Name: Key 2018-2019 Period: _____ Date: _____ ID: A

Algebra Prep Chapter 4 (Red Alg 1 Text) Study Guide

1. a) What is the formula for slope? $m = \frac{y_2 - y_1}{x_2 - x_1}$

b) What is slope-intercept form for linear equations? $y = mx + b$

c) What is standard form for linear equations? $Ax + By = C$

d) In words, what is the x-intercept? The point where the graph of a function crosses the x-axis.

What is the y-intercept? The point where the graph of a function crosses the y-axis.

e) Slope is the ratio of vertical change to horizontal change.

2. Given the following two points: $\left(\frac{5}{2}, 3\right)$ or $\left(\frac{3}{2}, 20\right)$, are both points, only one point or neither point on the graph of $2x - \frac{2}{3}y = 3$? You must show how you came to your conclusion for full credit.

$\left(\frac{5}{2}, 3\right)$? $2\left(\frac{5}{2}\right) - \frac{2}{3}(3) \stackrel{?}{=} 3$

$5 - 2 = 3$

$3 = 3$ ✓

$\left(\frac{5}{2}, 3\right)$ is a solution,

$\left(\frac{3}{2}, 20\right)$? $\frac{2}{1}\left(\frac{3}{2}\right) - \frac{2}{3}\left(\frac{20}{1}\right) \stackrel{?}{=} 3$

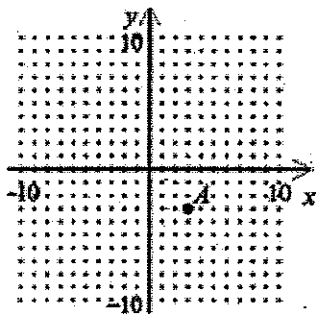
$3 - \frac{40}{3} \stackrel{?}{=} 3$

$\frac{9}{3} - \frac{40}{3} \stackrel{?}{=} 3$

$-\frac{31}{3} \neq 3$

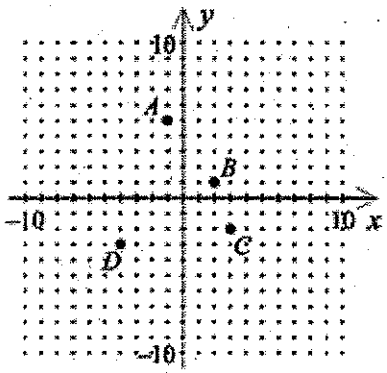
$\left(\frac{3}{2}, 20\right)$ is not a solution.

3. What are the coordinates of point *A*?



A(3, -3)

4. Name the coordinates of the points *A*, *B*, *C*, and *D*.



A (-1, 5)
B (2, 1)
C (3, -2)
D (-4, -3)

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5. The function $y = 3x - 2$ has a **domain** of –3, –2, –1, 0, and 1.
Is this a discrete or continuous domain?

Discrete

a. Complete the table. Show at least one substitution. What is the range of the function?

x	y	
–3	-11	QIII
–2	-8	QIII
–1	-5	QIII
0	-2	y-axis
1	1	QI

$y = 3(-3) - 2$
$= -9 - 2 = -11$

Range: $\{-11, -8, -5, -2, 1\}$

b. Suppose the (x, y) pairs in the table above are plotted in a coordinate plane. Which quadrant would contain the most points? How do you know?

Quadrant III contains the most points

Three of the points are in quandrant III because both the x- and y- coordinates are negative.

Make a table of values for the equation when $x = -1$, $x = 0$, and $x = 1$. Then graph the equation in a coordinate plane.

6. $y = -2x + 1$

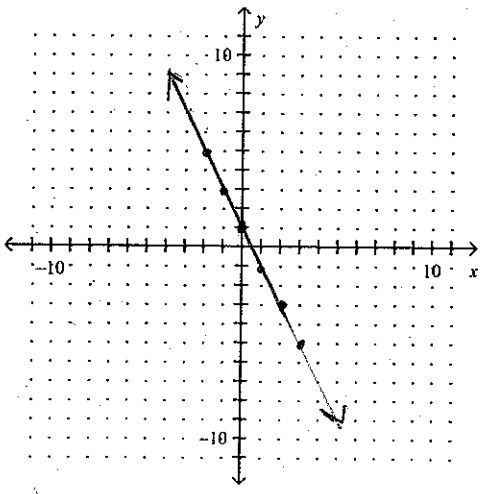

Table:

x	y
-1	3
0	1
1	-1

$y = -2(-1) + 1$
$y = 2 + 1$
$y = 3$

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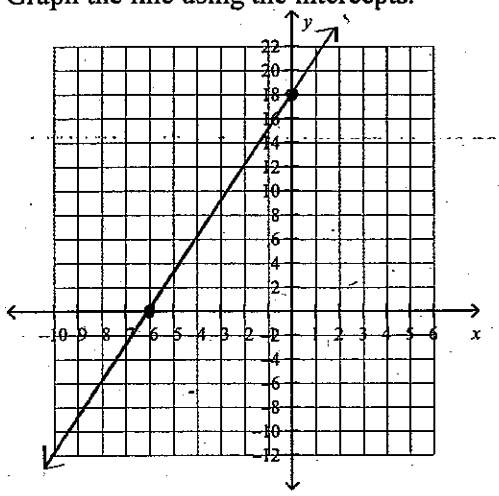
7. Find and identify the x-intercept and *y*-intercept of the line with the equation $-9x + 3y = 54$. Make sure to list the intercepts as **points** and identify which is the x-intercept and which is the y-intercept.

Graph the line using the intercepts.



Intercepts:

x-int. let $y = 0$

$-9x + 3(0) = 54$

$-9x = 54$

$x = -6$

x-int. $(-6, 0)$

y-int. let $x = 0$

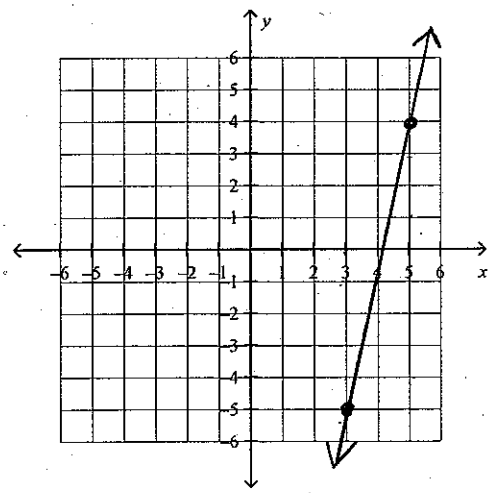
$-9(0) + 3y = 54$

$3y = 54$

$y = 18$

y-int. $(0, 18)$

8. Plot the points $(3, -5)$ and $(5, 4)$ and find the slope of the line passing through the points (make sure you show algebraic work). Then classify the line using its slope.



Slope:

$$m = \frac{y_2 - y_1}{x_2 - x_1} = \frac{4 - (-5)}{5 - 3} = \frac{9}{2} = m$$

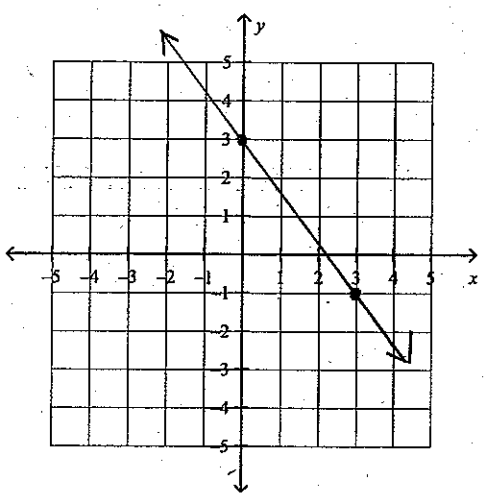
Line: Rising line

9. Find the slope of the line passing through the points $A(8, 5)$ and $B(-9, -1)$. Show how you found the slope.

$x_2 y_2 \quad x_1 y_1$

$$m = \frac{y_2 - y_1}{x_2 - x_1} = \frac{5 - (-1)}{8 - (-9)} = \frac{6}{17}$$

10. Write the equation $4x + 3y - 9 = 0$ in slope-intercept form, and sketch the line.



Slope-intercept form:

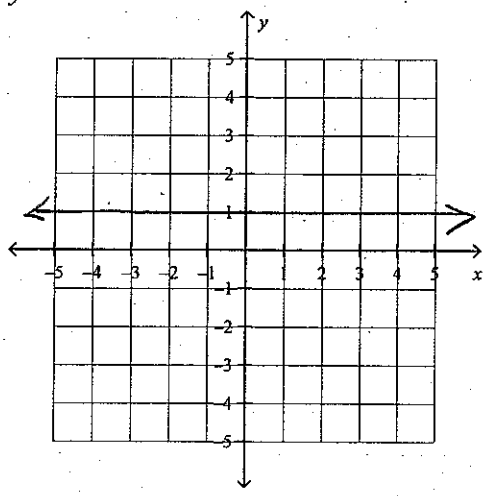
$4x + 3y - 9 = 0$
$+9 \quad +9$
$4x + 3y = 9$
$-4x \quad -4x$
$\frac{3y}{3} = \frac{-4x}{3} + \frac{9}{3}$

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

$m = \frac{-4}{3}$ $b = 3$ $(0, 3)$

Graph the equation using any method you like. Show work or describe what you did in words for full credit. Don't forget to label your axes.

11. $y = 1$



Horizontal Line
0
Y = #
V
U
X

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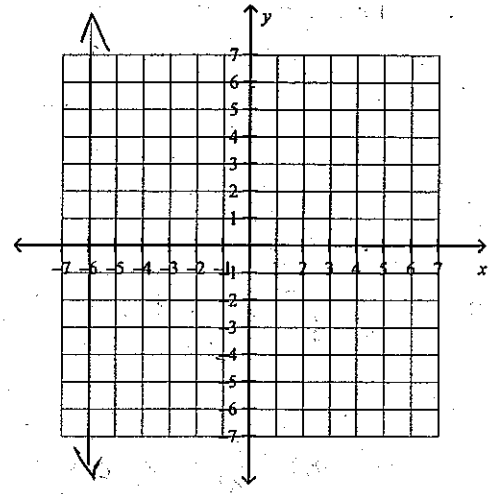
Graph the equation using any method you like. Show work or describe what you did in words for full credit. Don't forget to label your axes.

12. $2x+12=0$

$2x=-12$

$x=-6$

Horizontal
0 slope
$Y=\#$
$\Rightarrow$ Vertical line
Undefined slope
$\Rightarrow X=\#$

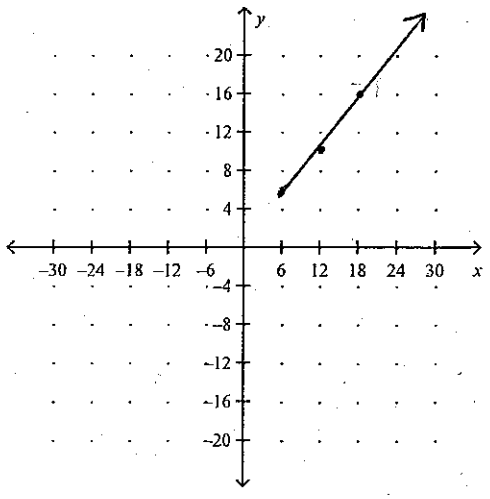


13. Writing: Explain the difference between a horizontal line and a vertical line in terms of slope.

A horizontal line has zero slope, vertical lines have undefined slope.

Graph the function with the given domain. Then identify the range of the function.

14. $y=\frac{5}{6}x+1$; domain $x \geq 6$ ← restricted



x	y
6	6
12	11
18	16

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

$y=5+1=6$

$y=\frac{5}{6}\left(\frac{12}{1}\right)+1$

$=10+1=11$

$y=\frac{5}{6}\cdot\left(\frac{18}{1}\right)+1$

Range:

$\{y \geq 6\}$

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15. Find the slope and y-intercept of the line $y = 3x + 7$. Is the line parallel to $y = -3x - 7$? Why or why not?

m (slope) = 3

b (y-int.) = 7

No, the lines are not parallel because the slopes are not the same.

16. On January 1 (month 0), Mario had a savings account balance of \$2742 and by April 1 (month 3), his balance had increased to \$3597. Find Mario's average savings rate in dollars per month for that period.

(0, 2742)
x_1 y_1

(3, 3597)
x_2 y_2

avg. rate of chang $= \frac{3597 - 2742}{3 - 0} = \frac{855}{3} = 285$

Mario saves an average of \$285 per month.

$m = \frac{y_2 - y_1}{x_2 - x_1}$ = avg. rate of change

17. Describe the effect of the transformation $(x, y) \rightarrow (x, -7y)$.

This is a reflection and a vertical stretch of the parent.

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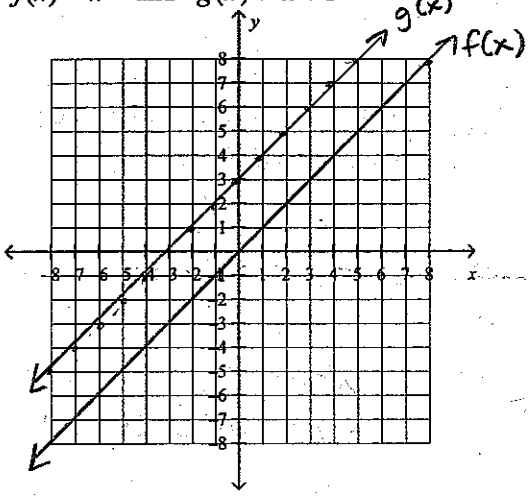
don't need to do for test. Can use $y=mx+b$

Graph the lines given below. Be sure to show a table for each graph, one line of work for each and label each graph. Then compare and contrast the lines. Finally, in a sentence, describe what transformation has occurred. Don't forget to label your axes.

18. $f(x)=x$ and $g(x)=x+3$



x	f(x)
-1	-1
0	0
1	1

x	g(x)
-1	2
0	3
1	4

$g(-1) = -1+3$

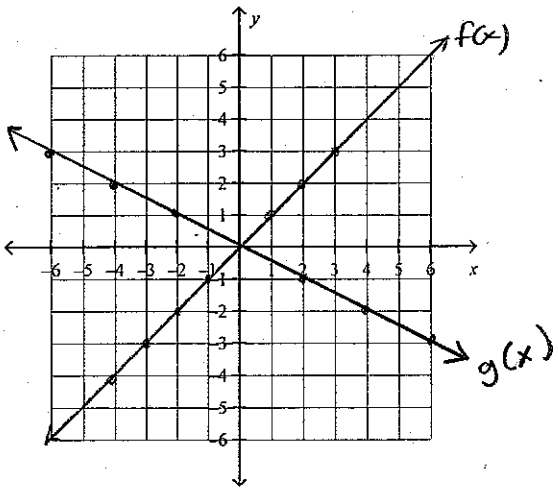
$g(-1) = 2$

Comparison: The lines have the same slope but different y-intercept.

Transformation: g(x) is a shift up 3 of f(x).

19. $f(x)=x$ and $g(x)=-\frac{1}{2}x$. $m = \frac{-1}{2}$ y-int. (0,0)

x	f(x)
-1	-1
0	0
1	1



Comparison: The lines have different slopes but the same y-intercept.

Transformation: g(x) is a reflection and a vertical compression of f(x).

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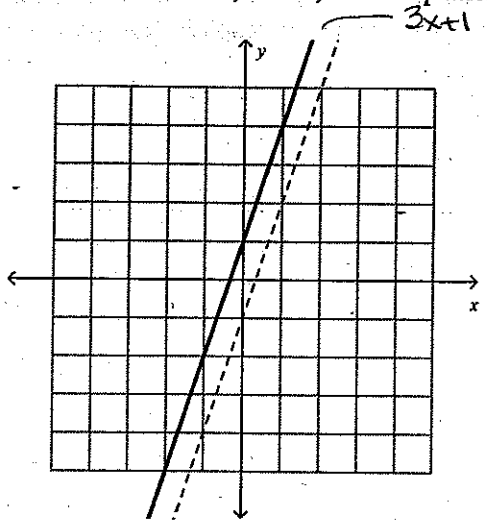
20. The solid line below is the graph of the equation $y = 3x + 1$. The dashed line is the result of changing just one of the numbers, 3 or 1, in the equation for the solid line.



These lines are parallel so have the same slope. But the y-intercept is different so the 1 in original equation was changed to -1.

Which number was changed and what was it changed to?

What is the value of the function when $x = 5$?

21. $f(x) = 4x + 9$

$f(5) = 4(5) + 9$

$f(5) = 20 + 9$

$f(5) = 29$

Find the value of x so that $f(x) = 13$.

22. $f(x) = -\frac{1}{4}x$

$13 = -\frac{1}{4}x$

$-\frac{4}{1} \cdot 13 = -\frac{1}{4}x \cdot -\frac{4}{1}$

$-52 = x$

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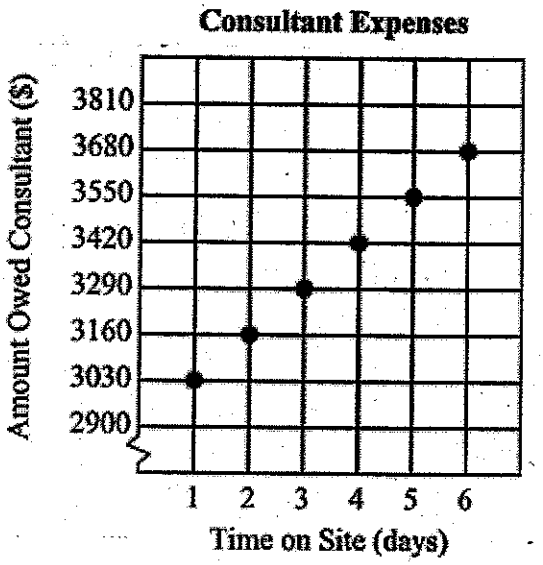
23. A consultant has agreed to a fixed-fee contract to analyze a company's employee training needs. The company site is located several states away from where the consultant lives, so in addition to the contracted fee, the consultant will receive a daily allowance for living expenses. The graph below shows the amount owed the consultant for up to six days.



$(1, 3030)\ (2, 3160)$
$x_1\ y_1\quad x_2\ y_2$

What is the dollar amount of the consultant's daily allowance for living expenses? In other words, how much does the consulant get per day to live (the average rate of change)?

$$\text{avg. rate of change} = \frac{3160 - 3030}{2 - 1} = \frac{130}{1}$$

The consultant gets $130 per day to live.