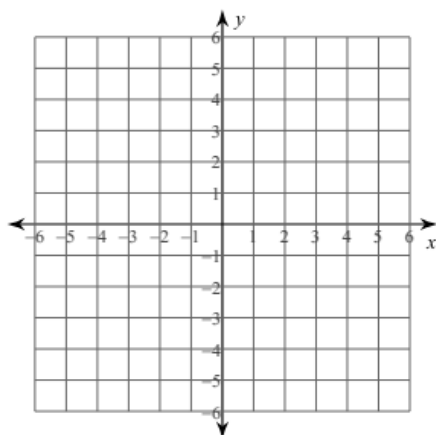
1) $y = -2x - 2$



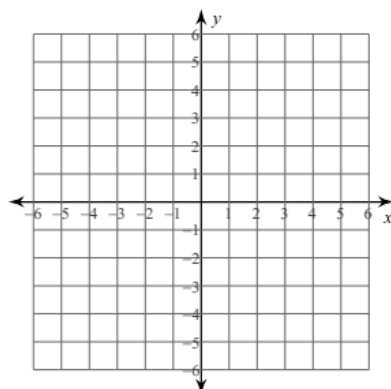
2) $y = -x - 2$



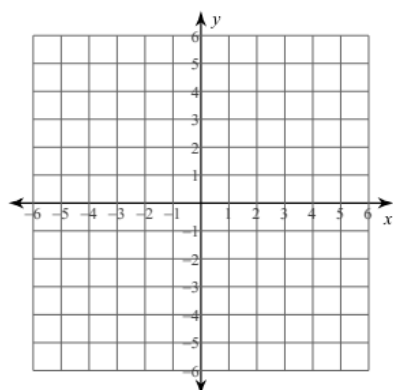
3) $y = -5$



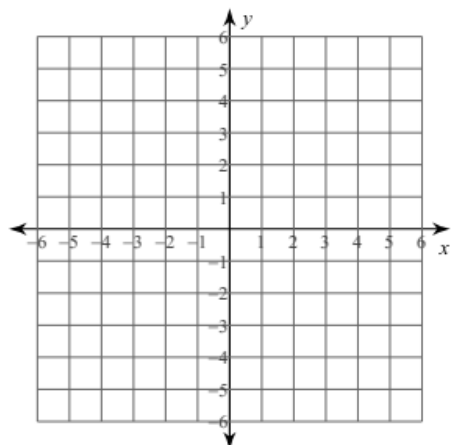
4) $y = \frac{6}{5}x + 1$



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

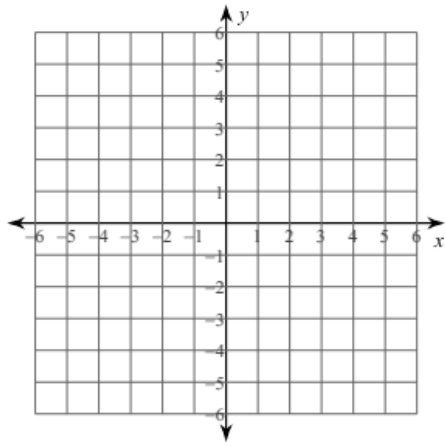


6) $x = 5$

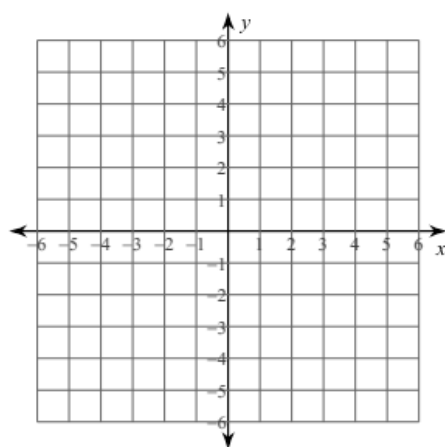


Standard 13: I can graph a line from standard form using x and y intercepts or $m = -A/B$ and $b = C/B$.

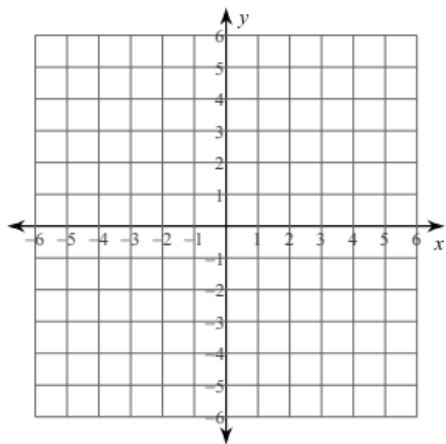
$$x + y = -3$$



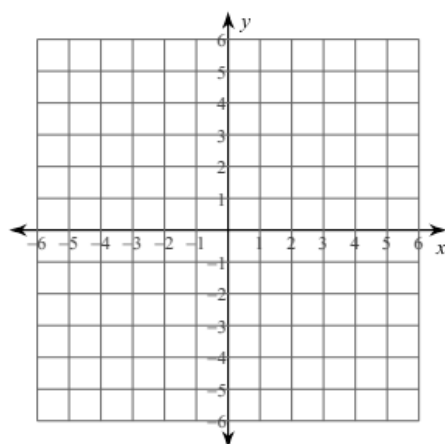
$$x - 2y = -6$$



$$x + y = 4$$



$$x - 3y = 3$$



Standard 14: I can find the x-intercept and the y-intercept of a linear equation.

<https://www.youtube.com/watch?v=-LvA1xlQLs>

Intercepts are points on a graph where a line intersects the x-axis and/or the y-axis.

x-intercept: $y = 0 \longrightarrow (4,0)$

y-intercept: $x = 0 \longrightarrow (0,4)$

To find the intercepts from an equation, first substitute 0 for x and solve for y. Then substitute 0 for y and solve for x.

example:	$x + 2y = 7$	\longrightarrow	$0 + 2y = 7$	$ $	$x + 2(0) = 7$
			$y = 3.5$		$x = 7$
			\downarrow		\downarrow
x-intercept:	<u>(7,0)</u>				<u>(7,0)</u>
y-intercept:	<u>(0,3.5)</u>		<u>(0,3.5)</u>		

<p>1. $2x + 9y = 18$</p> <p>x-intercept: _____</p> <p>y-intercept: _____</p>	<p>3. $-3x + 2y = 12$</p> <p>x-intercept: _____</p> <p>y-intercept: _____</p>
<p>2. $-5x + 4y = 20$</p> <p>x-intercept: _____</p> <p>y-intercept: _____</p>	<p>4. $2x + 8y = -4$</p> <p>x-intercept: _____</p> <p>y-intercept: _____</p>

Standard 15: I can solve a system of equations using substitution, elimination, or graphing.

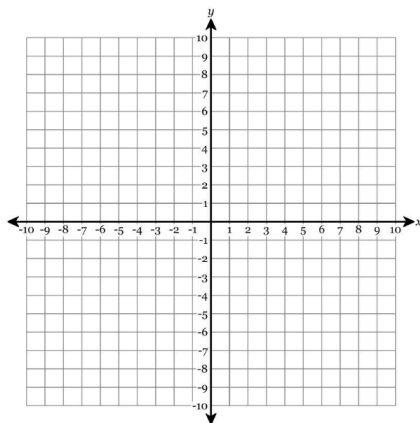
Substitution help: <https://www.youtube.com/watch?v=-mZZ6iPwOpE>

Elimination help: <https://www.youtube.com/watch?v=d6vyYvx8URw>

Graphing help: <https://www.youtube.com/watch?v=Pd4hwS8qHms>

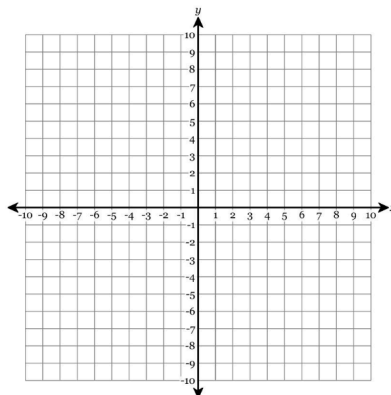
1. Solve the following system of equations graphically on the set of axes below and state the coordinates of the solution.

$$y = -x - 1 \quad y = \frac{1}{5}x - 7$$



2. Solve the following system of equations graphically on the set of axes below and state the coordinates of the solution.

$$y = 2x - 3 \quad y = -\frac{3}{4}x + 8$$



Solve the system of equations using substitution.

$$y = -3x + 4$$

$$y = -7x$$

$$x + 2y = -2$$

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

Solve the system of equations using elimination.

$$x + 2y = -2$$

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

$$-2x - 6y = 50$$

$$-2x + 9y = -40$$

ONE MORE PAGE!

Hooray!!! Your summer homework is complete! Please print and sign your name here on this line to verify that you have completed all of your work on your own and without a calculator.

Print: _____

Signature: _____