

Foundations of Math

Chapter 2 Packet

NAME:

Table of Contents

Notes #31	Slope	Pg. 1-2
Notes #32	Slope & Graphing Linear Equations	Pg. 3-4
Notes #33	Is the Point on the Line?	Pg. 5-6
Notes #34	Writing a Linear Equation	Pg. 7-8
Notes #35	Writing a Linear Equation with 2 Points	Pg. 9-10
Notes #36	Rate of Change	Pg. 11-12
Notes #37	Interpreting Linear Equations	Pg. 13-15
Notes #38	Linear Review	Pg. 16-18
Notes #39	Linear Word Problems	Pg. 19-20
Notes #40	Linear Equations from Tables	Pg. 21-24
Notes #41	Interpreting Graphs	Pg. 25-27
Notes #42	Graphing Inequalities	Pg. 28-30
HW #42	Homework #42	Pg. 31
HW #40	Homework #40	Pg. 33
HW #39	Homework #39	Pg. 35
HW #38	Homework #38	Pg. 37-38
HW #37	Homework #37	Pg. 39
HW #35	Homework #35	Pg. 41-42
HW #34	Homework #34	Pg. 43
HW #33	Homework #33	Pg. 45-46
HW #32	Homework #32	Pg. 47
HW #31	Homework #31	Pg. 49

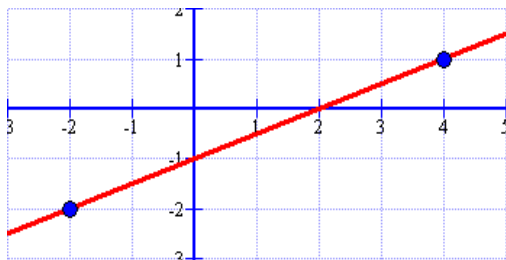
Slope, y_0

$$\text{Slope} = m = \frac{(y_2 - y_1)}{(x_2 - x_1)} = \frac{\text{rise}}{\text{run}} = \frac{\text{vertical change}}{\text{horizontal change}}$$

Example 1:

Let's find the slope of this line!

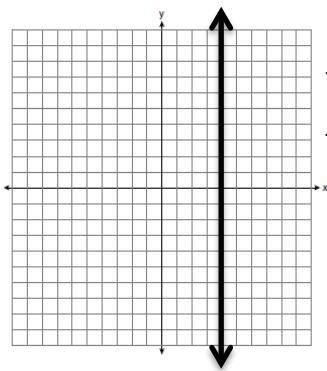
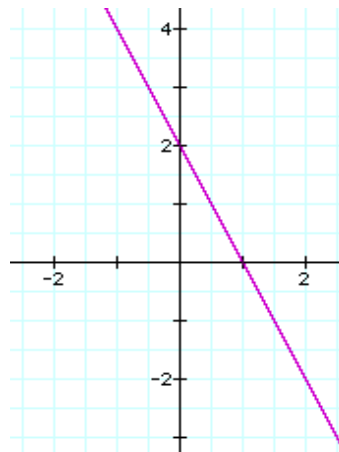
This is an example of _____ slope.



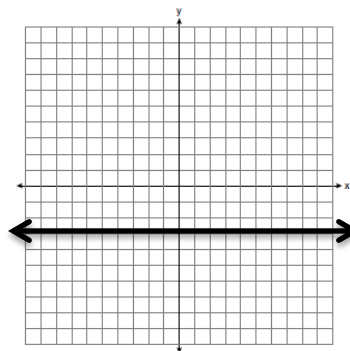
Example 2:

Let's find the slope of this line!

This is an example of _____ slope.



This is an example of _____ slope.



This is an example of _____ slope.

Example 3:

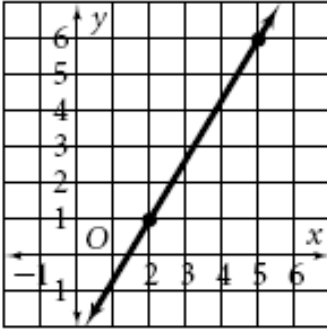
Now let's find the slope with no line, but given two points on the line.

a) (-2, -2) and (4, 1)

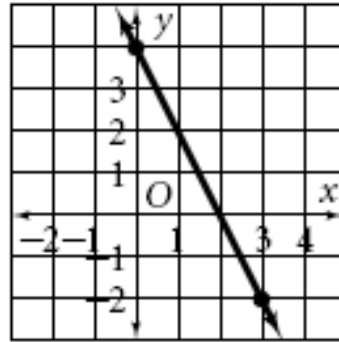
b) (0, 2) and (1, 2)

Find the slope of each line.

1.



2.



3. (3, 4) and (-2, 1)

4. (-2, 1) and (6, 7)

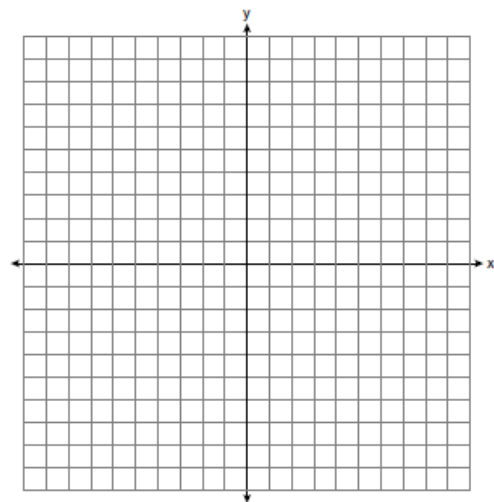
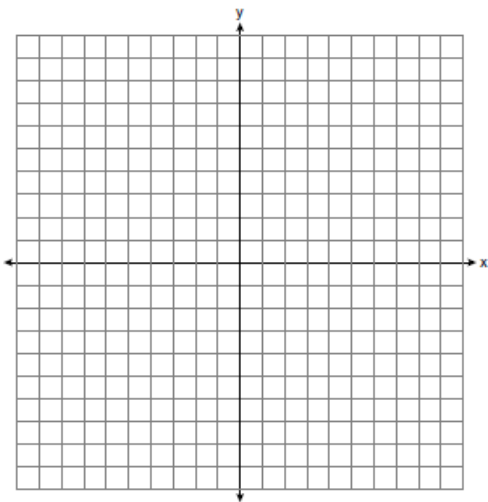
Graph the equation of a Line given a Point and the Slope

1) $m = \frac{1}{3}$

A. (-4, 1)

2) $m = -2$

B. (-6, 5)



SLOPE & GRAPHING LINEAR EQUATIONS

Find the slope of the line passing through each pair of points.

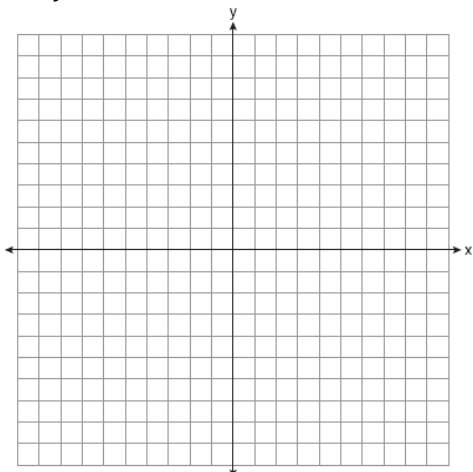
a. (3, 2) and (8, 1)	b. (4, -2) and (5, 3)
c. (10, -2) and (1, 0)	d. (7, -3) and (-3, 6)

Find the slope and y-intercept of the following lines.

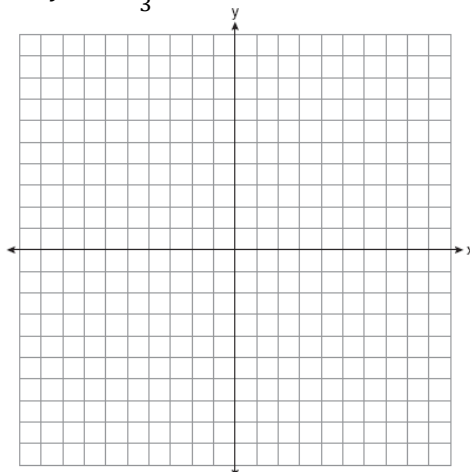
e. $y = 4x + 3$	f. $y = \frac{3}{4}x - 6$	g. $y + 2x = 4x + 3$
h. $y - 5 = \frac{1}{2}x + 3$	i. $2y = 4x + 8$	j. $3x + 5y = 10$

Graph a linear equation:

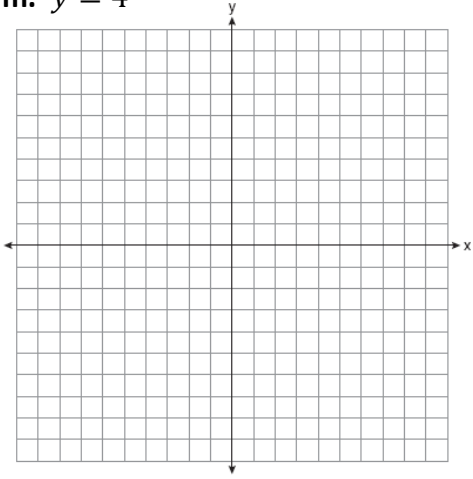
k. $y = 4x - 5$



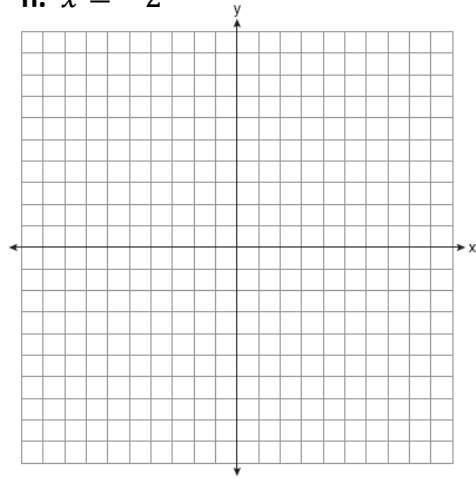
l. $y = -\frac{2}{3}x + 1$



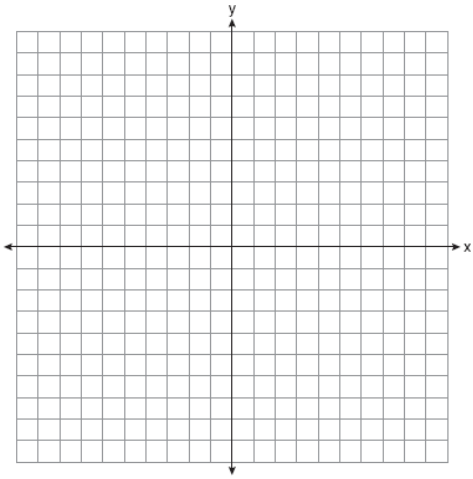
m. $y = 4$



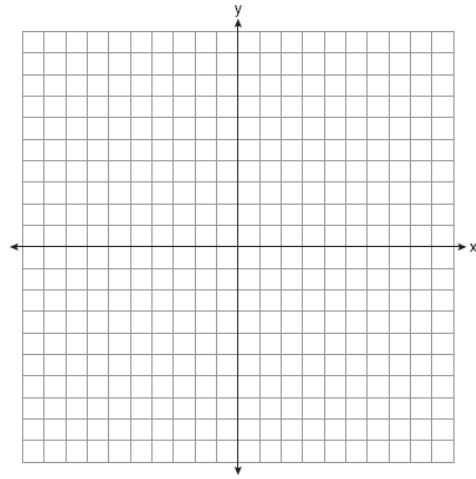
n. $x = -2$



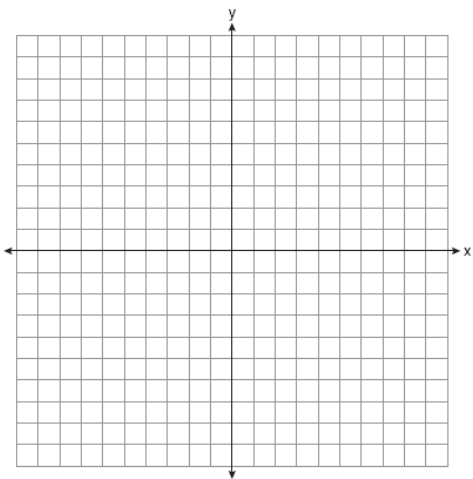
o. $3y = -9x + 6$



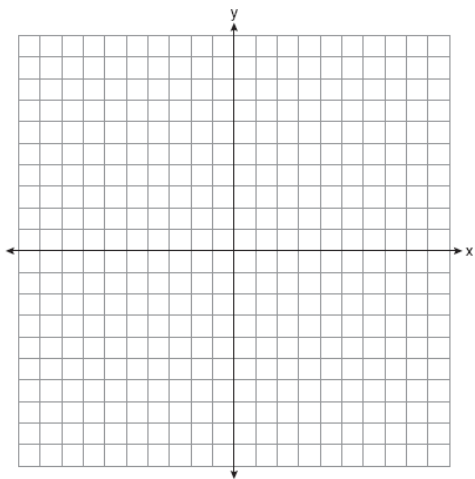
p. $2y - 4x = 8$



q. $y - 3x = -3$



r. $-2y + x = 2$

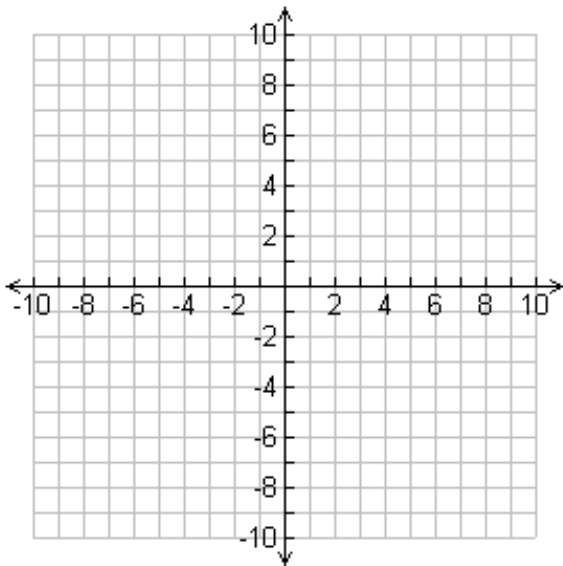


Is the Point on the Line??

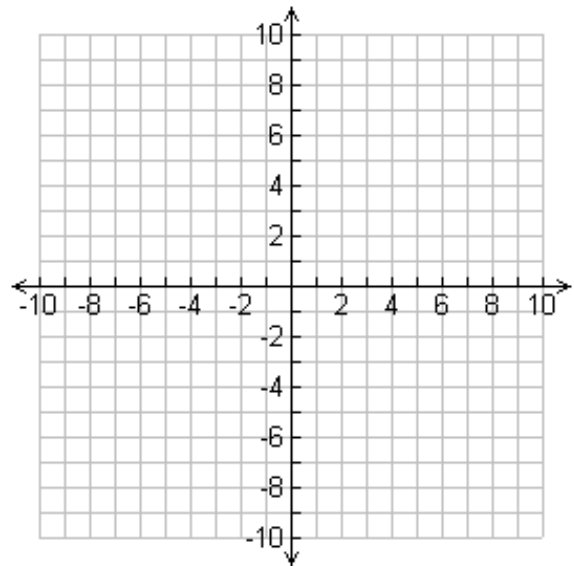
Graphically:

Graph the line, and plot the point to see if the point falls perfectly on the line!

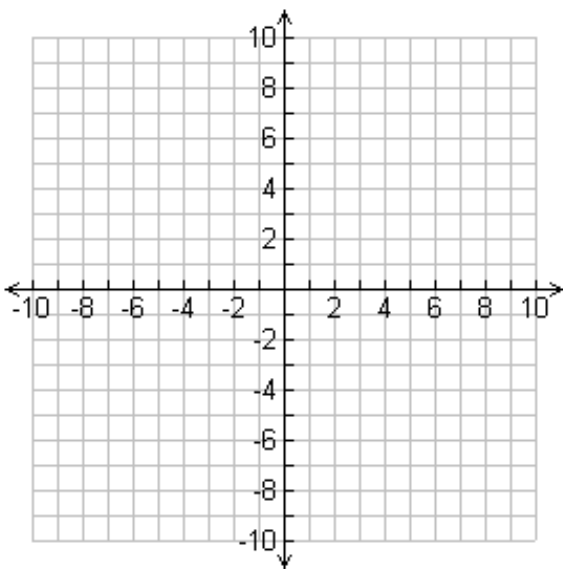
1) Is $(3,4)$ on the line $y = -2x - 5$?



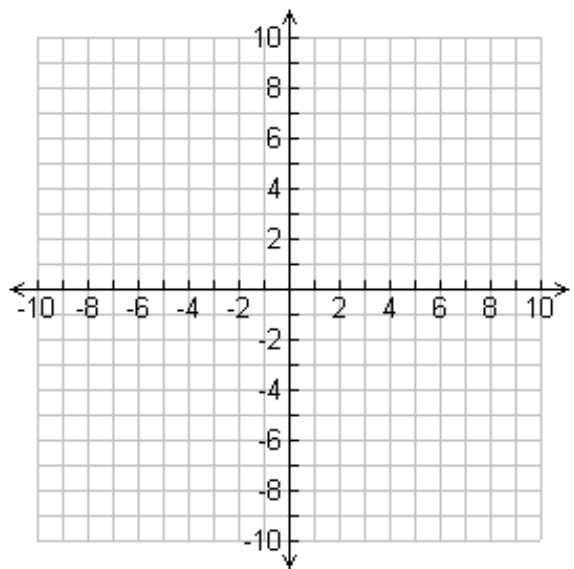
2) Is $(2,0)$ on the line $y = 4x - 8$?



3) Is $(-4,6)$ on the line $y = -x + 2$?



4) Is $(-2, -5)$ on the line $y = \frac{1}{2}x - 6$?



Algebraically:

To tell if a point is on the line, _____.

- If the two sides of the equation are equal, the point is _____.
- If the two sides of the equation are **not** equal, the point is _____.

1) Is (3,4) on the line $y = -2x - 5$?

2) Is (2,0) on the line $y = 4x - 8$?

3) Is (-4,6) on the line $y = -x + 2$?

4) Is (-2, -5) on the line $y = \frac{1}{2}x - 6$?

Writing a Linear Equation

The general equation of a line is _____. $m =$ _____ $b =$ _____

To write the equation of a line we must know the _____ and _____.

Write a linear equation given the SLOPE and the Y-INTERCEPT
--

1. What is the equation of a line with a slope of 5 and a y-intercept of 8?

2. What is the equation of a line with a slope of $-\frac{1}{2}$ and a y-intercept of -6?

Write a linear equation given the SLOPE and ONE point on the line
--

3. What is the equation of a line with a slope of 8 that passes through the point (2,5)?

4. What is the equation of a line with a slope of -3 that passes through (4,-3)?

5. What is the equation of a line with a slope of $\frac{1}{2}$ that passes through (6,-10)?

Write the linear equation for the given information.

1. $(6,-2)$; slope of $-\frac{4}{3}$

2. $(0,-7)$; slope of -4

3. $(-2,-1)$; slope of -2

4. $(8,10)$; slope of $\frac{1}{2}$

5. Find the slope and y-intercept.
 $2y = 4x + 8$

6. Find the slope and y-intercept.
 $3x + 5y = 10$

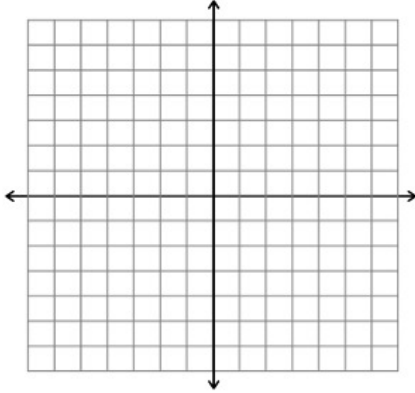
Write the linear equation for the given information.

4) Passes through (1,2) and (3,8)	5) Passes through (-4,0) and (4,4)
6) Passes through (-1,-4) and (5,-2)	7) Passes through (-9,9) and (4,-4)
8) Passes through (-4,-2) and (4,0)	9) Passes though (0,2) and (4,-4)

Rate of Change

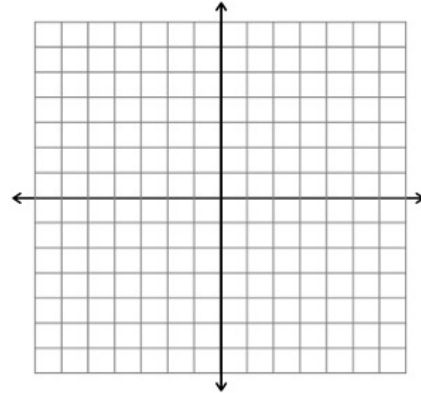
Graph the lines and fill in the table:

1. $y = 2x$



x	y
1	
2	
3	

2. $y = 3x + 1$



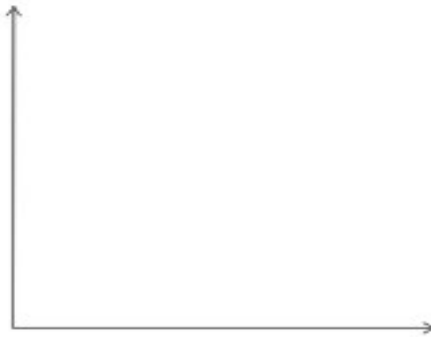
x	y
1	
2	
3	

Independent and Dependent Variables

Independent: Does not depend on anything. In graphs or tables, it is the _____

Dependent: Depends on the independent Variable. In graphs or tables, it is the _____

Label the Independent and Dependent Variables on the axes below:



Read the problem, and determine the independent and dependent variables:

1. Kayli babysits for the Smith family every Friday. The Smiths pay Kayli \$8 for every hour she is there.

Independent variable: _____

Dependent variable: _____

Create a Table to represent the situation:

Constant Rate of Change:

2. The Runkel family is going on a road trip. Their van can go 25 miles for every gallon of gasoline.

Independent variable: _____

Dependent variable: _____

Create a Table to represent the situation:

Constant Rate of Change:

3. Tops is having a sale on boxes of cereal. Each box of cereal costs \$1.50.

Independent variable: _____

Dependent variable: _____

Create a Table to represent the situation:

Constant Rate of Change:

Interpreting Linear Equations

Review:

Find the rate of change:

- Pandora started a new job as a nurse, making \$160 per day.

Dependent Variable (y)	
Independent Variable (x)	
Rate of Change:	

Remember:

Rate of Change is the same as _____

To find it:

$$\frac{\text{change in } y}{\text{change in } x}$$

Or:

$$\frac{\text{dependent variable}}{\text{independent variable}}$$



Steps to Interpreting Linear Word Problems:

- Identify the dependent variable _____
- Determine the independent variable _____
- Find the Initial Value _____ (_____)
- Find the Rate of Change _____
- Create an equation that expresses the information given in the problem _____

Example 1:

Dan is on a road trip from Buffalo to NYC. He is driving at a constant rate of 60 miles each hour. If he has already driven 100 miles, write a linear equation to represent his situation.

Dependent:

Independent:

Initial Value:

Rate of Change:

Linear Equation:

How many miles will he have traveled after two more hours?

Example 4:

Jayden decided to raise money for his favorite charity by having a bake sale. He bought baking mix and other ingredients at the store for \$15 to use for his baked goods. He is selling each item for \$1.50. Write a linear equation to model the situation.

Dependent:

Independent:

Initial Value:

Rate of Change:

Linear Equation:

What will his profit be if he sells 54 baked goods at his sale?

Example 5

A company that manufactures radios first pays a start-up cost of \$125, and then spends \$5.25 to manufacture each radio. Write a linear equation to represent how much money the company spends on manufacturing radios.

Dependent:

Independent:

Initial Value:

Rate of Change:

Linear Equation:

How much money will it cost the company to manufacture 350 radios?

Example 6:

Diona is deciding which cell phone plan will be best for her.

- Plan A costs a basic fee of \$29.95 per month and 10 cents per text message
- Plan B costs a basic fee of \$49.95 per month and 5 cents per text message

If she normally sends 900 texts per month, which plan will she spend less money on per month?

Plan A:

Dependent:

Independent:

Initial Value:

Rate of Change:

Linear Equation:

Plan B:

Dependent:

Independent:

Initial Value:

Rate of Change:

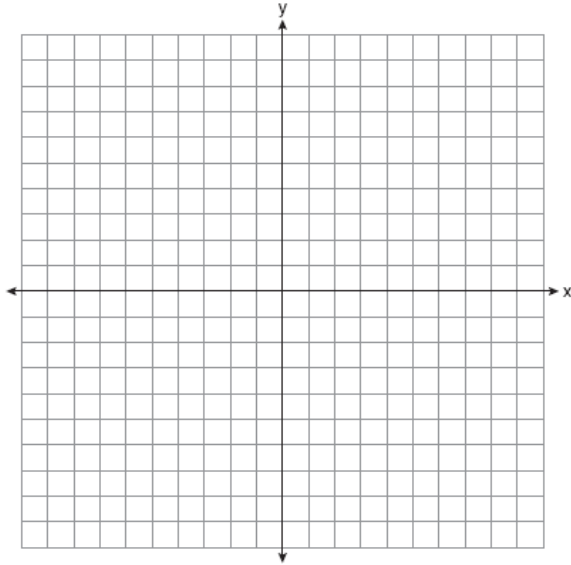
Linear Equation:

Conclusion:

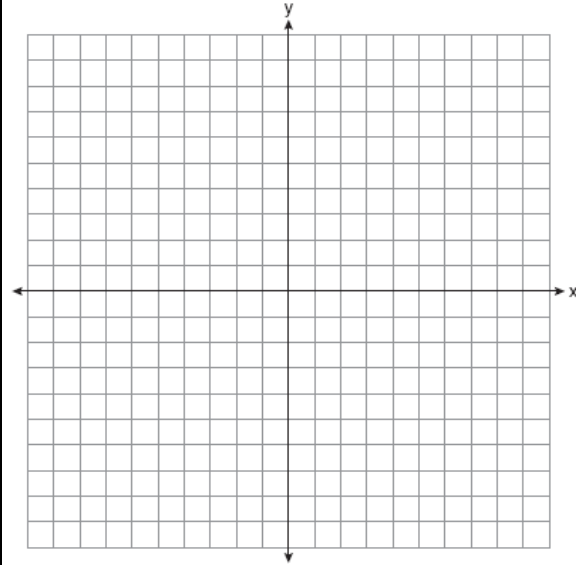
LINEAR REVIEW

Graph the following lines on the axes below:

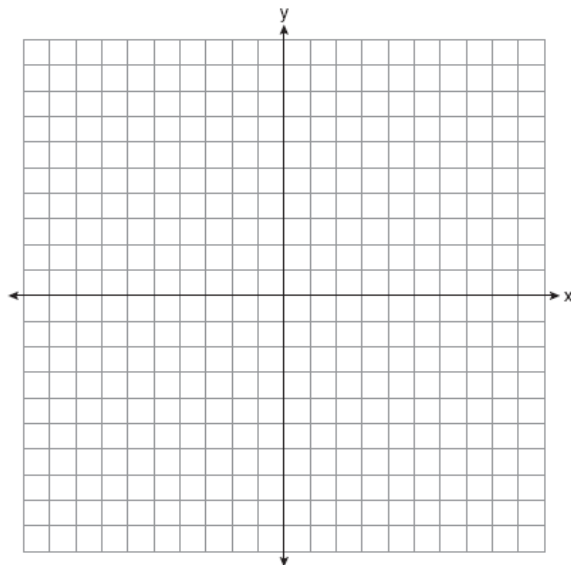
1. $y = \frac{2}{3}x - 4$



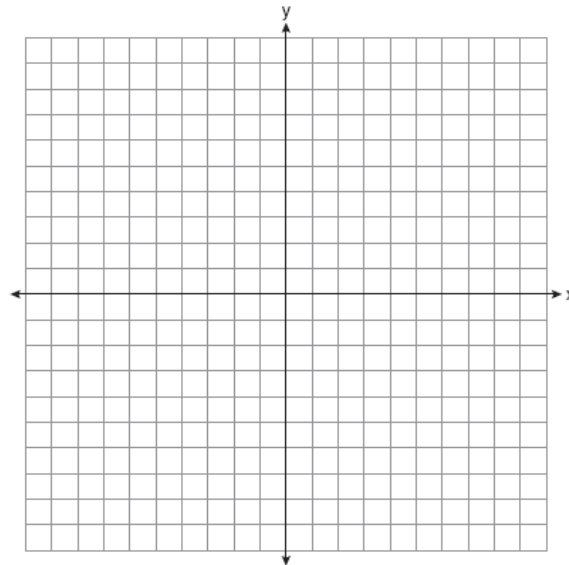
2. $y = -3x + 2$



3. $3y = x - 6$



4. $2y + 4x = 8$



5. Find the linear equation of the line that has a slope of $-\frac{1}{3}$ and passes through the point (6,-4)

6. Find the linear equation of the line that passes through the points (3,5) and (1, -1).

7. Find the equation of the line that passes through the points (-4, 8) and (6, -7)

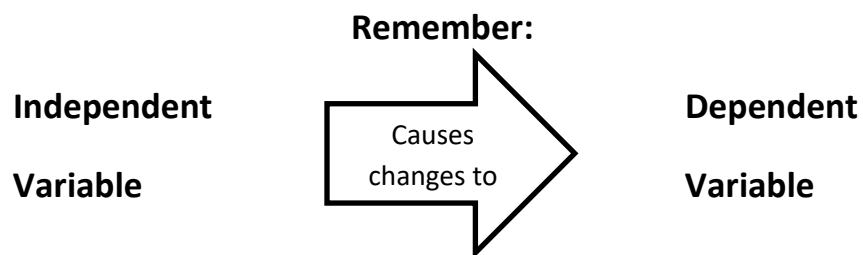
8. Katie's Cell Phone Company has a monthly fee of \$19.99 and charges 3 cents per text message.
- Write a linear equation that represents the situation.
 - How much will her cell phone bill be if she sends 800 text messages this month?
 - If Katie's cell phone bill was \$48.49, how many text messages did she send that month?

linear word problems

This lesson will demonstrate the use of previously learned algebraic techniques in solving real world linear scenarios. The key to doing all of these problems is to **read the problem as many times as necessary to understand what is being asked.**

y=
x=
b=
m=

Steps in Solving Word Problems With Linear Equations	
1. Identify the dependent variable	_____
2. Identify the independent variable	_____
3. Identify the initial value	_____
4. Identify the rate of change	_____
5. Create an equation that expresses the information given in the problem	



Exercise #1: At a concert, Mevi purchased three t-shirts and a concert program that cost \$15. In total, Mevi spent \$90. Find the cost of a single t-shirt if they all had the same price.

y=

x=

b=

m=

Exercise #2: Verizon Cell Phone Company advertises service for 3 cents per minute plus a monthly fee of \$29.95. If Cam's phone bill for October was \$38.95, find the number of minutes he used.

y=

x=

b=

m=

Exercise #3: Marvin was shopping at a used book sale where all books were selling at the same price. He bought six science fiction books and eight mysteries. He also decided to buy a poster for \$2.40. In total, Marvin spent \$8.70. What was the price of a single book?

y=

x=

b=

m=

Exercise #4: Logan purchased three videos and one music CD. The CD cost Logan \$12.99. If he paid the same amount for each video and spent a total of \$42.96, how much did each video cost?

y=

x=

b=

m=

Linear Equations from Tables

Review:

Find the linear equation of the line that passes through the points (1,2) and (-3, -10).

m=

b=

x=

y=

Linear Equation ($y = mx + b$)

Is it Linear??

A function is linear if it has a _____.

Take a look at the tables below. Determine if it represents a linear function.

If it is linear, identify the *rate of change*.

1.

x	y
-2	-1
0	0
2	1
4	2

2.

x	y
10	3
15	6
25	9
30	12

3.

x	y
3	-3
4	-4
6	-5
7	-6

4.

x	y
3	5
6	-1
12	-13
15	-19

Recall:

To write a linear equation, we MUST know the _____ and the _____.

Let's look back to questions 1 and 4. Find the linear equations of each.

Question 1:

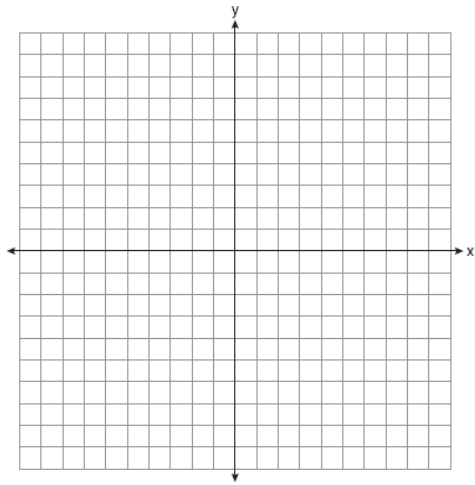
x	y
-2	-1
0	0
2	1
4	2

m=

b=

x=

y=



Linear Equation:

Question 4:

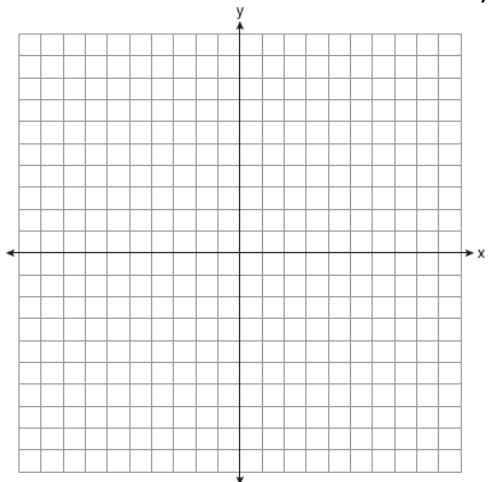
x	y
3	5
6	-1
12	-13
15	-19

m=

b=

x=

y=



Linear Equation:

Question 5:

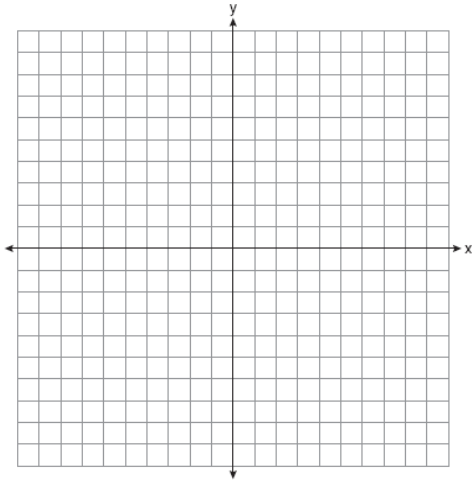
x	y
-4	-4
-1	2
2	0
5	2

m=

b=

x=

y=



Linear Equation:

Question 6:

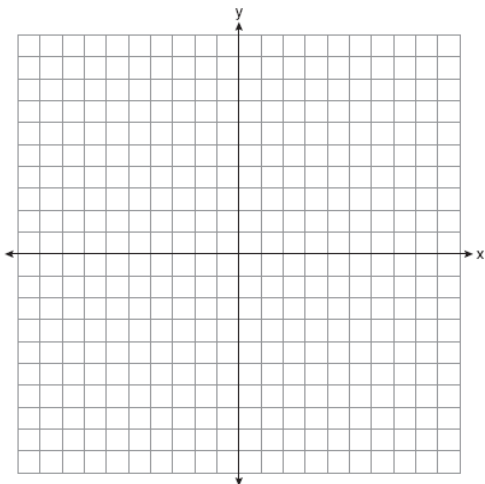
x	y
8	-15
4	-7
0	1
-4	9

m=

b=

x=

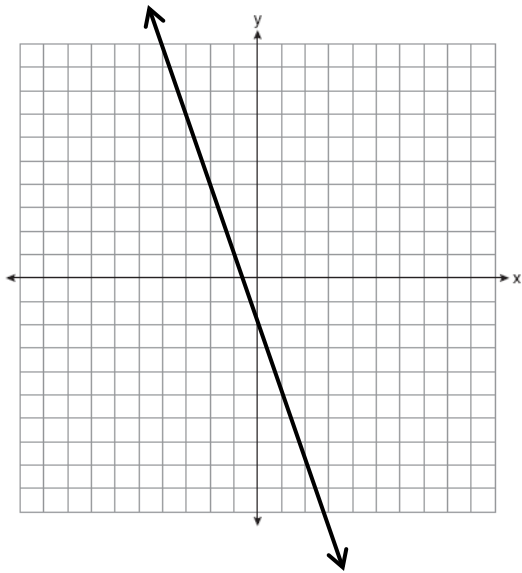
y=



Linear Equation:

Taking it a step further:

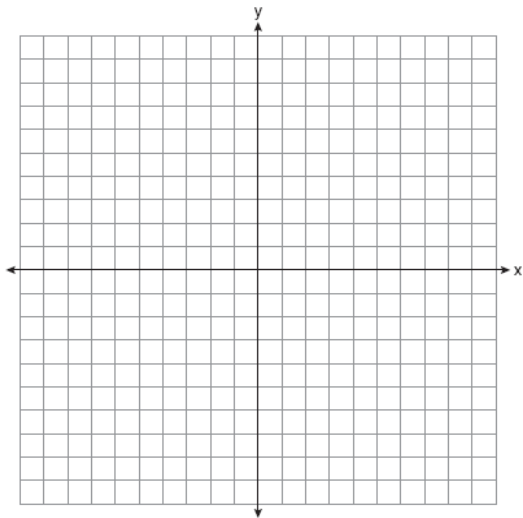
1. Create a Table from the Graph



x	y

What is the linear equation on this graph?

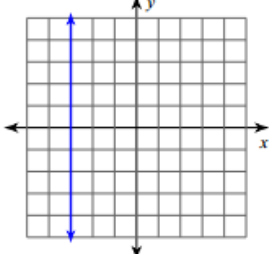
2. Make a table and a graph from this linear equation: $2y = 3x - 4$



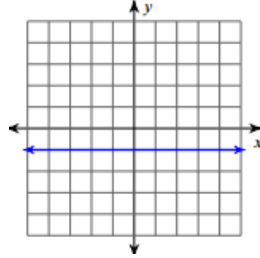
x	y

INTERPRETING GRAPHS

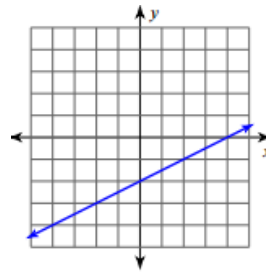
Review: Find the slope of each graph:



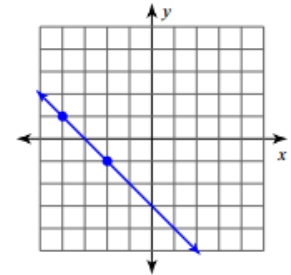
$m =$



$m =$



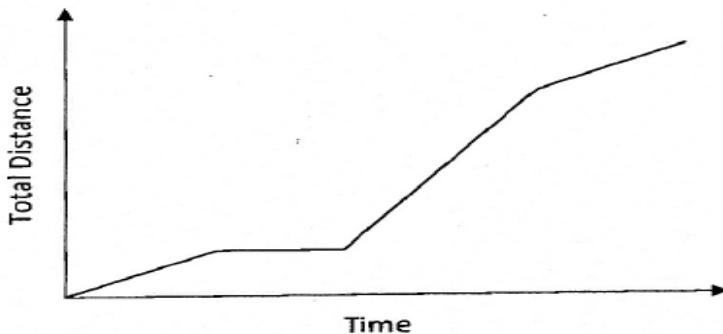
$m =$



$m =$

Example 1:

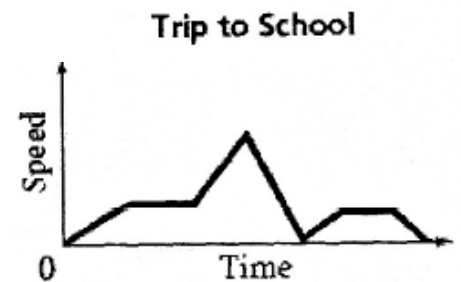
Commuting: One student walks and takes a bus to get from school to home each day. The graph below shows the student's commute by relating the time the student spends commuting and the distance he travels. Describe what the graph shows by labeling each part.



Note: Steeper slope means a _____ rate of change

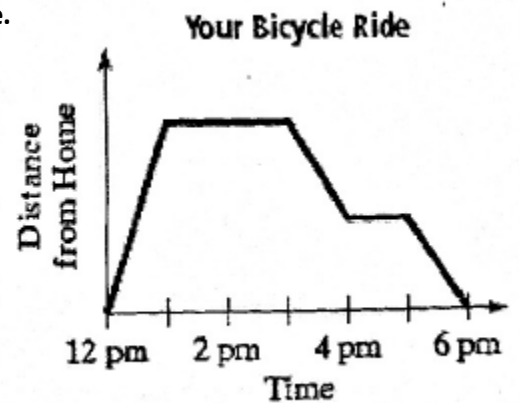
The graph shows the speed a student traveled on the way to school.

1. What do the flat parts of the graph represent?
2. Circle the parts where the speed is decreasing

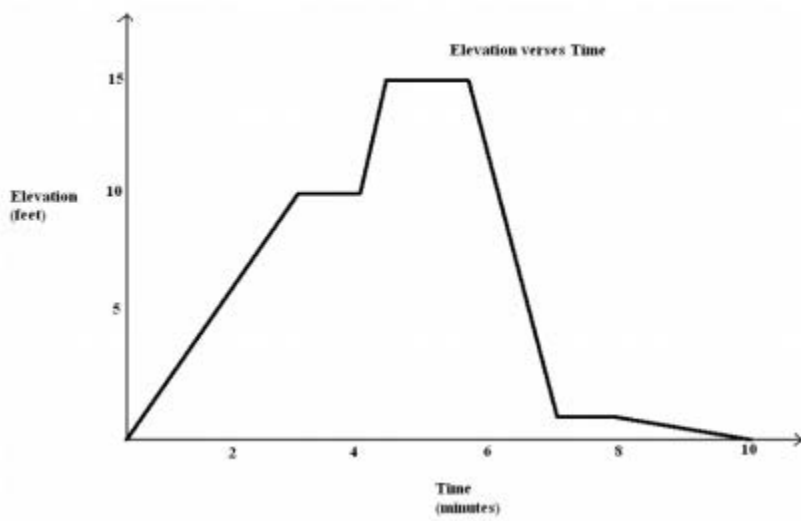


This graph shows the relationship between time and the distance from home.

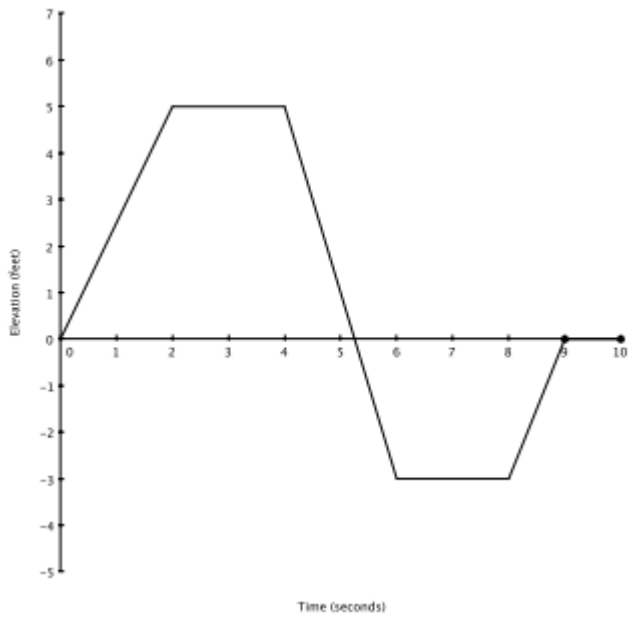
3. What do the flat parts of the graph represent?
4. What do the sections from 3 P.M to 4 P.M and 5 P.M to 6 P.M represent?
5. What does the section from 12 P.M to 1 P.M represent?



6. Here is an elevation-versus-time graph of a person's motion. Can we describe what the person might have been doing?

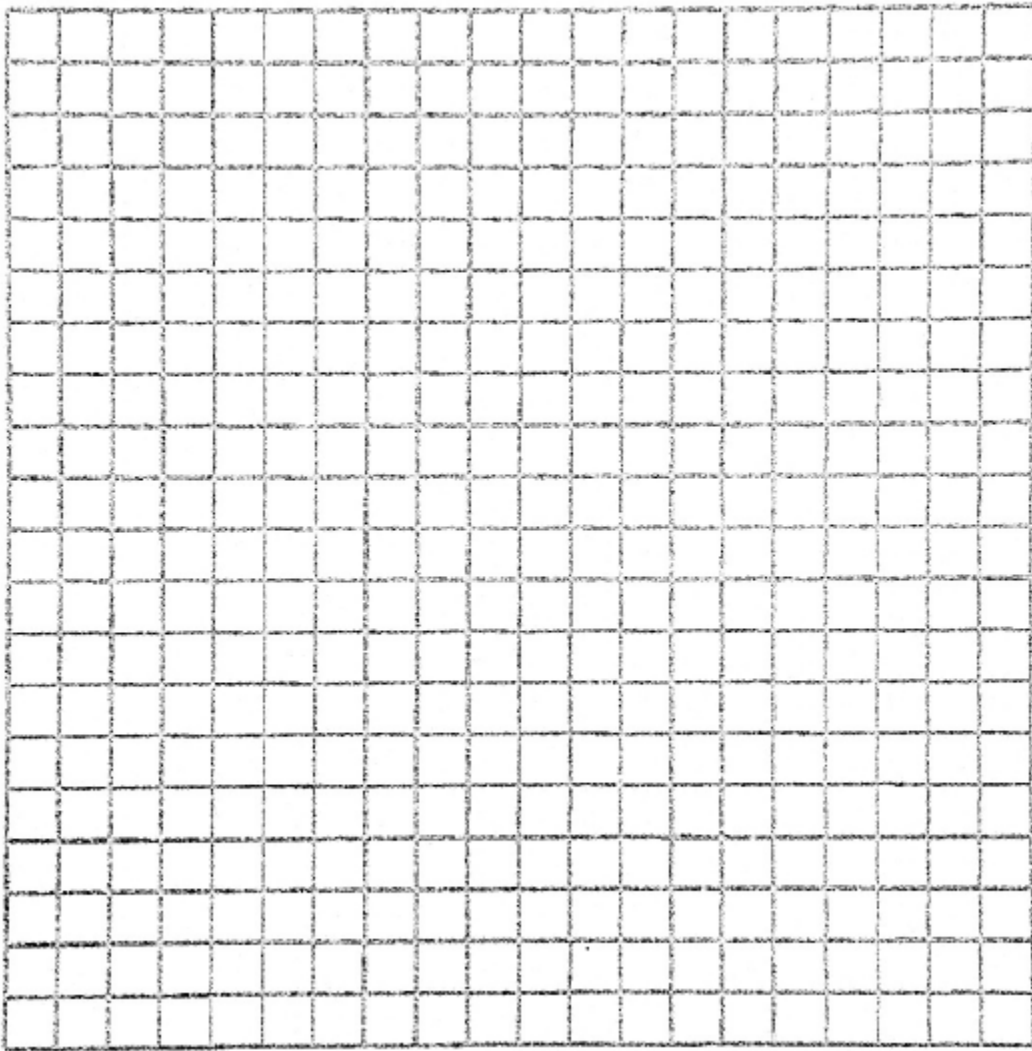


7. Create an elevation-versus-time graphing story for the following graph:



8. During a snow storm, a meteorologist tracks the accumulation of snow. For the first three hours of the storm, the snow fell at a constant rate of 1 inch per hour. Then, it stopped snowing for two hours. Then, it started snowing again at a rate of one-half inch per hour for the next four hours.

On the grid below, draw a graph that models the amount of snow on the ground over time.



Graphing Inequalities

Solve each inequality:

1) $3x + 14 \geq 29 - 2x$

2) $10 - 4x > -6$

We have to do two special things when we graph inequalities:

Dashed or Solid?

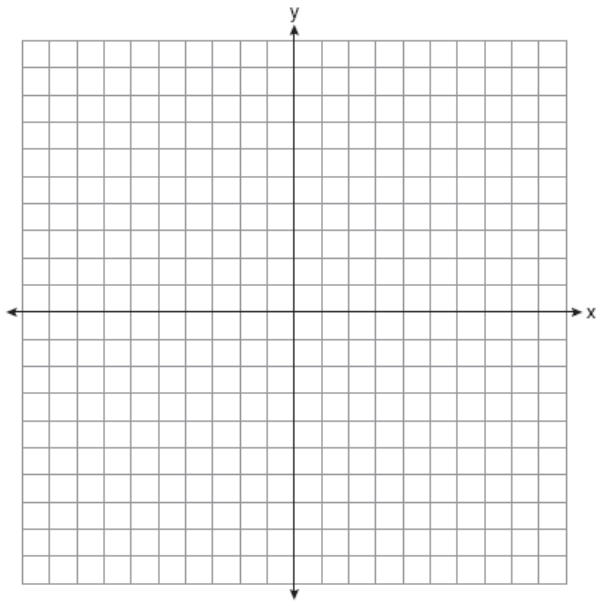
-----Dashed-----	—————Solid—————

Shade Above or Below?

Above	Below

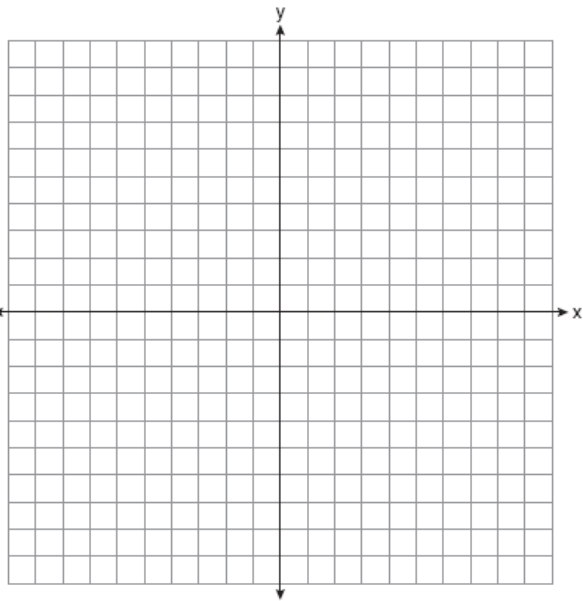
A point is **in the solution** of an inequality if:

1) $y \leq -x + 3$



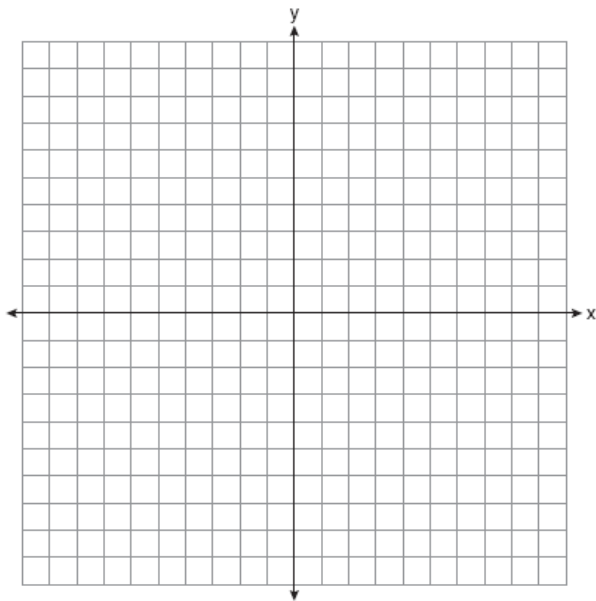
Point in the Solution:

2) $x \leq 3$



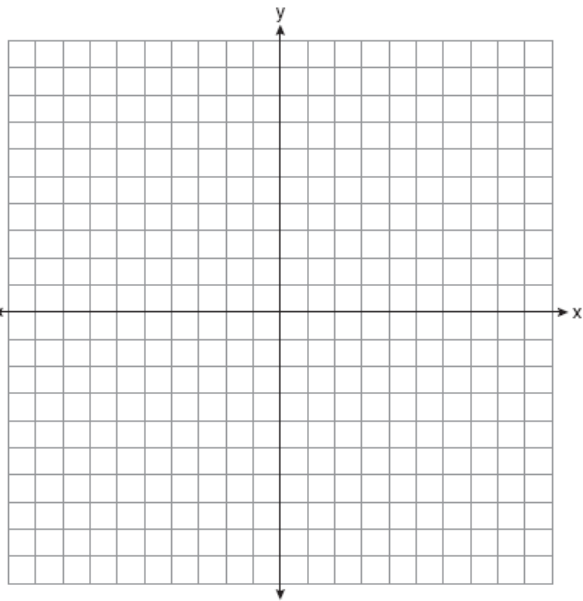
Point in the Solution:

3) $y > -4$



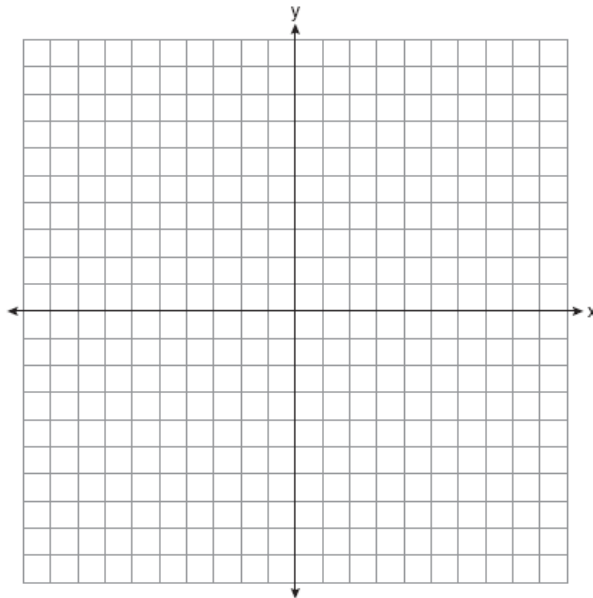
Point in the Solution:

4) $y \leq 3x - 6$



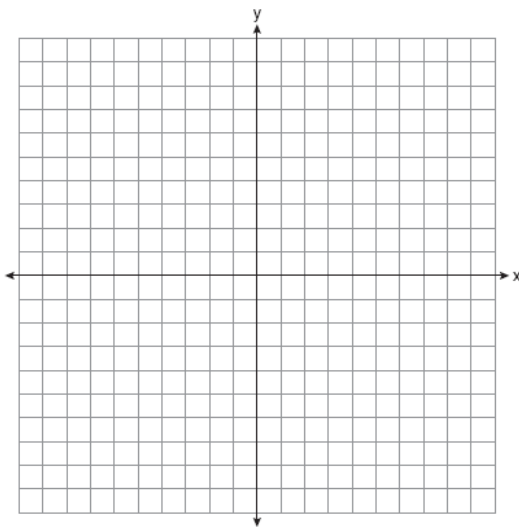
Point in the Solution:

5) $3y \leq -6x - 15$



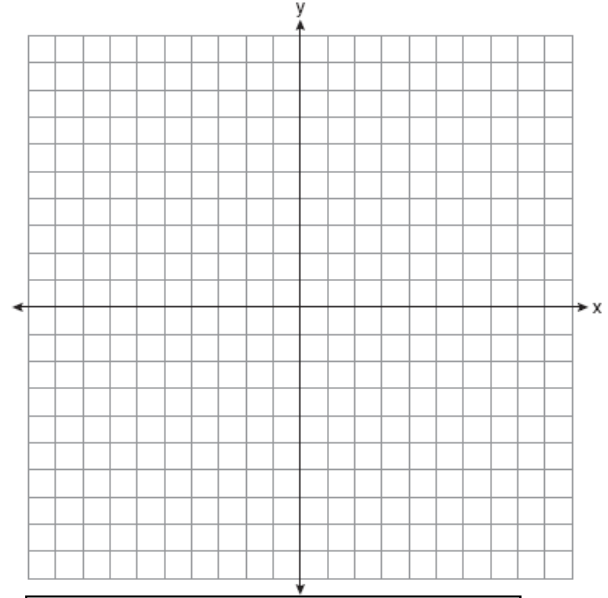
Point in the Solution:

11) $x + 3y < 3$



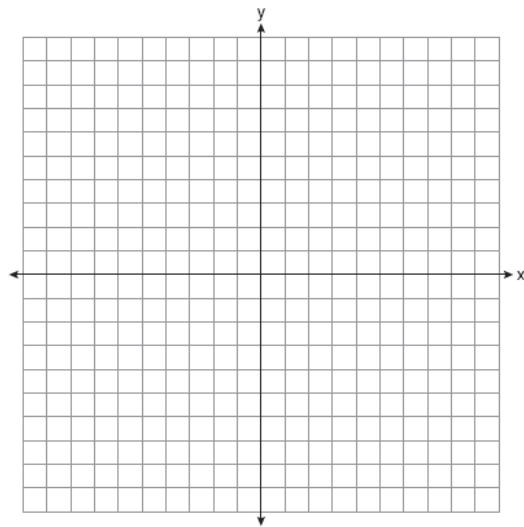
Point in the Solution:

6) $y \leq -2x - 4$



Point in the Solution:

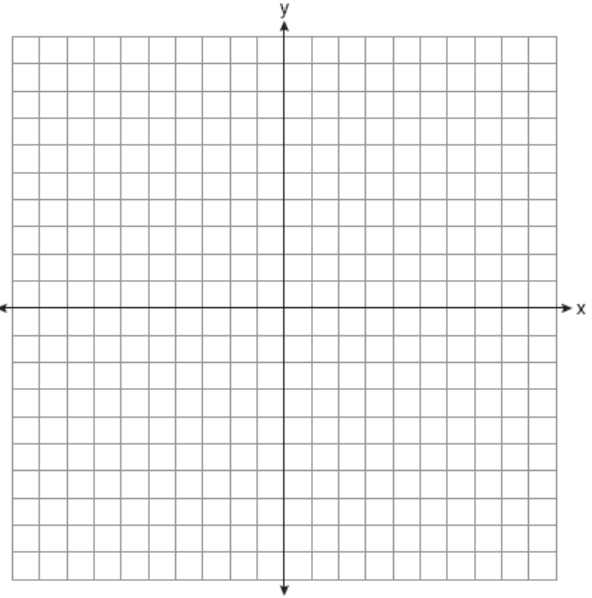
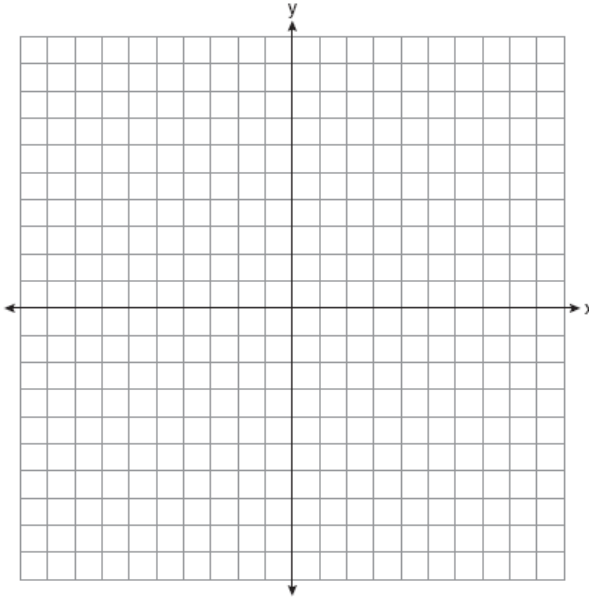
12) $2x - 5y \geq 10$



Point in the Solution:

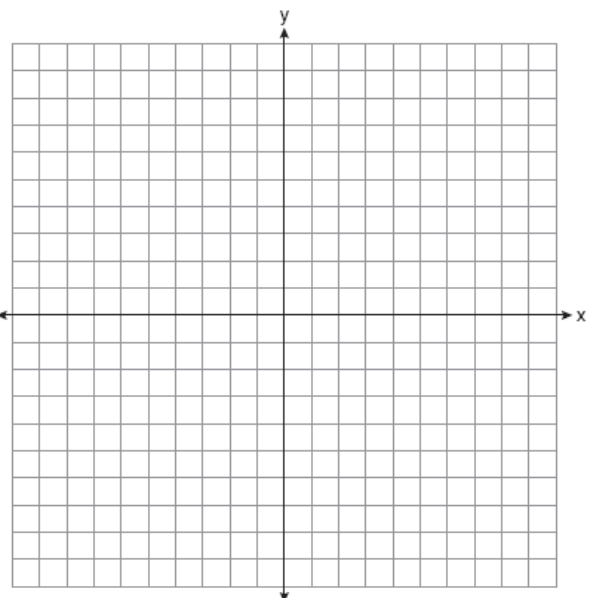
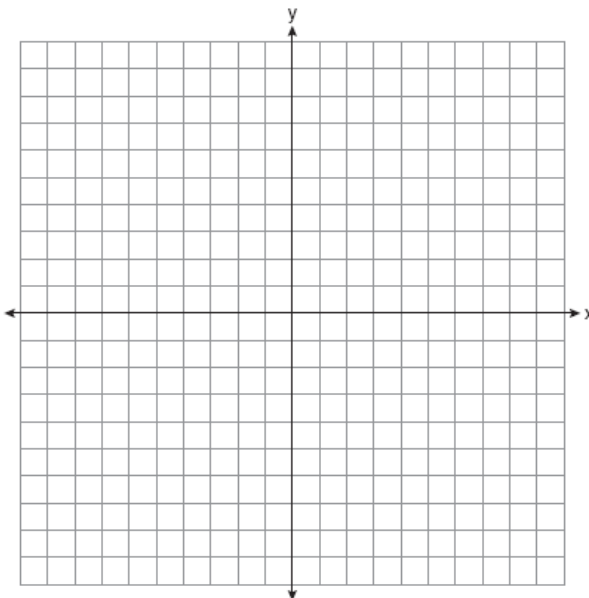
1) $3x - 2y < 10$

2) $y < \frac{1}{3}x + 1$



3) $x > -5$

4) $y \geq -\frac{1}{2}x + 4$



Find the linear equation from the given table, and then graph the equation.

1.

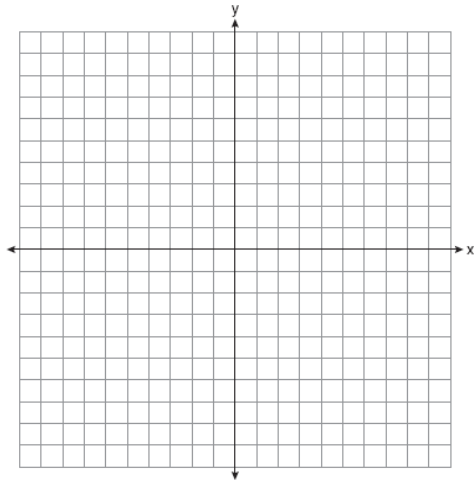
x	y
1	1
3	7
5	13
7	19

m=

b=

x=

y=



Linear Equation:

2.

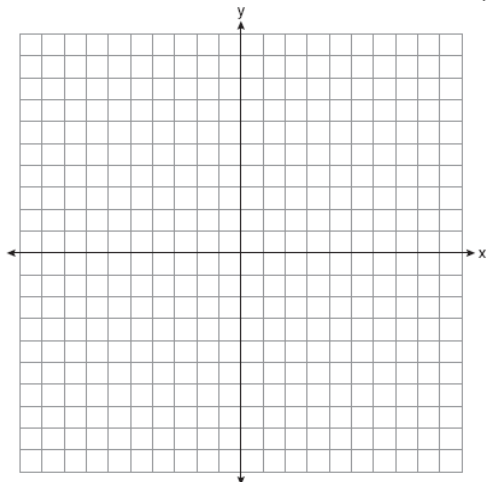
x	y
-2	4
2	6
6	8
8	9

m=

b=

x=

y=



Linear Equation:

1. Amou has to put up a display of 102 paper towels at the drug store she works at. So far, she has set up 3 rolls of paper towels. If she can set up 9 paper towels per minute, how long will it take for her to set up all of them?

y=

x=

b=

m=

2. Jason is going on a road trip in his car that has a fuel economy of 30 miles per gallon. So far, he has already gone 50 miles. How many more gallons of gas will he need to go a total of 500 miles?

y=

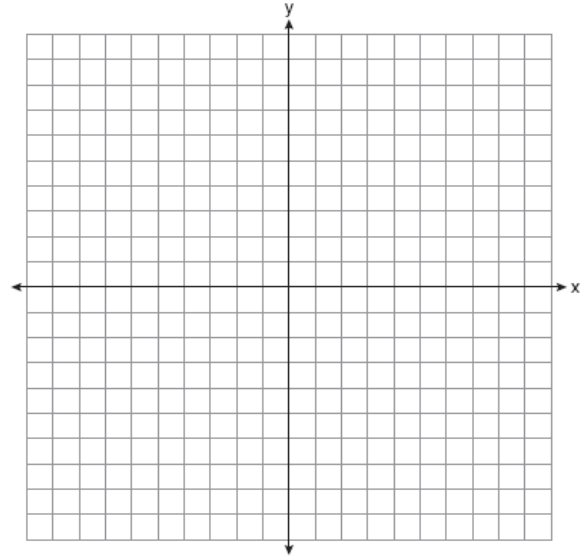
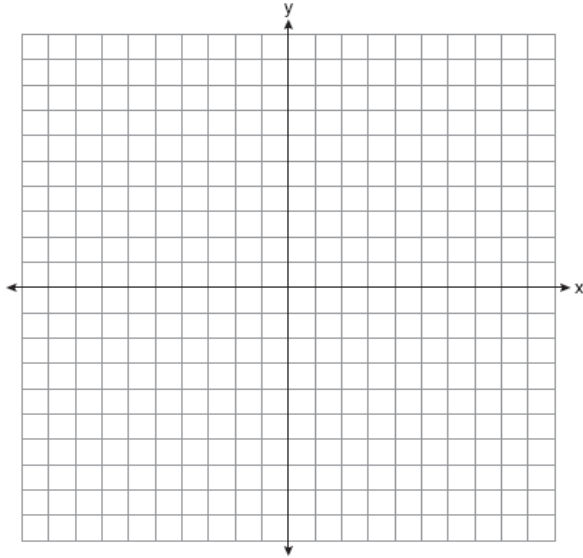
x=

b=

m=

1. $y = -x + 4$

2. $3y - 6x = 9$



3. Write the equation of the line that has a slope of 2 and passes through the point $(-5, -7)$.

4. Find the equation of the line that passes through the points $(-5, 2)$ and $(-10, -1)$.

5. Kathlynn works for her dad who is a contractor. Her assignment is to paint a 300 square foot wall. She has already painted 40 square feet and can paint 5 square feet per minute.

(a) Write a linear equation to model the situation.

(b) How many square feet will she have painted after 30 more minutes?

Write the slope-intercept form of the equation of each line then graph the line.

1) $3y = 12x - 6$

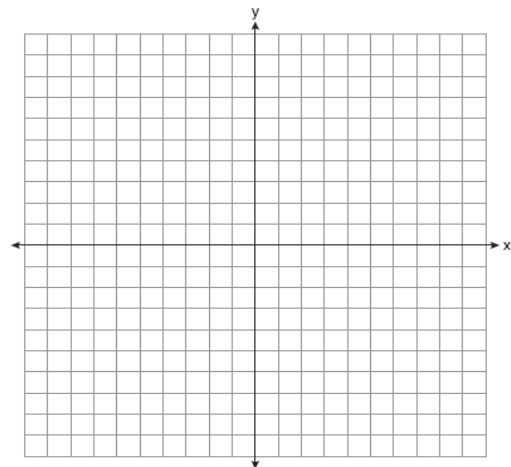
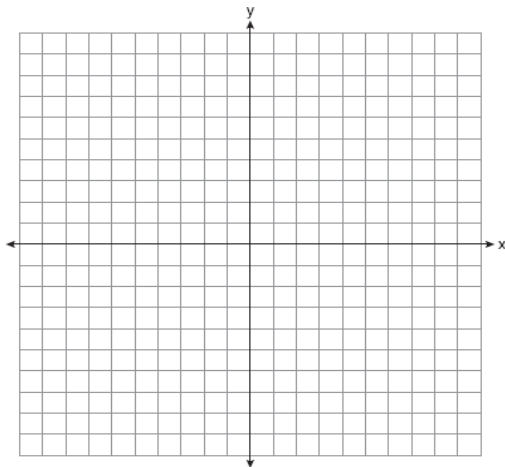
2) $4x - 2y = -16$

m=

m=

b=

b=



3. Memberships at Build Gym have a start-up fee of \$49.99 and a monthly membership charge of \$9.99. Write a linear equation to model the cost of membership.

Dependent:

Independent:

Initial Value:

Rate of Change:

Linear Equation:

How much will it cost to have the gym membership for 9 months?

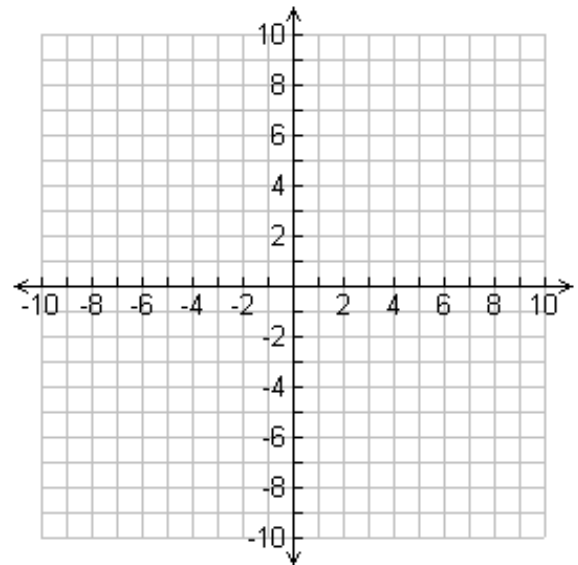
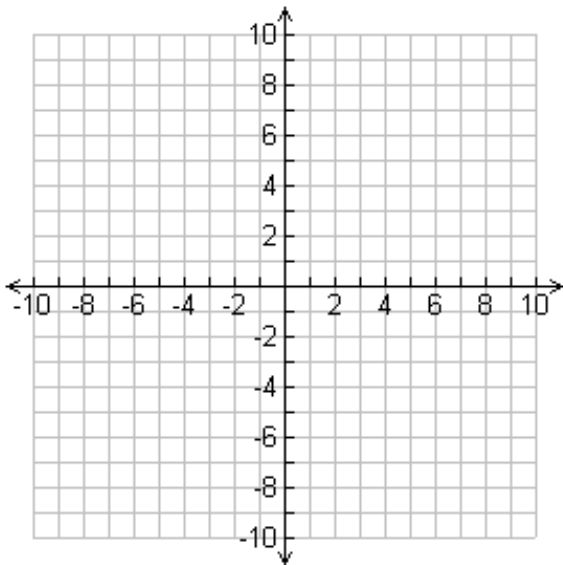
Name _____

HW #35

Determine the equation of a line passing through the given points then graph the line.

1) (3,4) and (-8,1)

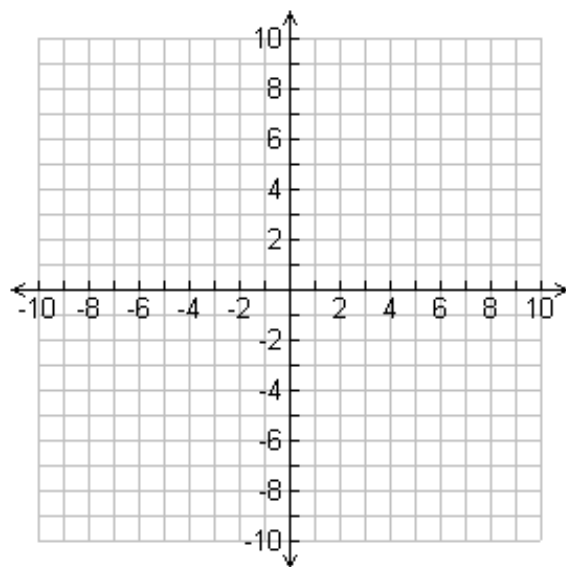
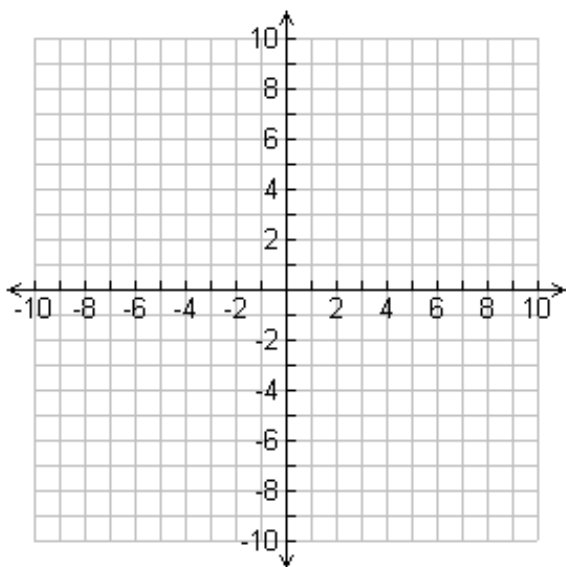
2) (2,0) and (6, -5)



Determine the equation of a line passing through the given points then graph the line.

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

4) $(2,2)$ and $(-4,-4)$



1) Write a linear equation for a line that has a slope of -2 and passes through the point (5, 4).

Answer:

2) Write a linear equation for a line that has a slope of $\frac{1}{3}$ and passes through the point (6, 8).

Answer:

3) Write a linear equation for a line that has a slope of $-\frac{1}{5}$ and passes through the point (5, 12).

Answer:

4) Write a linear equation for a line that has a slope of 4 and passes through the point (-2, -3).

Answer:

Student Name: _____

HW #33

Yes/No

Does the given ordered pair satisfy the linear equation?

Equation	Ordered Pair	Yes/No
$y = 5x$	(1,5)	
$y = 2x - 7$	(2, -3)	
$y = x + 12$	(1,12)	
$y = \left(\frac{2}{3}\right)x - 1$	(6,3)	
$y = x + \frac{1}{2}$	(0,1)	
$y = -6x$	(-6, -6)	
$y = \left(-\frac{1}{3}\right)x$	(-9,3)	
$y = -11x + 4$	(0,4)	
$y = 2x - \frac{3}{5}$	(2,4)	
$y = -x$	(1,1)	

Work Space

Student Name: _____

Score: _____

Yes/No

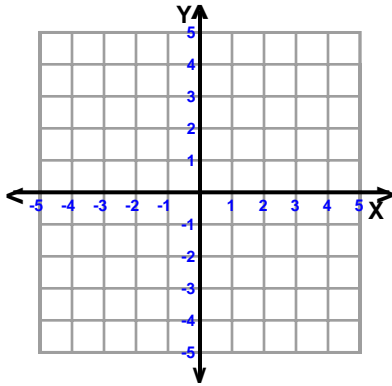
Does the given ordered pair satisfy the linear equation?

Equation	Ordered Pair	Yes/No
$3x + 2y = 1$	$(1, -1)$	
$4y - 3x = 6$	$(2, 3)$	
$2x + 5y = 1$	$(2, -1)$	
$x - 5y = 10$	$(0, -2)$	
$5x - y = -12$	$(-4, 6)$	
$9x + 4y + 5 = 0$	$(-1, 1)$	
$4x - y = 0$	$(2, 4)$	
$x - y + 4 = 0$	$(6, 6)$	
$7x - 11y = 2$	$(4, -5)$	
$6x - 5y = -9$	$(1, 3)$	

Work Space

Sketch the Graph of Each Line

1)

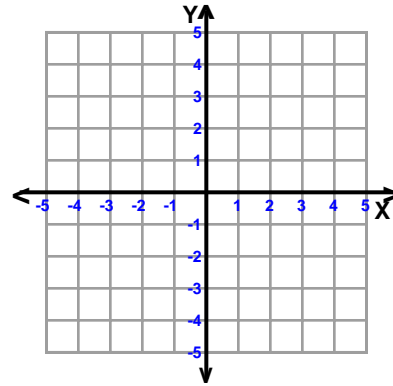


$$-2x + y = -4$$

slope = _____

y-intercept = _____

2)

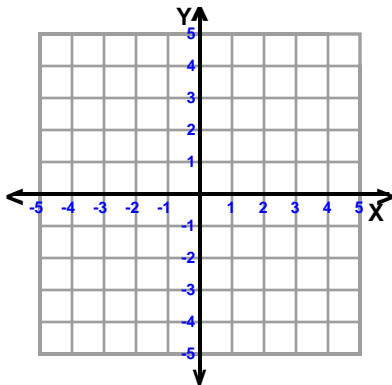


$$-5x + 3y = -9$$

slope = _____

y-intercept = _____

3)

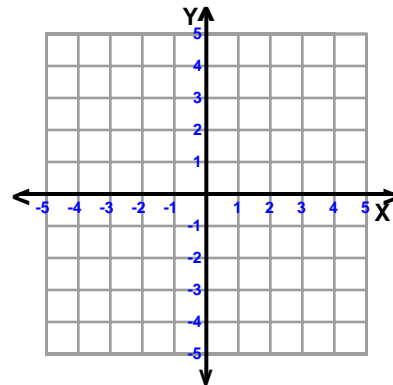


$$x + 4y = 16$$

slope = _____

y-intercept = _____

4)

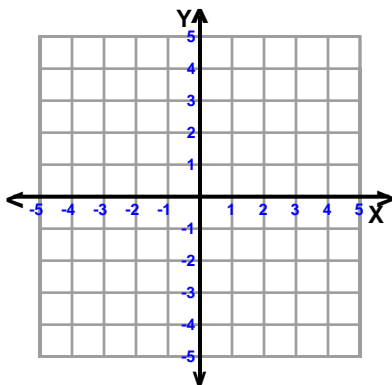


$$-7x + 2y = 8$$

slope = _____

y-intercept = _____

5)

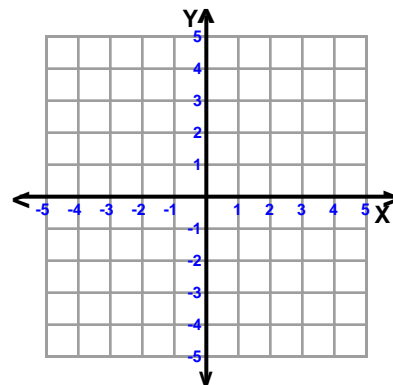


$$-x + 4y = -16$$

slope = _____

y-intercept = _____

6)

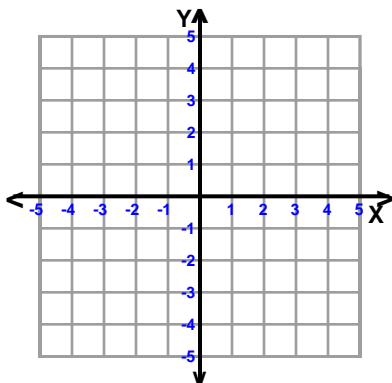


$$-4x + 3y = -6$$

slope = _____

y-intercept = _____

7)

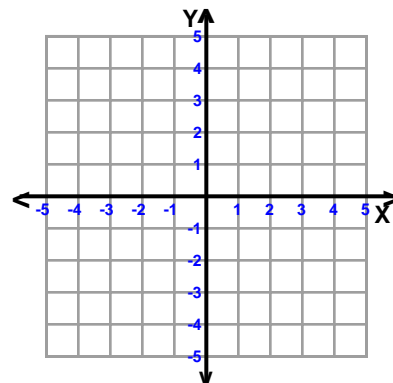


$$3x + y = -4$$

slope = _____

y-intercept = _____

8)



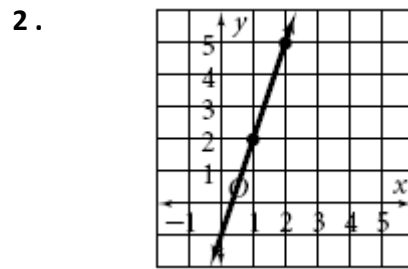
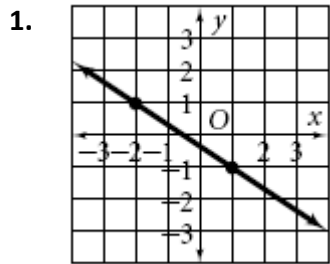
$$3x + 2y = 8$$

slope = _____

y-intercept = _____



Find the slope of each line.



Find the slope of the line that passes through each pair of points.

3. $(7, 2), (3, 5)$

4. $(0, 2), (4, 6)$

Graph a Line given a Point and the Slope

5. $m = \frac{1}{2}$ and $A(2,3)$

6. $m = -3$ and $B(2,-4)$

