

Name: \_\_\_\_\_

Date: \_\_\_\_\_

## Lesson 3 Practice Problems

### Section 3.1: Linear Equations and Functions

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1. Find the slope of the line that passes through the given points. Then determine if the line is increasing, decreasing or constant.

	Points	Slope	Sign of Slope (+, -, 0)	Increasing, Decreasing or constant?
a)	(3, 2) and (6, 8)	$m = \frac{8 - 2}{6 - 3} = \frac{6}{3} = 3$	<i>Positive</i>	<i>Increasing</i>
b)	(-2, 6) and (-6, -2)			
c)	(3, -5) and (7, 7)			
d)	(-1, -5) and (4, 7)			
e)	(-3, 12) and (5, -1)			
f)	$(\frac{3}{2}, 2)$ and $(-\frac{5}{2}, 2)$			
g)	$(-\frac{3}{4}, \frac{2}{7})$ and $(-\frac{1}{4}, \frac{4}{7})$			

2. Complete the table below. If the equation is not in  $y = mx + b$  form, show the steps required to convert it to that form. Also show the work required to calculate the horizontal intercept. Write all intercepts as ordered pairs.

Equation	$y = mx + b$ form	Slope	Vertical Intercept	Horizontal Intercept
a) $y = -4x - 8$				
b) $y = 3 - 4x$				
c) $y = \frac{1}{3}x - 2$				
d) $-4x - y = 2$				
e) $-6x + 3y = 9$				
f) $y = 2x$				
g) $y = 4$				
h) $x = -3$				

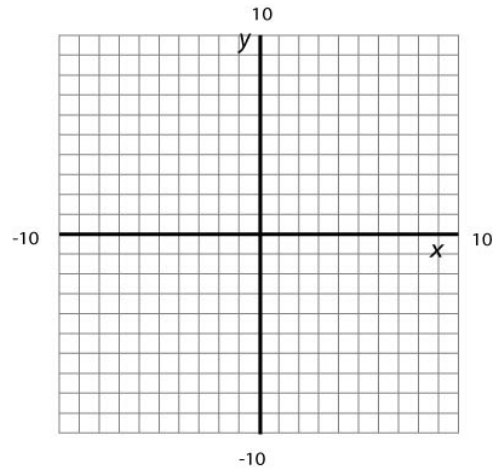
Section 3.2: Graphs of Linear Functions

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3. For the given linear functions, complete the table of values. Plot the ordered pairs, and graph the line.

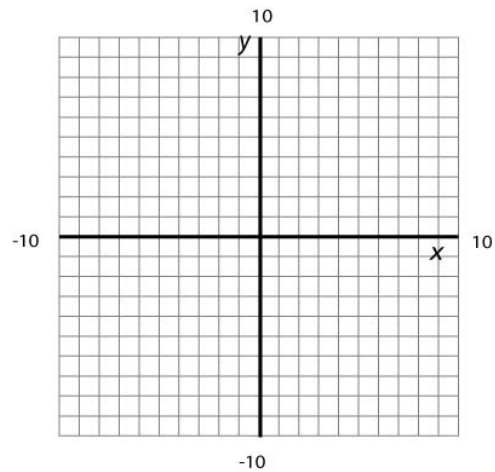
a)  $y = 3x - 2$

$x$	$y = 3x - 2$	Ordered Pair
-3	$y = 3(-3) - 2 = -11$	$(-3, -11)$
-2		
-1		
0		
1		
2		
3		



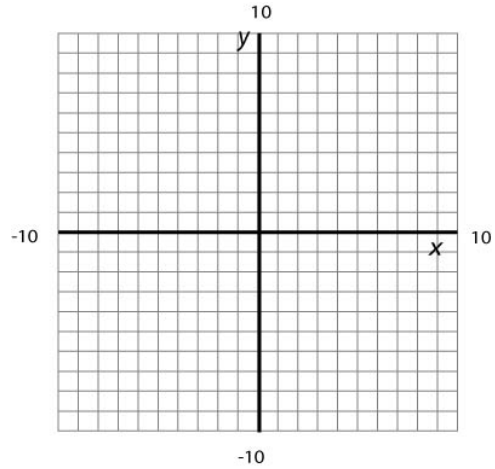
b)  $y = -2x + 4$

$x$	$y = -2x + 4$	Ordered Pair
-3		
-2		
-1		
0		
1		
2		
3		



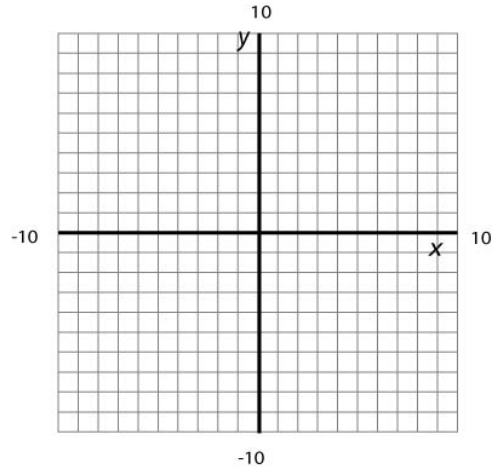
c)  $y = -\frac{3}{2}x + 1$

$x$	$y = -\frac{3}{2}x + 1$	Ordered Pair
-4		
-2		
0		
2		
4		



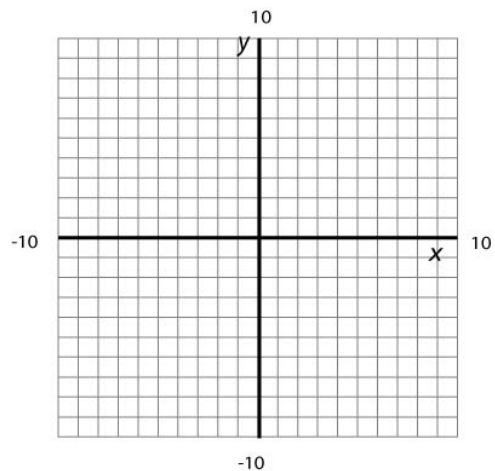
d)  $y = \frac{2}{5}x - 3$

$x$	$y = \frac{2}{5}x - 3$	Ordered Pair
-10		
-5		
0		
5		
10		

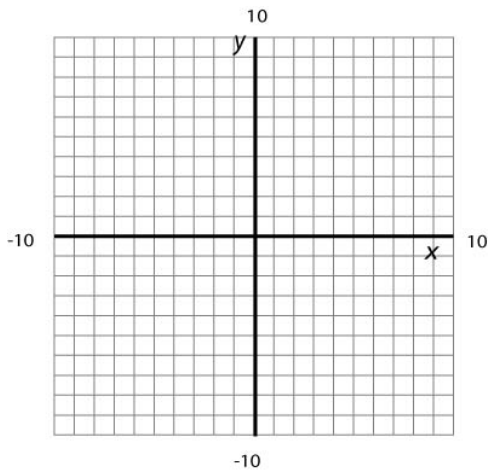


e)  $y = -x$

$x$	$y = -x$	Ordered Pair
-3		
-2		
-1		
0		
1		
2		
3		



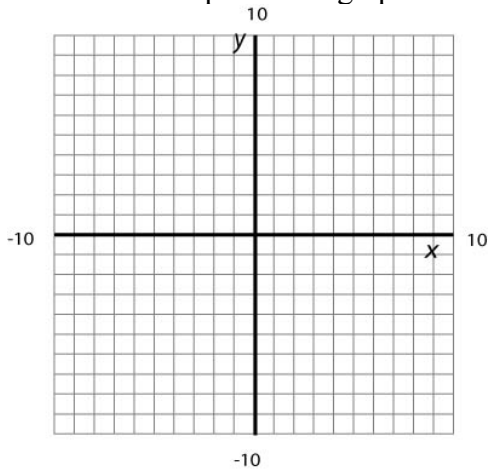
4. Use the intercepts to draw the graph of the equation  $y = 3x - 1$ . Show your work to find these points. PLOT and LABEL the intercepts on the graph then connect them to draw the line.



Vertical Intercept: ( \_\_\_\_\_ , \_\_\_\_\_ )

Horizontal Intercept : ( \_\_\_\_\_ , \_\_\_\_\_ )

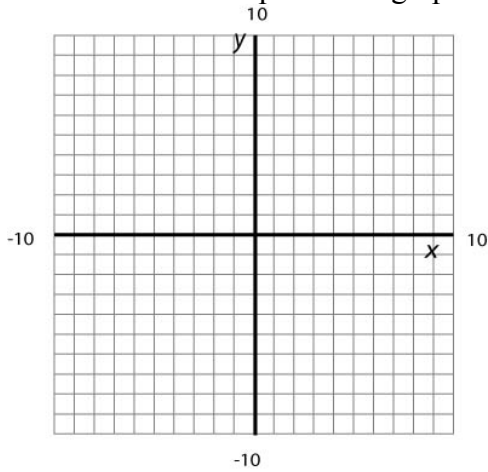
5. Draw the graph of the equation  $y = -x + 2$  Show your work to find these points. PLOT and LABEL the intercepts on the graph then connect them to draw the line.



Vertical Intercept: ( \_\_\_\_\_ , \_\_\_\_\_ )

Horizontal Intercept : ( \_\_\_\_\_ , \_\_\_\_\_ )

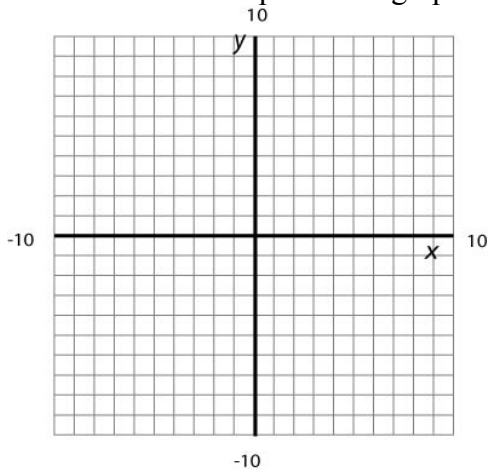
6. Draw the graph of the equation  $y = -\frac{1}{3}x + 3$  Show your work to find these points. PLOT and LABEL the intercepts on the graph then connect them to draw the line.



Vertical Intercept: ( \_\_\_\_\_ , \_\_\_\_\_ )

Horizontal Intercept : ( \_\_\_\_\_ , \_\_\_\_\_ )

7. Draw the graph of the equation  $2x - 3y = 12$  Show your work to find these points. PLOT and LABEL the intercepts on the graph then connect them to draw the line.



Vertical Intercept: ( \_\_\_\_\_ , \_\_\_\_\_ )

Horizontal Intercept : ( \_\_\_\_\_ , \_\_\_\_\_ )

8. Use the SLOPE to graph the line. Identify at least two additional points on the line (not the intercepts), and label them on your graph.

a) A line has a slope of 4 and contains the point  $(-3,0)$ .

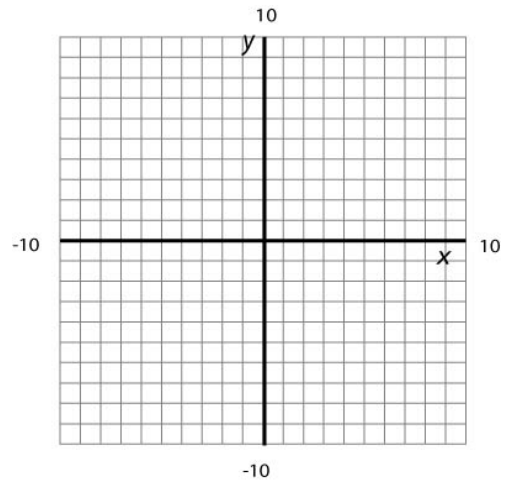
Plot the point on the graph to the right and use the *slope* to find at least two other points to graph the line.

List the two additional ordered pairs you found below.

( \_\_\_\_\_ , \_\_\_\_\_ )      ( \_\_\_\_\_ , \_\_\_\_\_ )

Use the *slope* to complete the table below.

$x$	$y$
-3	0
-5	
-1	



b) A line has a slope of  $-2$  and contains the point  $(-1,5)$ .

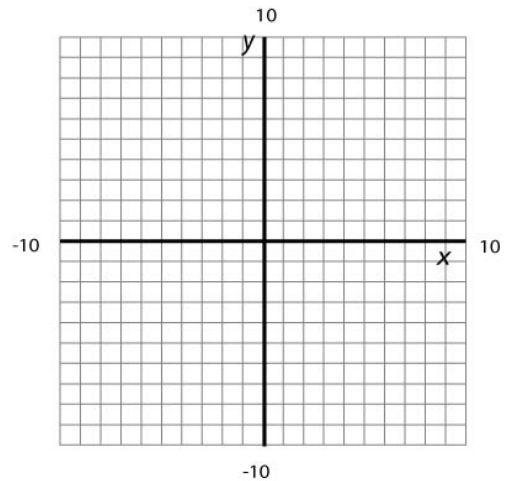
Plot the point on the graph to the right and use the *slope* to find at least two other points to graph the line.

List the two additional ordered pairs you found below.

( \_\_\_\_\_ , \_\_\_\_\_ )      ( \_\_\_\_\_ , \_\_\_\_\_ )

Use the *slope* to complete the table below.

$x$	$y$
-3	
0	
6	



### Lesson 3 – Linear Equations and Functions

### Practice Problems

- c) A line has a slope of  $-\frac{1}{3}$  and contains the point  $(2, -4)$ .

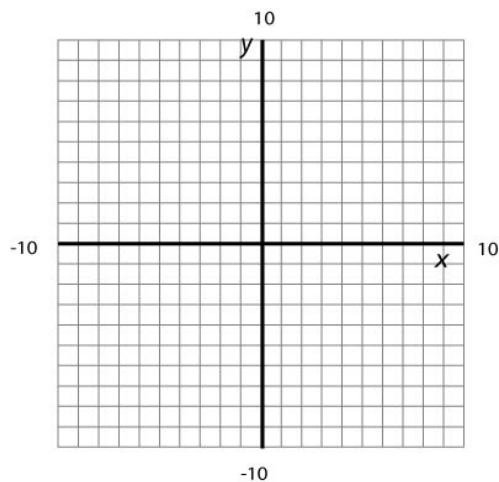
Plot the point on the graph to the right and use the *slope* to find at least two other points to graph the line.

List the two additional ordered pairs you found below.

( \_\_\_\_\_ , \_\_\_\_\_ )      ( \_\_\_\_\_ , \_\_\_\_\_ )

Use the *slope* to complete the table below.

$x$	$y$
2	-4
8	
-10	



- d) A line has a slope of  $\frac{1}{2}$  and contains the point  $(-3, 2)$ .

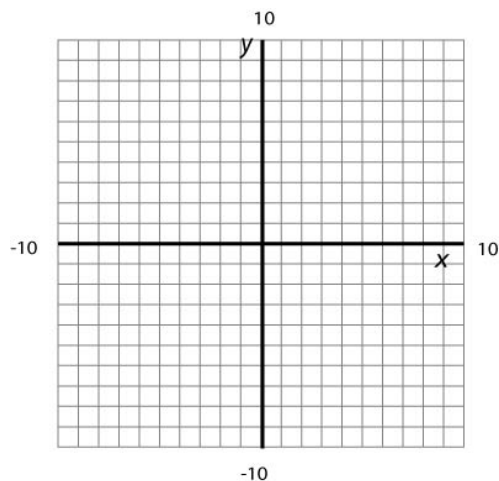
Plot the point on the graph to the right and use the *slope* to find at least two other points to graph the line.

List the two additional ordered pairs you found below.

( \_\_\_\_\_ , \_\_\_\_\_ )      ( \_\_\_\_\_ , \_\_\_\_\_ )

Use the *slope* to complete the table below.

$x$	$y$
-3	2
-7	
7	





Section 3.3: Horizontal and Vertical Lines

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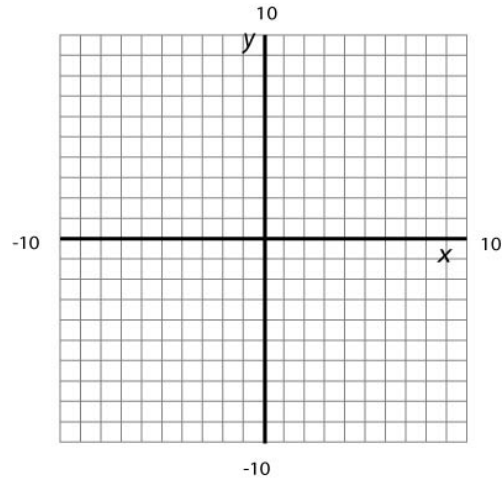
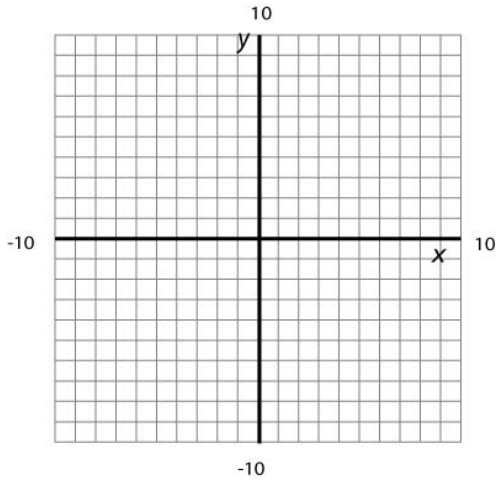
9. Complete the table.

Equation	Slope	Horizontal Intercept	Vertical Intercept
a) $y = 5$	$m = 0$	<i>does not exist</i>	$(0, 5)$
b) $y = 3$			
c) $x = 3$			
d) $y = -2$			
e) $x = -4$			
f) $y = 0$			
g) $x = 0$			

10. Graph each of the following equations. Plot and label any intercepts.

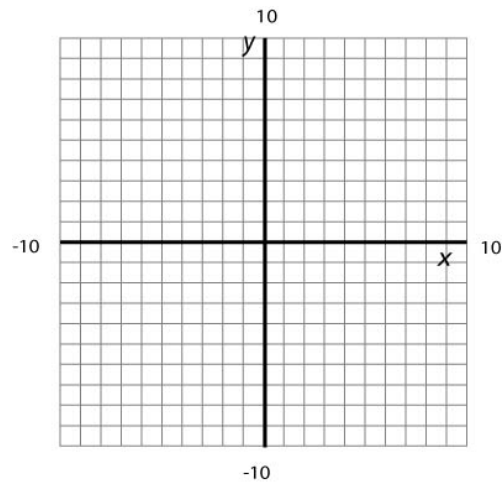
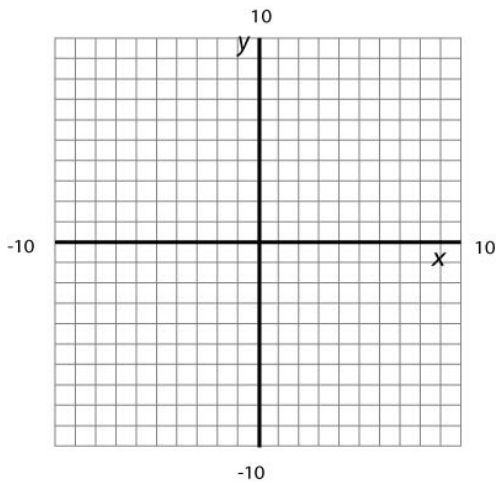
a)  $y = 3$

b)  $x = 3$



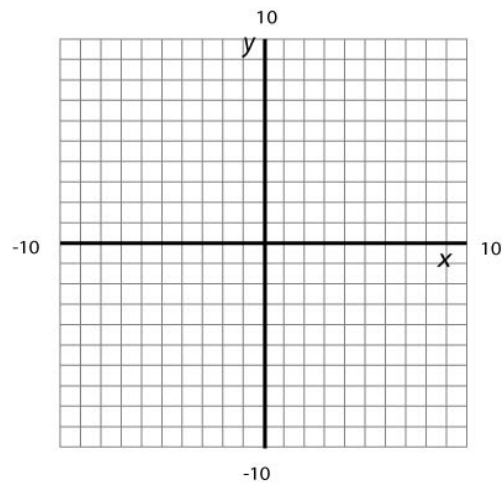
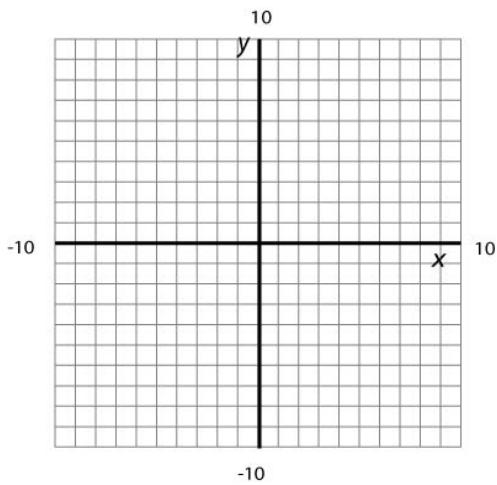
c)  $y = -2$

d)  $x = -4$

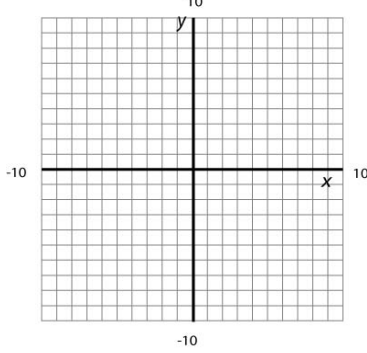
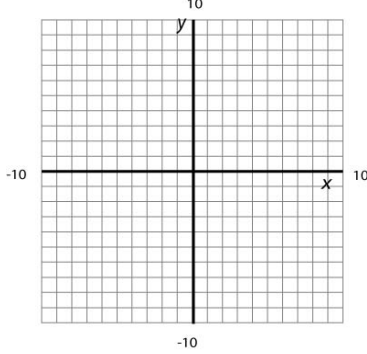
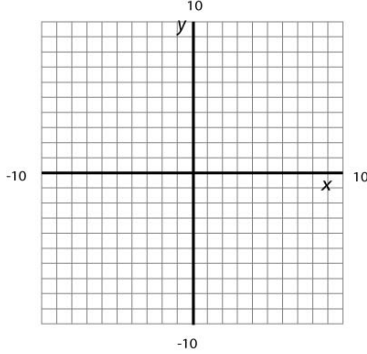
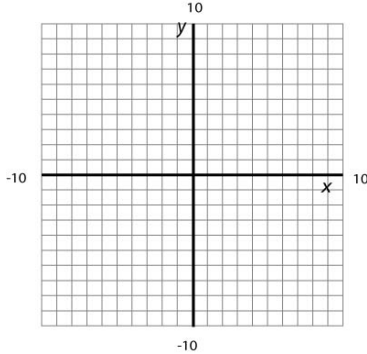


e)  $y = 0$

f)  $x = 0$



11. Use the given information to determine the equation of the line and to graph the line.

	Given Information	Equation	Graph
a)	A horizontal line that passes through the point $(-2, 3)$		
b)	A vertical line that passes through the point $(5, -2)$		
c)	A horizontal line that passes through the point $(8, 3)$		
d)	A vertical line that passes through the point $(-4, -7)$		

## Section 3.4: Writing the Equation of a Line

12. For each of the following, find the equation of the line that meets the following criteria.

	Slope	Point	Equation of Line
a)	$m = 2$	$(0, -3)$	
b)	$m = -4$	$(0, \frac{2}{3})$	
c)	$m = \frac{3}{8}$	$(0, -5)$	
d)	$m = -2.37$	$(0, 6.35)$	

13. For each of the following, find the equation of the line that meets the following criteria.

	Slope	Point	Find Vertical Intercept	Equation of Line
a)	$m = 2$	$(2, -3)$		
b)	$m = -4$	$(3, 4)$		
c)	$m = \frac{5}{16}$	$(-8, -5)$		
d)	$m = -1.4$	$(2, 2.34)$		

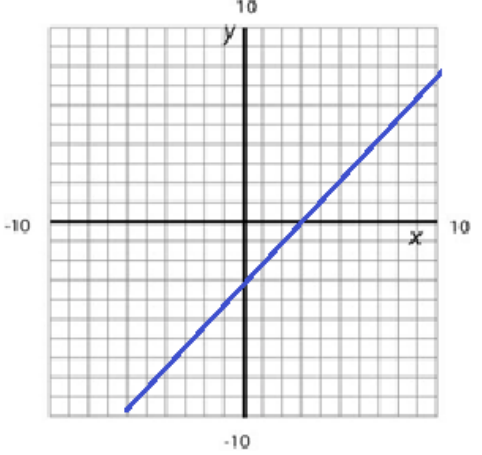
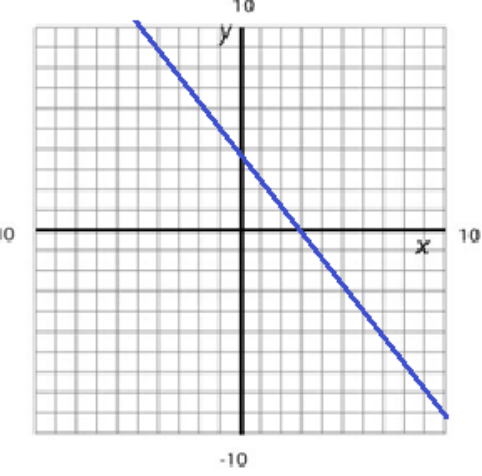
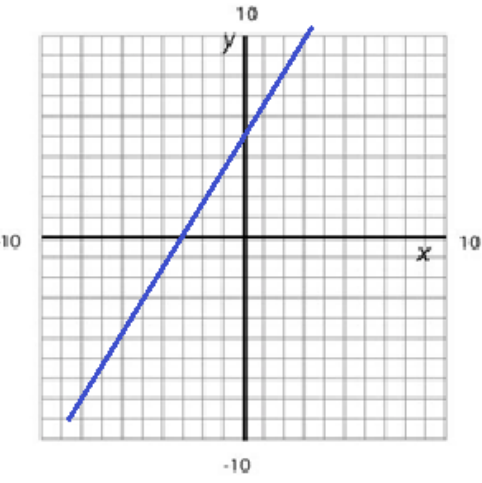
14. For each of the following, find the equation of the line that meets the following criteria.

	Two Points	Find Slope	Find Vertical Intercept	Equation of Line
a)	(2, -3), (4, 7)			
b)	(-3, 6), (3, -12)			
c)	(5, -5), (-1, 3)			
d)	(2, 4.2), (6, 9.4)			

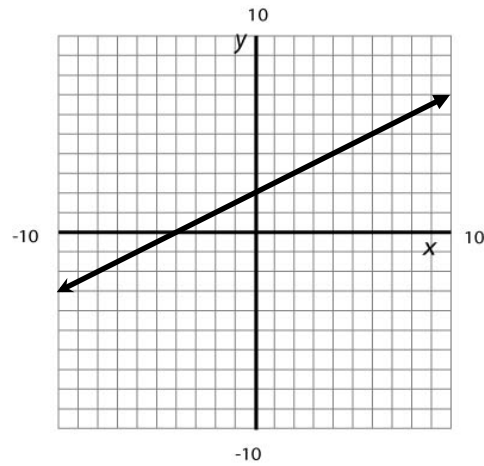
15. Determine the equation of the line that is parallel to the given line and passes through the point.

	Equation of given line	Point on parallel line	Slope of parallel line	Vertical Intercept of parallel line	Equation of Parallel line
a)	$y = 2x - 4$	(2, -3)			
b)	$y = -3x + 4$	(3,4)			
c)	$y = \frac{3}{2}x + 2$	(-8, -5)			

16. Determine the equation of the line that corresponds to the given graph.

Graph	Equation
<p>a)</p> 	
<p>b)</p> 	
<p>c)</p> 	

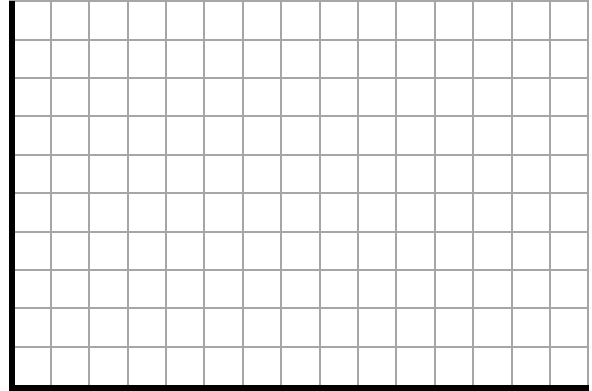
17. Use the given graph to help answer the questions below.



- Is the line above increasing, decreasing, or constant?
- What is the vertical intercept? Also, plot and label the point on the graph.
- What is the horizontal intercept? Also, plot and label the point on the graph.
- What is the slope? Show your work.
- What is the equation of the line in  $y = mx + b$  form?

18. Find the equation of the line for the following problem. Clearly indicate what your variables represent. Graph the results.

Cora decided to go on a diet. On the day she started, she weighed 200 pounds. For the next 8 weeks, she consistently lost 2 pounds a week. At the end of 8 weeks, she decided to make a graph showing her progress.



19. Mark needed 200 pounds of roofing nails for his project. He poured one cup filled with nails into a bucket and found that it weighed 2.3 pounds. He then poured 4 more cups of nails into the bucket and found that it weighed 9.5 pounds. He figured if he used the points **(1, 2.3)** and **(5, 9.5)** he could figure out a formula (i.e. equation) and calculate how many cups he would need.

a) Find the equation of the line for this problem. Clearly indicate what your variables represent.

b) How many cups of roofing nails does Mark need for his project?

c) Challenge question. The formula you found above doesn't go through the origin. Shouldn't 0 cups of nails weigh 0 pounds? Can you figure out why 0 cups of nails actually weighs MORE than 0 pounds in Mark's equation?