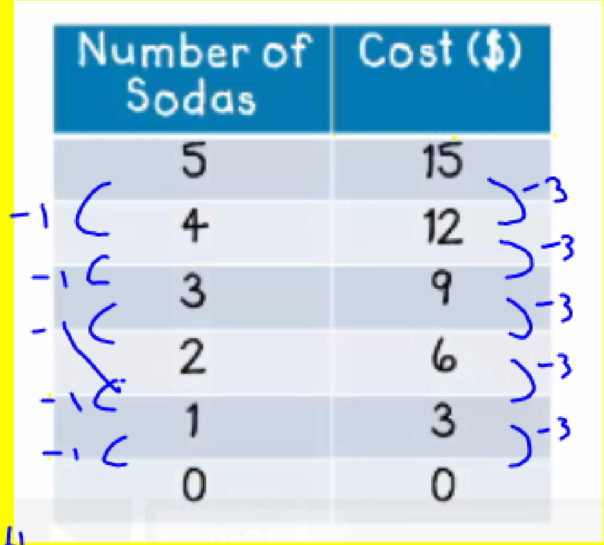
Pop for the Party

The table on the right shows the cost in dollars to purchase bottles of soda for a party.

independent variable = # of sodas , x

dependent variable = cost, $, y

$$m = \frac{\Delta y}{\Delta x} = \frac{-3}{-1} = 3$$



	Number of Sodas	Cost ($)	
	5	15	
-1	4	12	-3
-1	3	9	-3
-1	2	6	-3
-1	1	3	-3
-1	0	0	-3

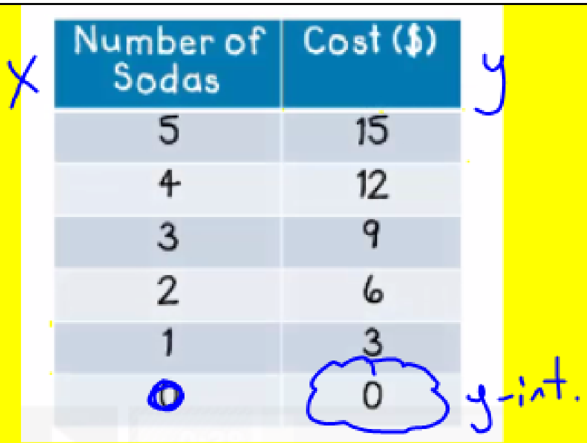
Find the average rate of change for this relationship. Interpret this value.

average rate of change = 3

For each additional soda bought, the cost has increased by $ 3.

State and interpret the y-intercept. y-intercept = ___0___

For ___zero___ soda bottles, the cost is ___$0___.



x y

Number of Sodas	Cost ($)
5	15
4	12
3	9
2	6
1	3
0	0

y-int.

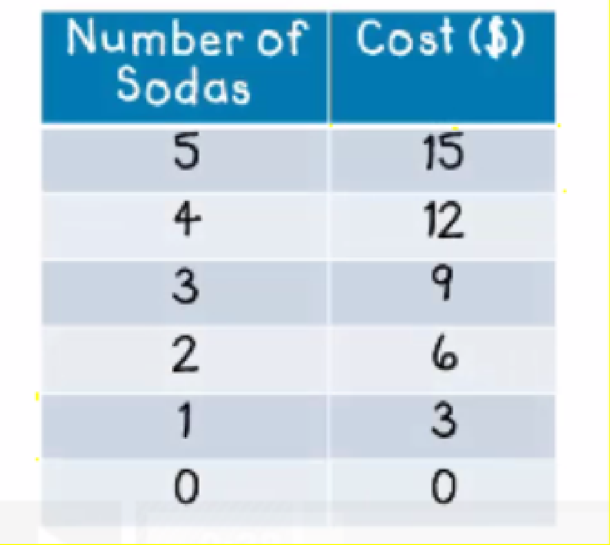
$b = 0$

Write an equation that models this relationship:

$y = \underline{m}x + \underline{b}$

$y = 3x + 0$

$\boxed{y = 3x}$



Number of Sodas	Cost ($)
5	15
4	12
3	9
2	6
1	3
0	0

Use your model to determine the cost of 10 bottles of soda. $30

$y = 3x$

$y = 3(10)$

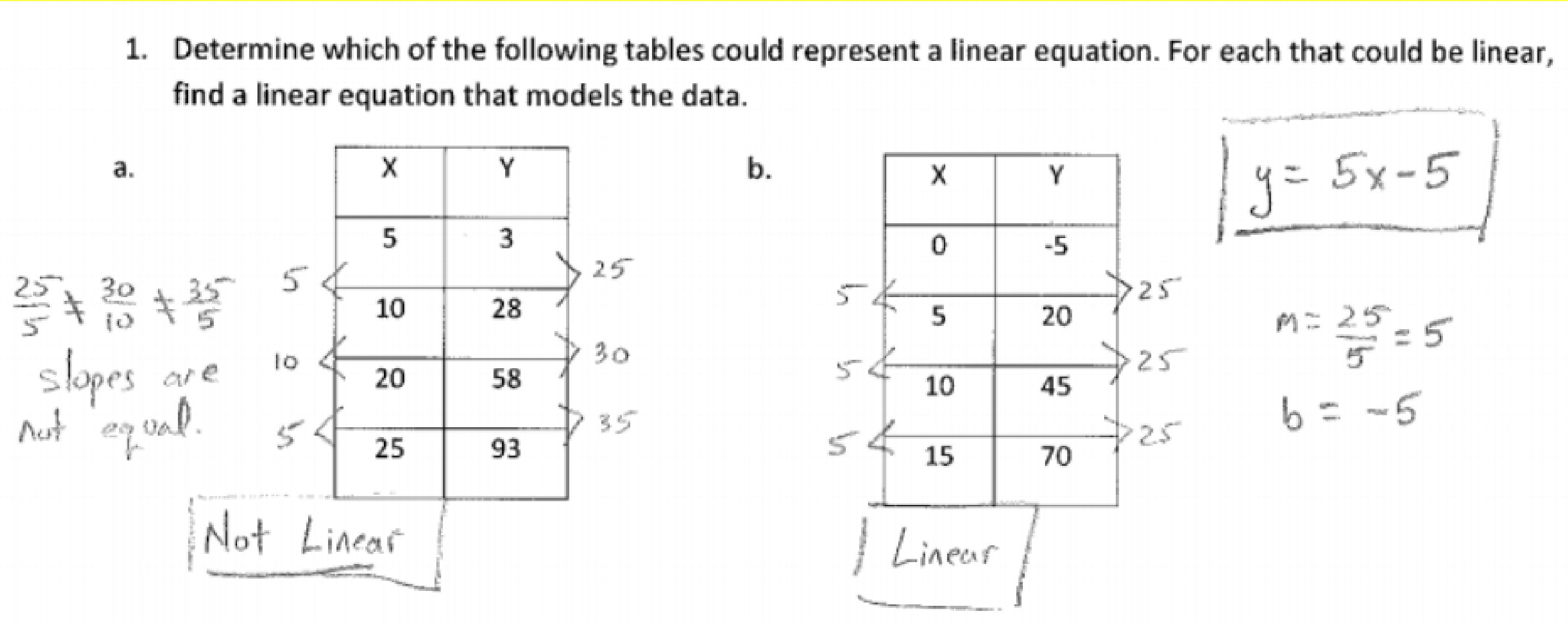
$y = \$30$

Use your model to predict how many bottles of soda were purchased if you spent $45. 15 bottles

$y = 3x$

$\frac{45}{3} = \frac{\cancel{3}x}{\cancel{3}}$

$15 = x$



1. Determine which of the following tables could represent a linear equation. For each that could be linear, find a linear equation that models the data.

a.

X	Y
5	3
10	28
20	58
25	93

5 10 5

25 30 35

$\frac{25}{5} \neq \frac{30}{10} \neq \frac{35}{5}$

slopes are not equal.

$\boxed{\text{Not Linear}}$

b.

X	Y
0	-5
5	20
10	45
15	70

5 5 5

25 25 25

$\boxed{\text{Linear}}$

$\boxed{y = 5x - 5}$

$m = \frac{25}{5} = 5$

$b = -5$

2. A mountain climber is scaling a 400-ft cliff. The climber starts at the bottom at $t = 0$ and climbs at a constant rate of 124 feet per hour.

a. Complete the table.

t	Time t, (hours)	0	1	2	3	4
y	Distance (ft)	0	124	248	372	496

b. Calculate and interpret the slope.

For each additional hour, the mountain climber scales 124 feet.

b. Calculate and interpret the y-intercept.

At the beginning of the climb, when *time* = 0, the mountain climber has scaled 0 feet.

c. Use the slope and y-intercept to write the linear model for the distance y *(in feet)* that the climber climbs in terms of time *(in hours).*

$y = 124t$

d. After 3 ½ hours, has the climber reached the top of the cliff? Show work.

$t = 3.5$ find y $\quad y = 124(3.5) = \underline{434 \text{ feet}}$ $\quad$ $\underline{\text{Yes}}$

e. Use your linear model in part #1*c* to determine how long it takes for the climber to reach the top.

top = 400 ft = y find t

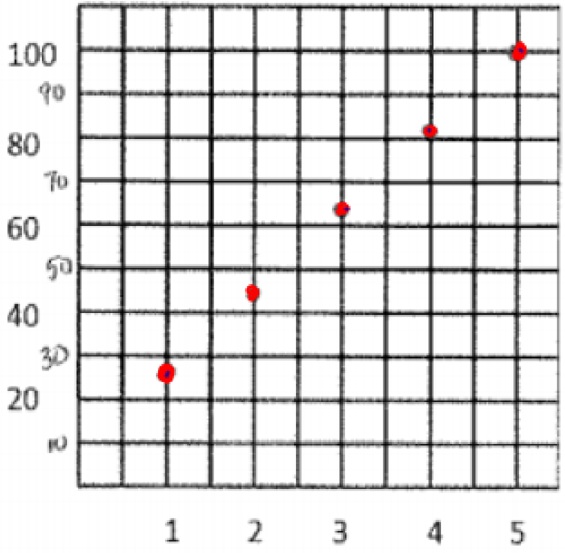
$$\frac{400}{124} = \frac{124t}{124} \qquad \underline{t = 3.23 \text{ hours}}$$

3. Renting a canoe costs $10 plus $18 per day. The linear model for this situation relates the total costs of renting a canoe, *y*, with the number of days rented, *x*.

Days Rented(x)	1	2	3	4	5
Total Costs (y)	28	46	64	82	100

No Line Discrete vs. Continuous (Line)

a. Complete the table and graph this data.



b. Calculate and interpret the slope. slope #18 per day

For each additional day, the cost to rent a canoe

increases #18.

c. Determine and interpret the y-intercept.

The initial cost to rent a canoe, when days = 0, is # 10.

d. Use the slope and y-intercept to write the linear model for total cost to rent a canoe, y, as a function of days, x.

y = $18x + 10$

e. Use your model to determine the cost to rent a canoe for $\underbrace{\text{7 days}}_{x}$.

$136

$$y = 18(7) + 10$$
$$y = \$136$$

f. Use your model to determine how many days you could rent a canoe if you had $\underbrace{\$190}_{y}$ to spend.

10 days

$$\begin{aligned} 190 &= 18x + 10 \\ -10 & \quad\quad\;\; -10 \end{aligned}$$

$$\frac{180}{18} = \frac{18x}{18}$$

$$x = 10$$

E.Q.: How do we graph linear equations in two variables?

Standard: **MGSE9-12.A.CED.2**

Create linear equations in two or more variables to
represent relationships
between quantities; graph equations on coordinate axes
with labels and scales.
(The phrase "in two or more variables" refers to formulas
like the compound
interest formula, in which A = P(1 + r/n)nt has multiple
variables.)

Methods to Graphing a Linear Equation:

- Make a table of values and plot those points.
- Use the slope intercept method of graphing a line
- Find the x and y intercepts of a line.

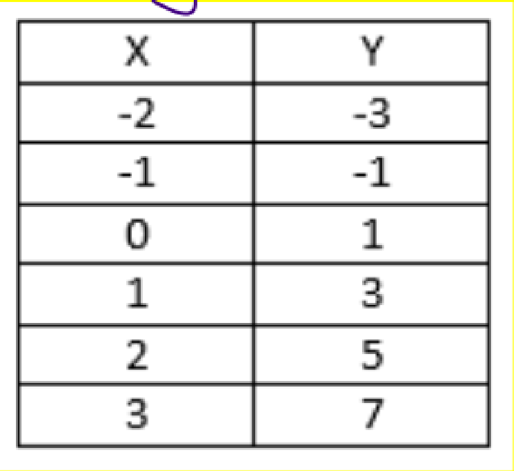
Method 1:

Make a table of values.

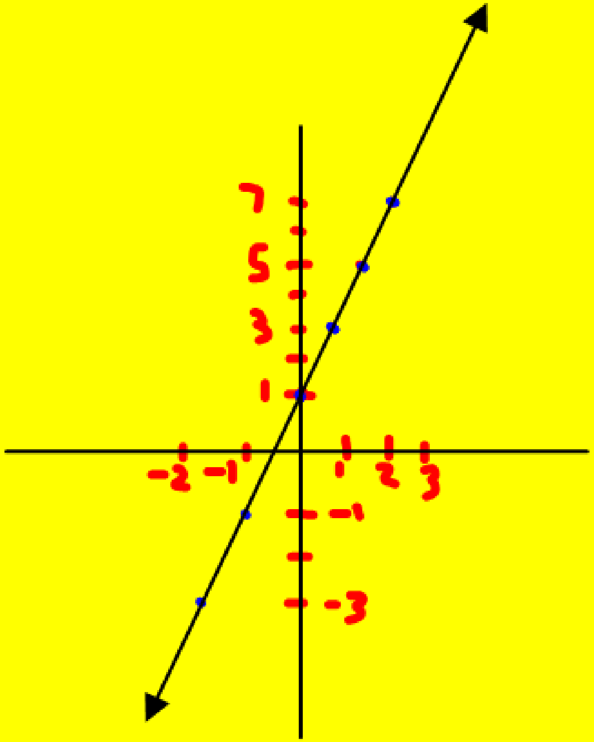
Plot the points in your table.

Draw your line.

$y = 2x+1$

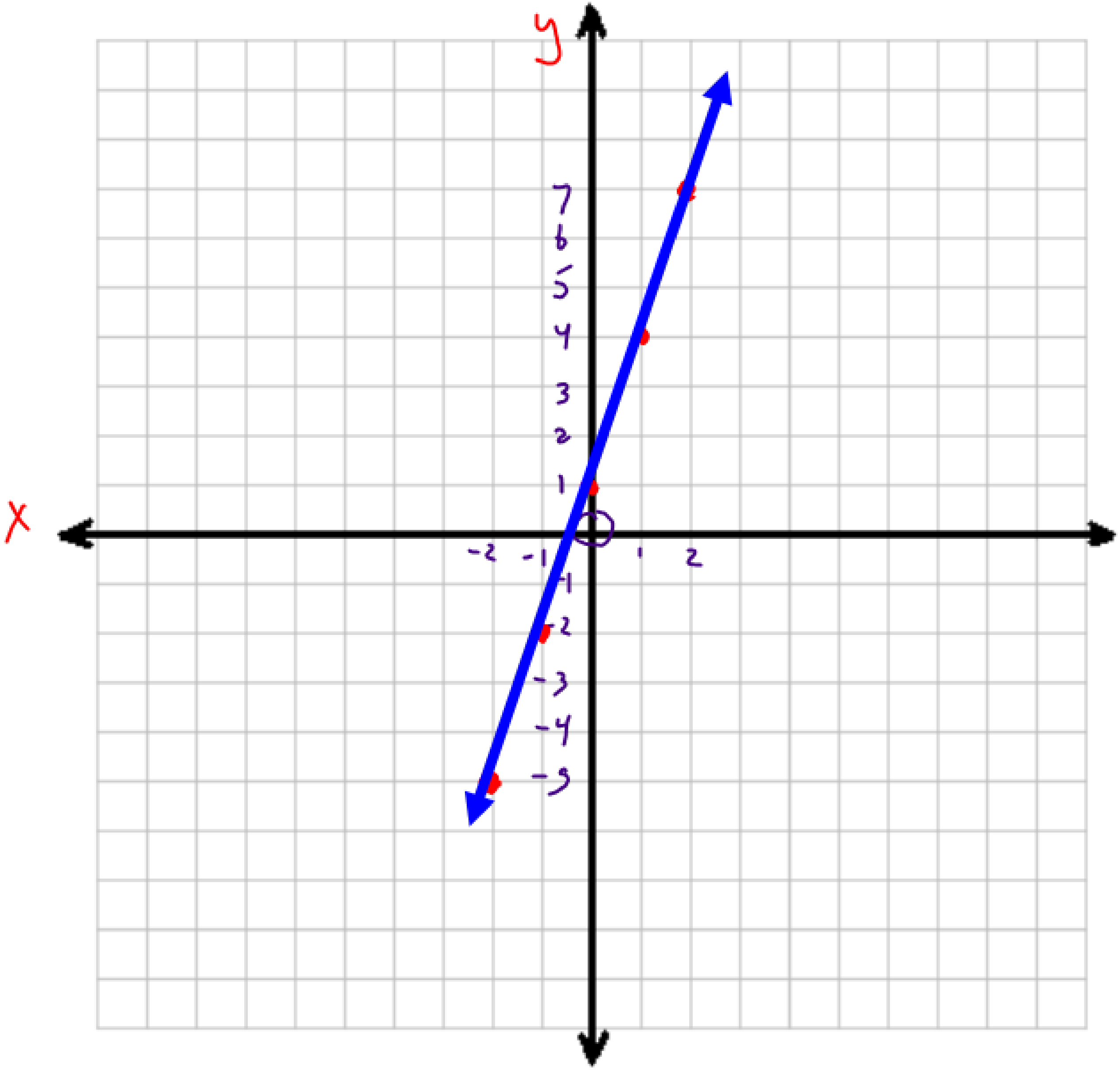


X	Y
-2	-3
-1	-1
0	1
1	3
2	5
3	7



$$y = \underbrace{3}_{\text{slope}}x \underbrace{+ 1}_{\text{y-int}}$$

x	y
-2	-5
-1	-2
0	1
1	4
2	7



Solve for y first, then complete your table.

Standard form

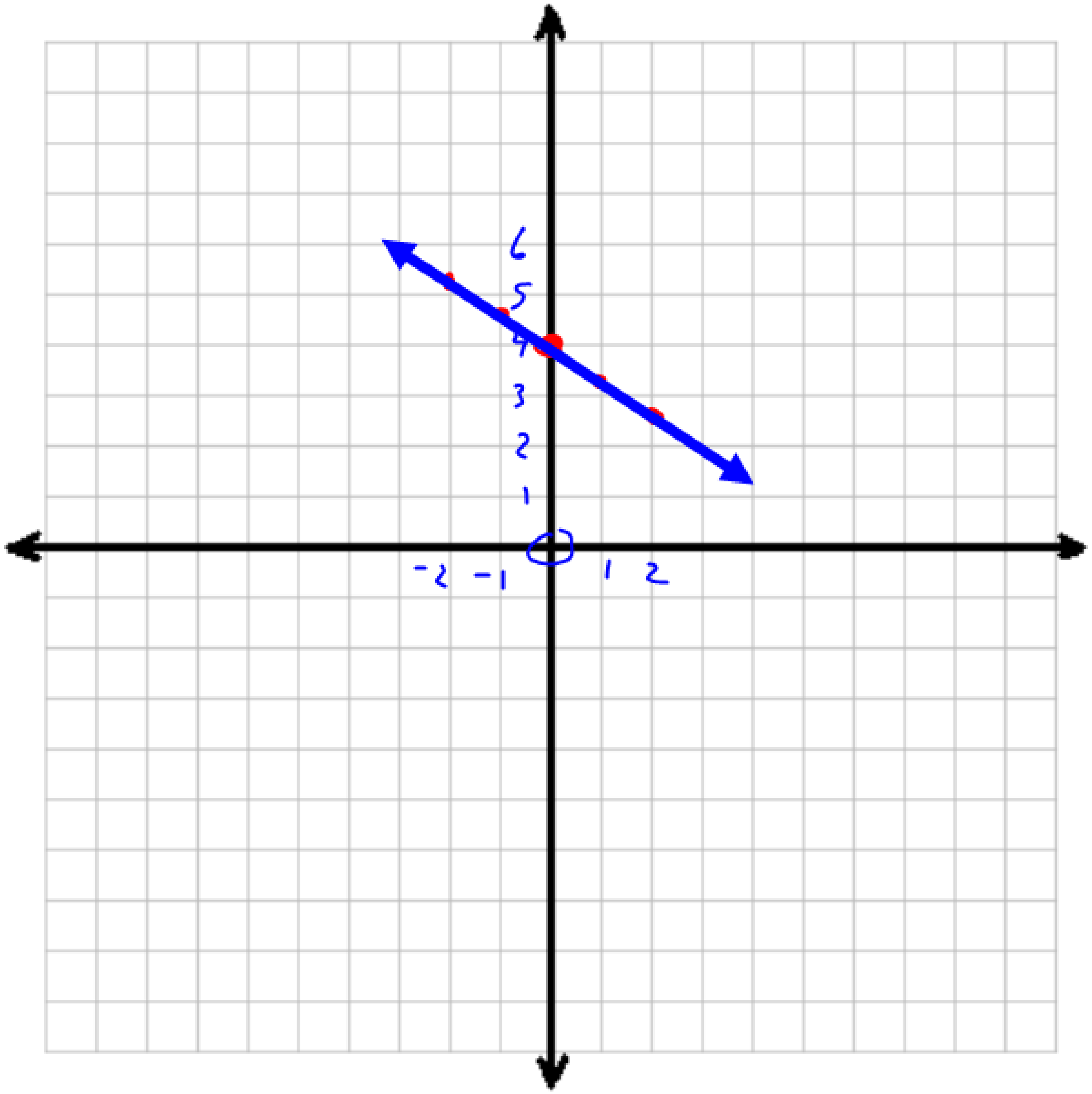
$$2x + 3y = 12$$

x	y
-2	$16/3 = 5.\overline{3}$
-1	$14/3 = 4.\overline{6}$
0	4
1	$10/3 = 3.\overline{3}$
2	$8/3 = 2.\overline{6}$

$2(2) + 3y = 12$

$4 + 3y = 12$

$\frac{3y}{3} = \frac{8}{3}$ $y =$



Method 2:

Use the slope intercept method.

Plot your y-intercept.

Use your slope to find other points.

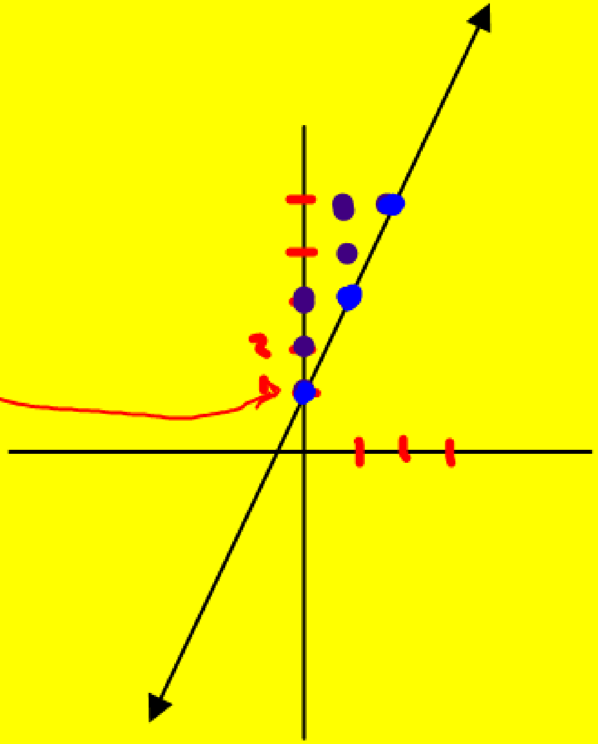
Draw your line.

X	Y
-2	-3
-1	-1
0	1
1	3
2	5
3	7

1

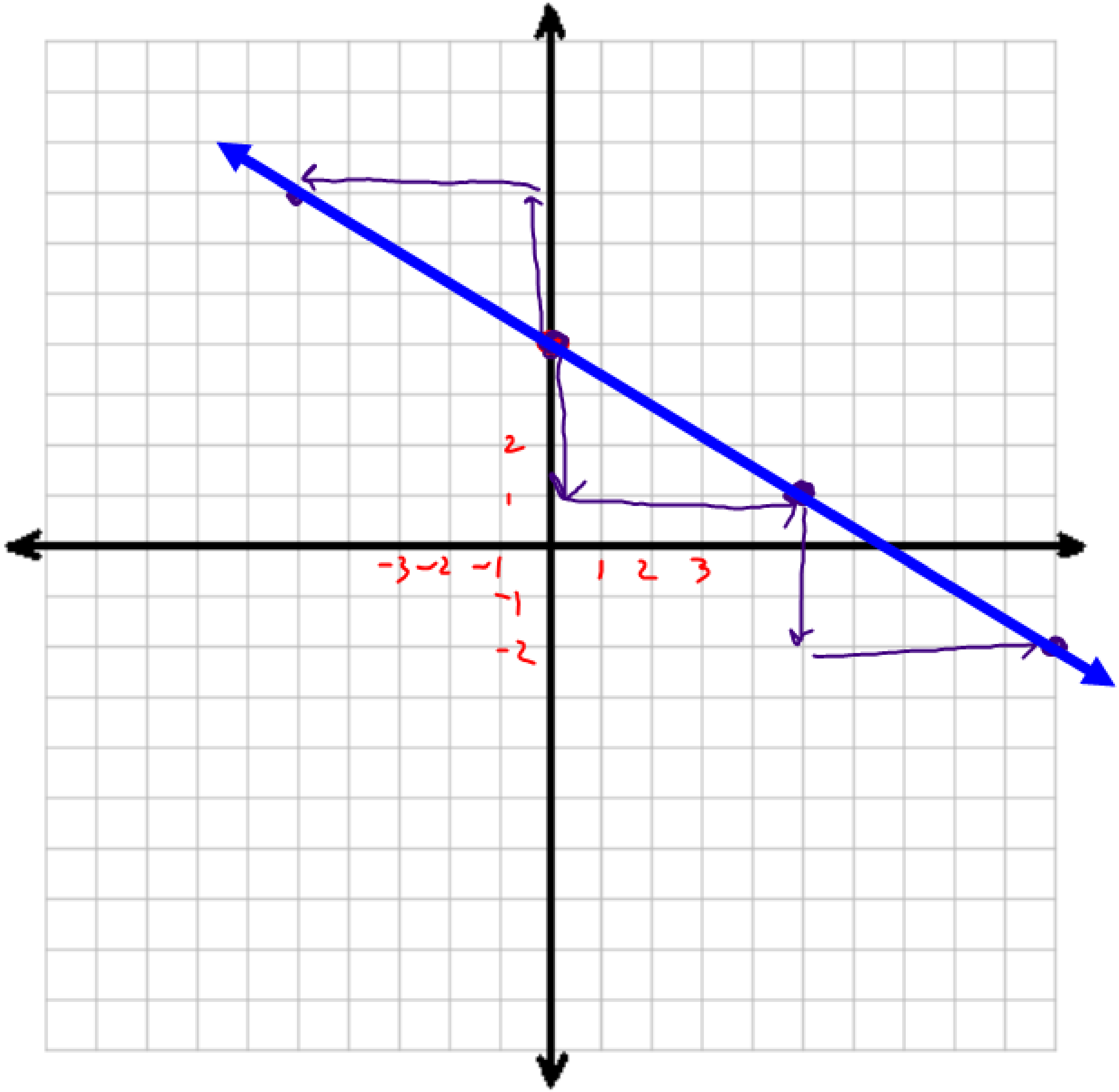
2

slope = $\frac{2}{1}$



$$y = \frac{-3}{5}x \overset{\text{y-int}}{+4}$$

slope: $\frac{-3}{5} = \frac{\text{rise}}{\text{run}}$



$x - 4y = 16$

solve for "y"

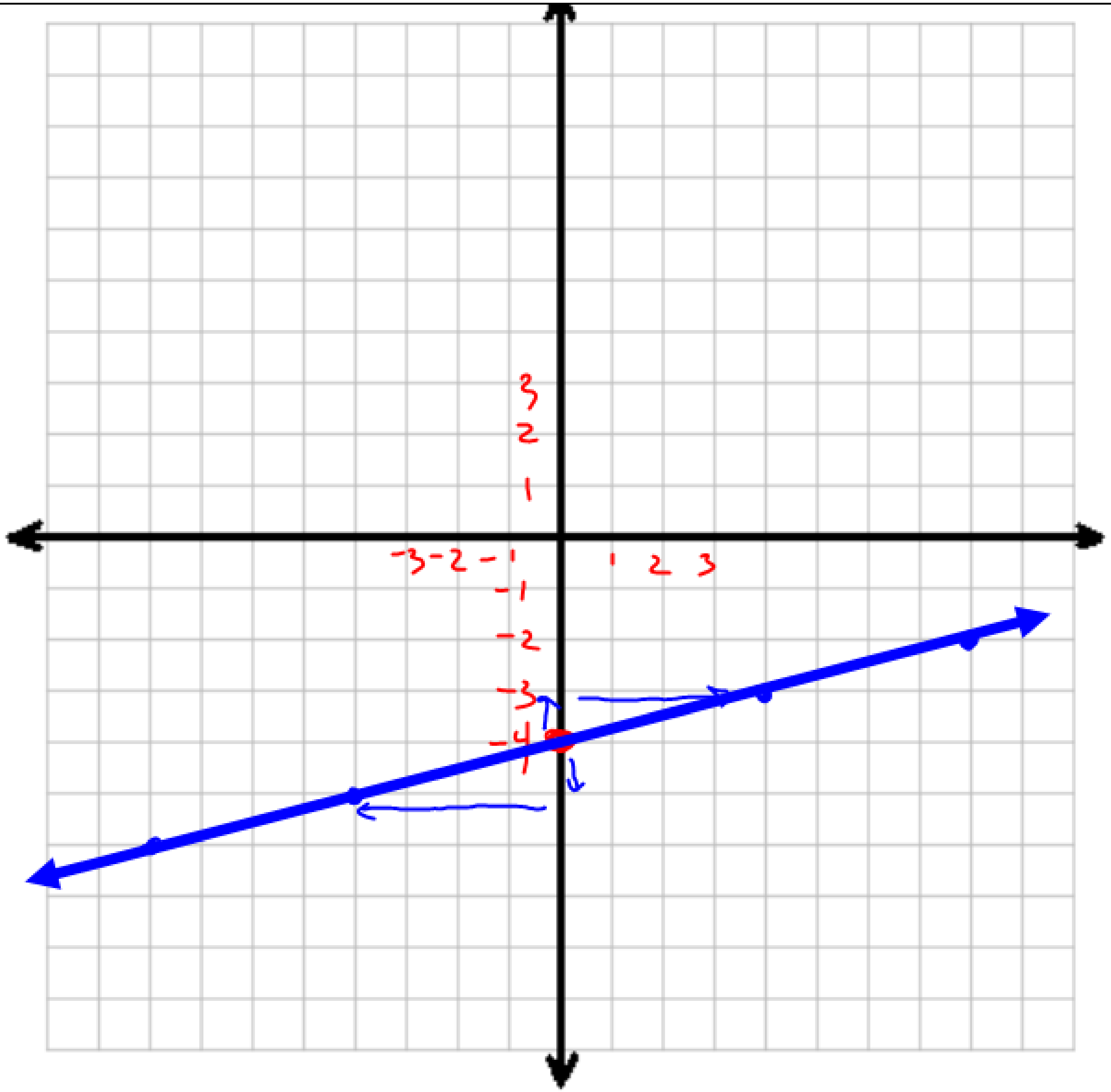
$$x - 4y = 16$$

$$-x \qquad\qquad -x$$

$$\frac{\cancel{-4}y}{\cancel{-4}} = \frac{-x}{-4} + \frac{16}{-4}$$

$$y = \boxed{\frac{1x}{4}} \overbrace{-4}^{\text{y-int}}$$

slope = $1/4$



Method 3:

Find the x and y intercepts.

Plot the x and y intercepts.

Draw your line.

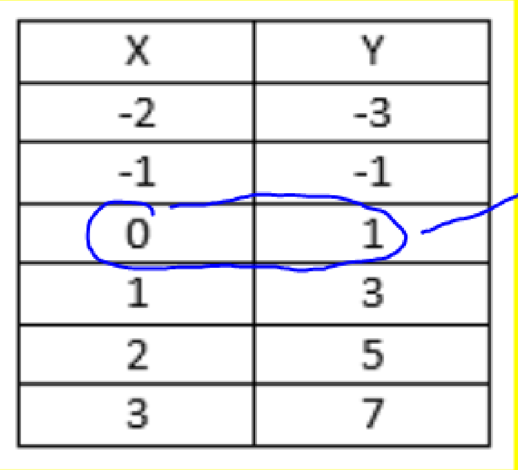
$y = 2x + 1$

$0 = 2x + 1$

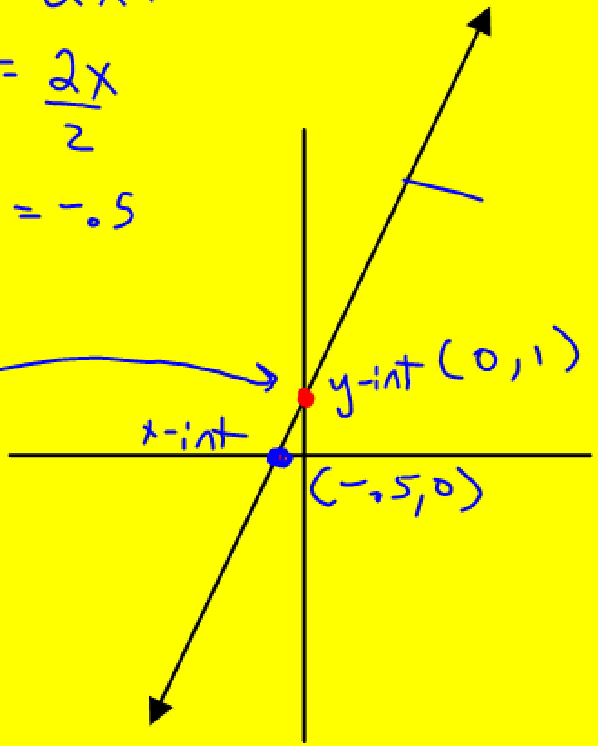
$\frac{-1}{2} = \frac{2x}{2}$

$x = -.5$

plug in 0 for y



X	Y
-2	-3
-1	-1
0	1
1	3
2	5
3	7



$y = 2x + 8$

y-int = 8

x-int

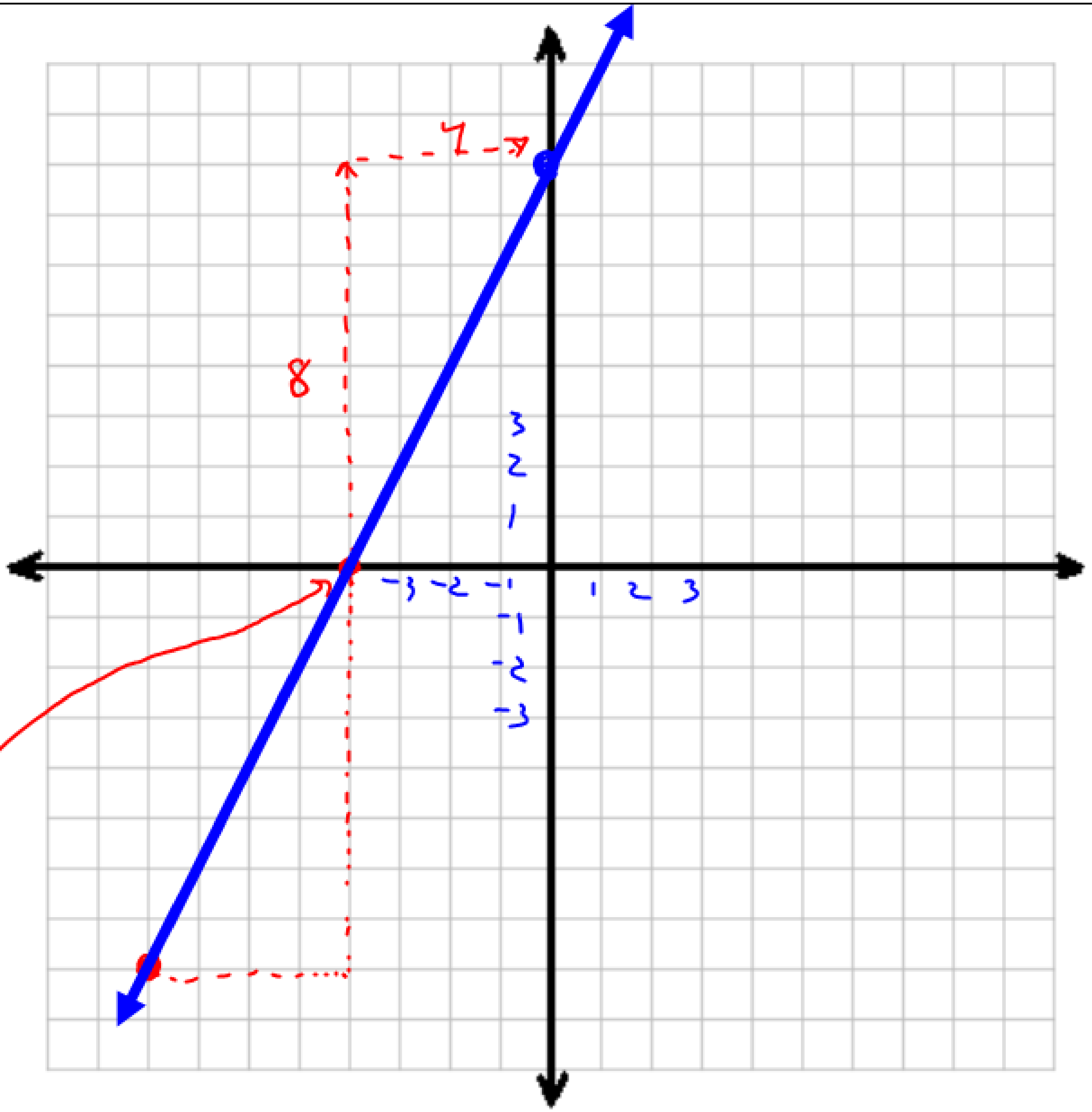
plug in 0 for y.

$0 = 2x + 8$

solve for x

$\frac{-8}{2} = \frac{2x}{2}$

$x = -4$



$5x - 6y = 30$

y-int
plug in 0 for x

$$\frac{-6y}{\cancel{-6}} = \frac{30}{-6}$$

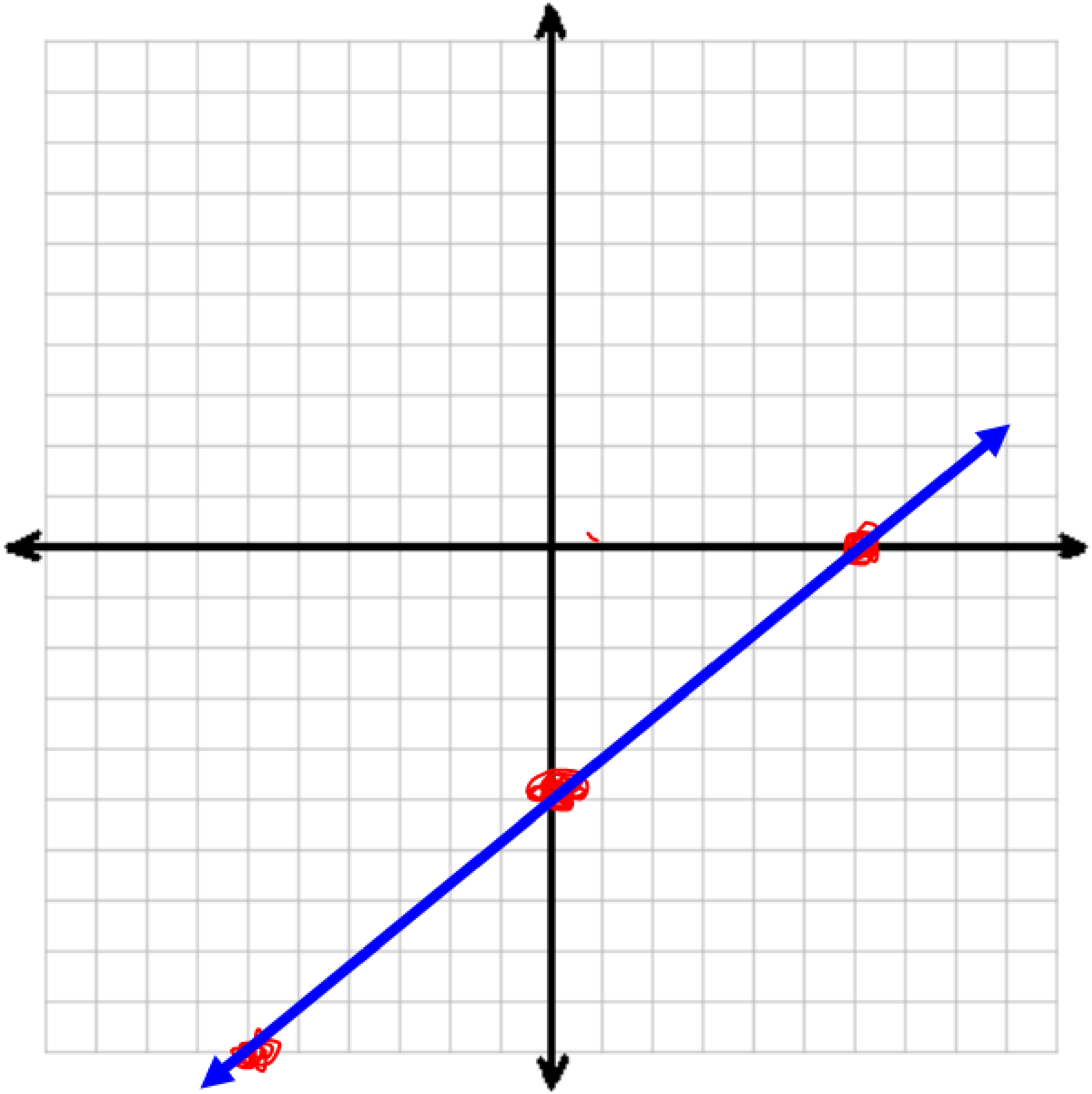
y-int: -5

x-int

$y = 0$

$5x = 30$

$\cancel{x} = 6$



Homework #5:

Graphing Two Variable Equations