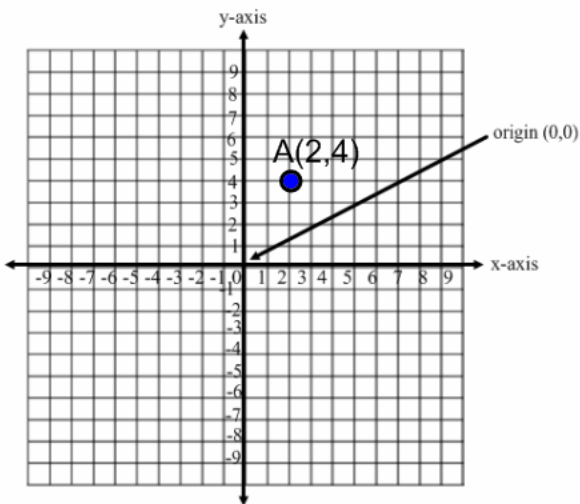


## Outcome 8B Review

CO#8B: Students will demonstrate understanding of linear relations through graphing a linear relation

Beginning	Approaching	Proficient	Mastery
I need help/I am inconsistent	I am consistently able to graph a linear relation given a table of values/ordered pairs.	I am consistently able to graph a linear relation given the equation.	I am able to perform error analysis. I can explain their graphing strategy. I am able to graph a linear relation given the context of the relation.

Before we begin, we should review how to graph points on a coordinate plane. The horizontal number line is called the x-axis. The vertical number line is called the y-axis. The two lines meet at a point called the origin.



Points are labeled using ordered pairs (5, 3), (4, 5) etc. The first number of the ordered pair is the x-coordinate. The second number of the ordered pair is the y-coordinate. To plot a point such as A(2, 4) on the grid, start at the origin, and move 2 units to the right and then 4 units up.

### Level 2

**Example 1: Graph the following table of values:**

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

Each of these can be considered as ordered pairs.

The ordered pairs would be: (-2, 1), (-1, -1), (0, -3), (1, -5), and (2, -7). Each point is plotted on the coordinate plane and then the points can be joined with a line if they form a linear relation.

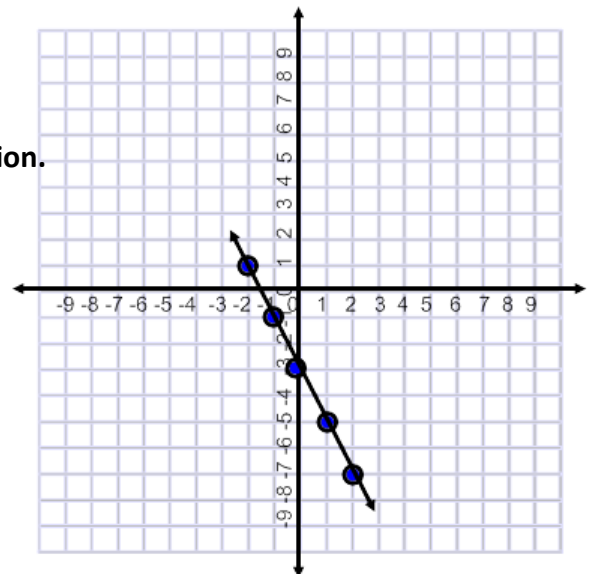
To plot (-2, 1), start at the origin, move 2 left and 1 up and place a point

To plot (-1, -1), start at the origin move 1 left and 1 down and place a point

To plot (0, -3), start at the origin, you don't move left or right, just go down 3 and place a point.

To plot (1, -5), start at the origin, move 1 right and 5 down and place a point

To plot (2, -7), start at the origin, move 2 right and 7 down and place a point

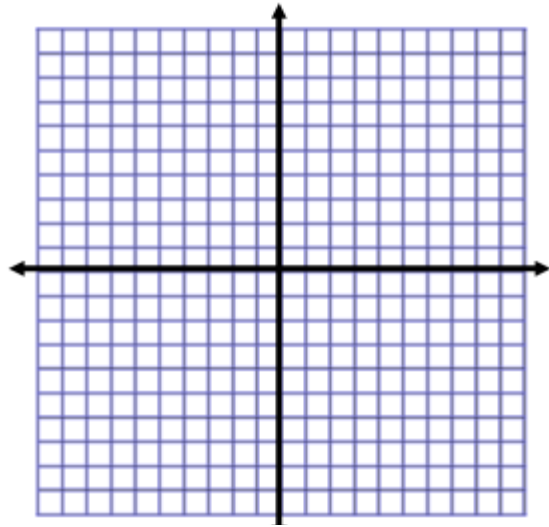


Practice 1

1. Graph the following table of values.

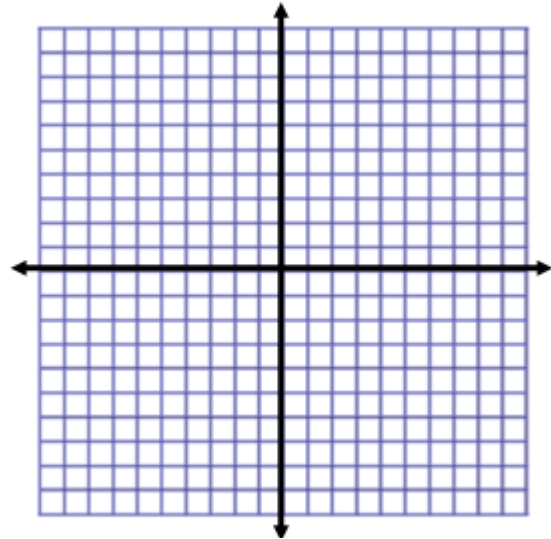
a)

X	Y
-5	8
-3	5
-1	2
1	-1
3	-4



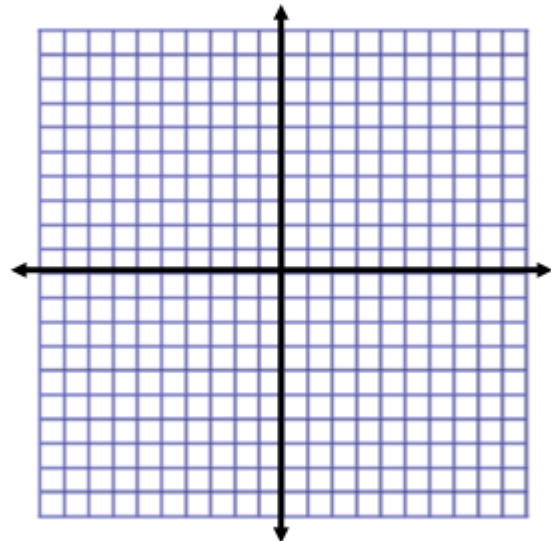
b)

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



c)

X	Y
0	9
1	5
2	1
3	-3
4	-7



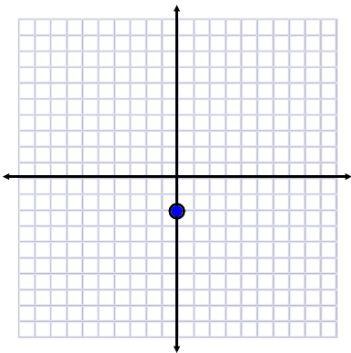
### Level 3

Example 2: Graph  $y = \frac{3}{4}x - 2$

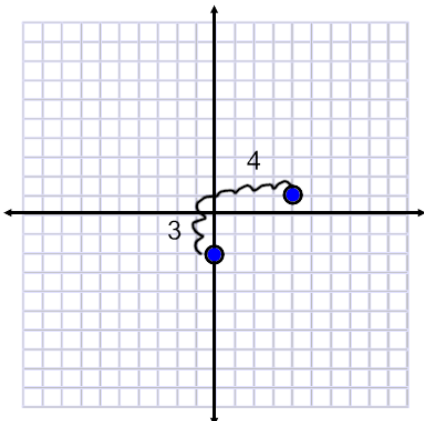
\*\*\*There is more than one strategy to do this. If you know an alternate correct strategy, feel free to use it. The strategy that will be shown here is to graph using slope and y-intercept.

The equation is in the form  $y = mx + b$ , so we know the slope ( $m$ ) and we know the y-intercept ( $b$ ). The slope is  $\frac{3}{4}$  and the y-intercept is  $-2$ . We can use these values to graph the linear relation.

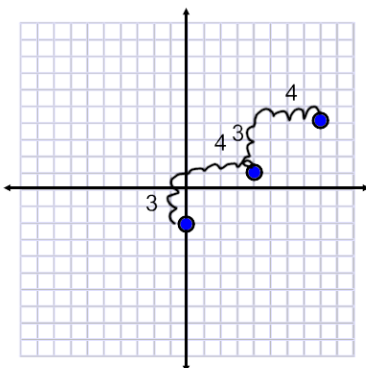
Step 1: Plot the y-intercept. (Go down 2 from the origin)



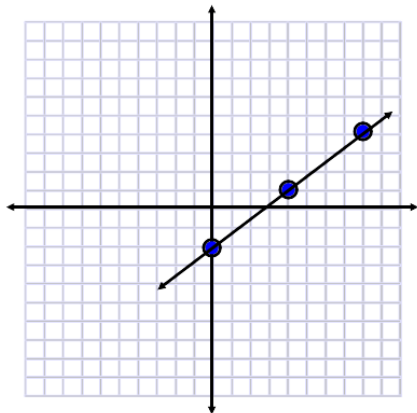
Step 2: Use your slope which gives you  $\frac{\text{rise}}{\text{run}}$ . The rise is 3 and the run is 4. That means that FROM YOUR Y-INTERCEPT  $(-2)$ , count up 3 (rise is positive so you go up) and move right 4 (run is positive so you move right). Here is where you will put the next point.



Step 3: You can either join these points or you can continue the process to find another point and then join.



Finished product should look like this:



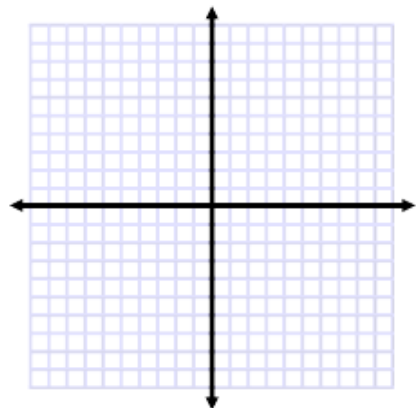
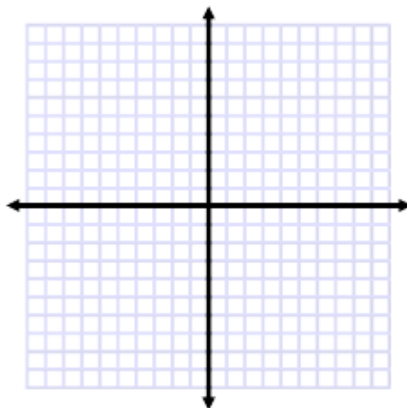
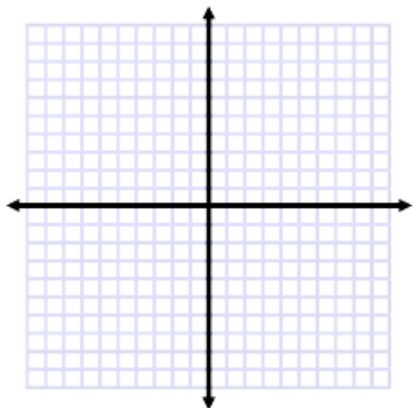
Practice #2

Graph the following linear relations

a)  $y = \frac{1}{3}x - 4$

b)  $y = \frac{3}{5}x - 8$

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



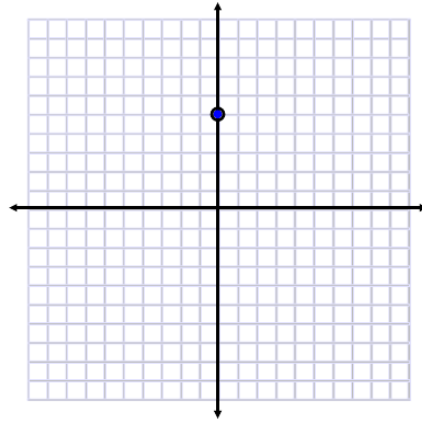
**Example 3**

Graph  $y = -\frac{2}{3}x + 5$

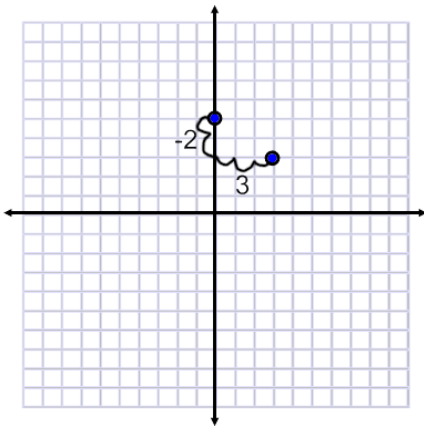
\*\*\*There is more than one strategy to do this. If you know an alternate correct strategy, feel free to use it. The strategy that will be shown here is to graph using slope and y-intercept.

The equation is in the form  $y = mx + b$ , so we know the slope ( $m$ ) and we know the y-intercept ( $b$ ). The slope is  $-\frac{2}{3}$  and the y-intercept is +5. We can use these values to graph the linear relation.

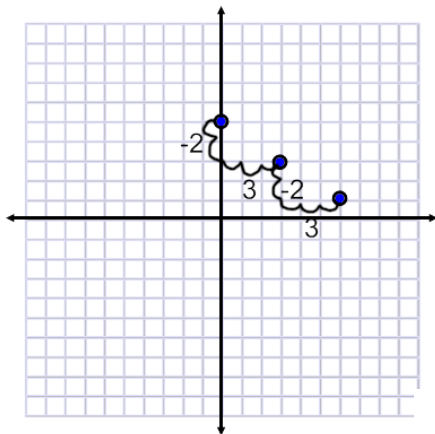
Step 1: Plot the y-intercept. (Go up 5 from the origin)



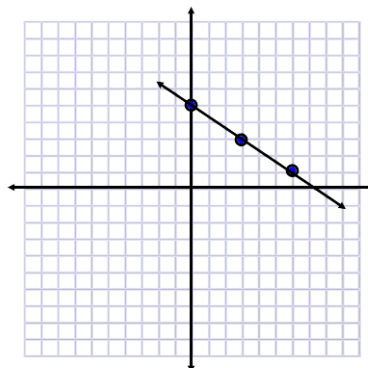
Step 2: Use your slope which gives you  $\frac{\text{rise}}{\text{run}}$ . The rise is -2 and the run is 3. That means that FROM YOUR Y-INTERCEPT (+5), count down 2 (rise is negative so you go down) and move right 3 (run is positive so you move right). Here is where you will put the next point.



Step 3: You can either join these points or you can continue the process to find another point and then join.



The finished product should look like:



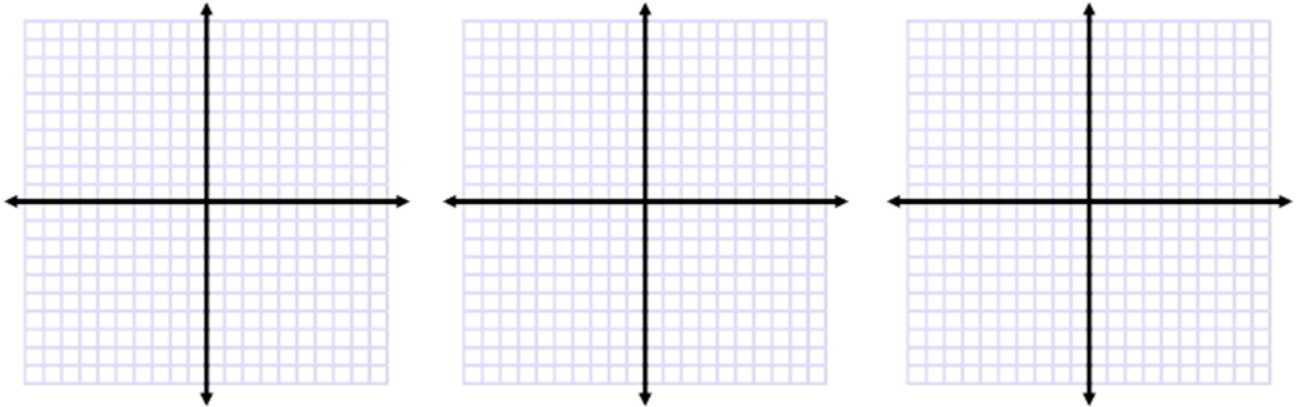
Practice #3

Graph the following linear relations

a)  $y = -\frac{3}{5}x + 7$

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

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



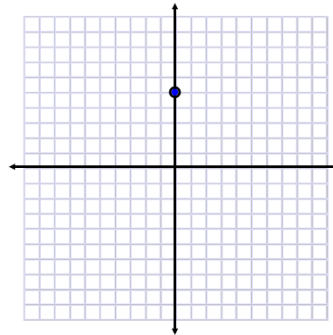
**Example 4**

Graph  $y = -2x + 5$

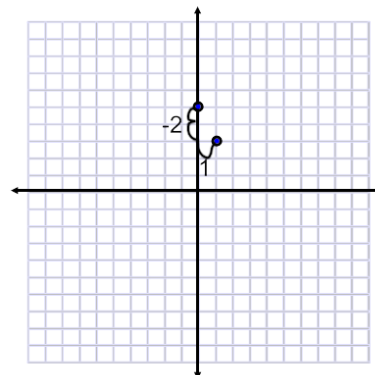
\*\*\*There is more than one strategy to do this. If you know an alternate correct strategy, feel free to use it. The strategy that will be shown here is to graph using slope and y-intercept.

The equation is in the form  $y = mx + b$ , so we know the slope ( $m$ ) and we know the y-intercept ( $b$ ). The slope is  $-2$  and the y-intercept is  $+5$ . We can use these values to graph the linear relation.

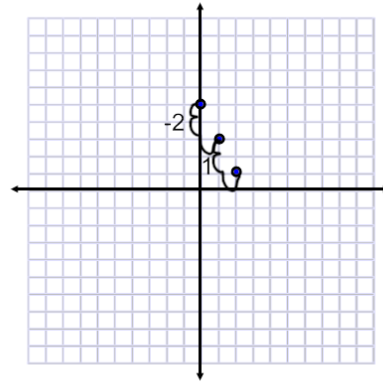
Step 1: Plot the y-intercept. (Go up 5 from the origin)



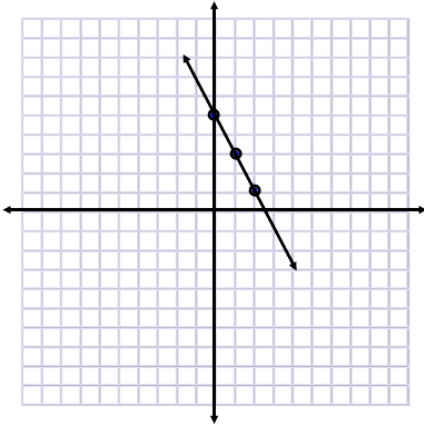
Step 2: Use your slope which gives you  $\frac{\text{rise}}{\text{run}}$ . The rise is  $-2$  and the run is  $1$ . (A slope of  $-2$  is the same as  $\frac{-2}{1}$ ) That means that FROM YOUR Y-INTERCEPT ( $+5$ ), count down  $2$  (rise is negative so you go down) and move right  $1$  (run is positive so you move right). Here is where you will put the next point.



Step 3: You can either join these points or you can continue the process to find another point and then join.



The finished product should look like this:



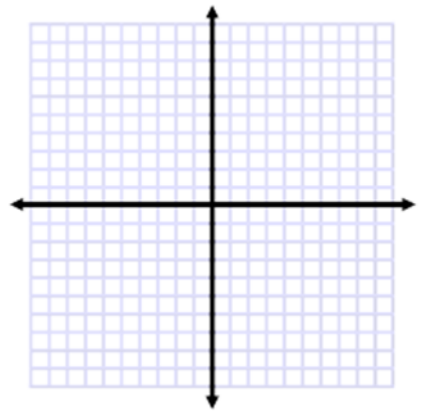
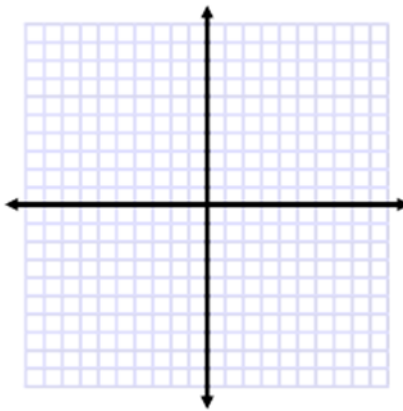
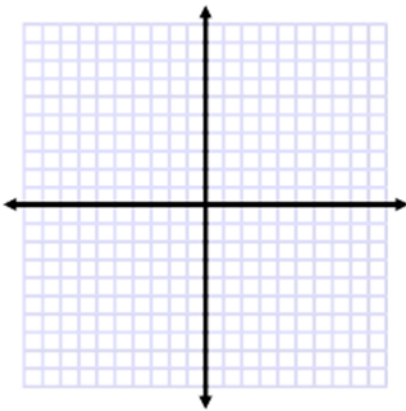
#### Practice #4

Graph the following linear relations

a)  $y = -3x + 4$

b)  $y = -x + 5$

c)  $y = 4x - 6$

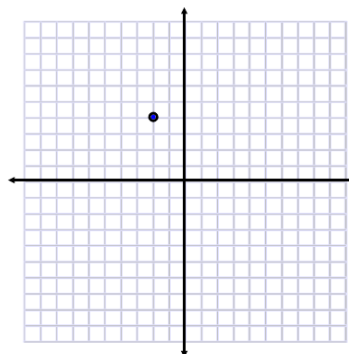


Example: Graph  $y - 4 = -3(x + 2)$

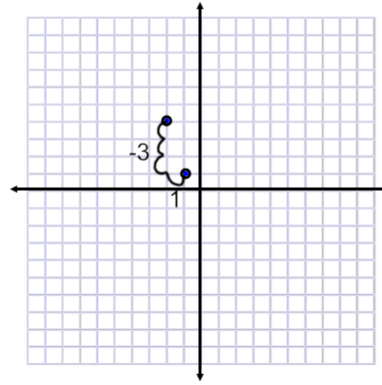
\*\*\*There is more than one strategy to do this. If you know an alternate correct strategy, feel free to use it. The strategy that will be shown here is to graph using point and slope.

Step 1: This equation is in point slope form so from the equation you know the slope and the point. Point slope form is  $y - y_1 = m(x - x_1)$  where  $m$  is the slope and  $(x_1, y_1)$  is a point on the line. So the slope of this question is  $-3$  and the point is  $(-2, 4)$ .

We begin by putting a dot on the graph at  $(-2, 4)$ .

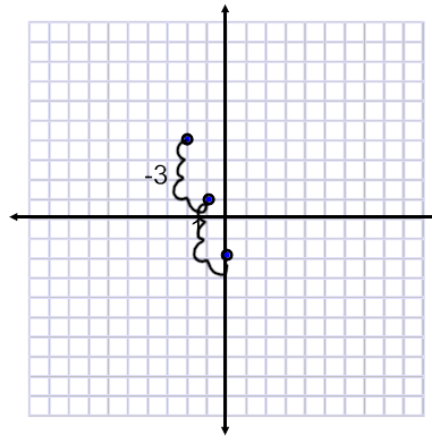
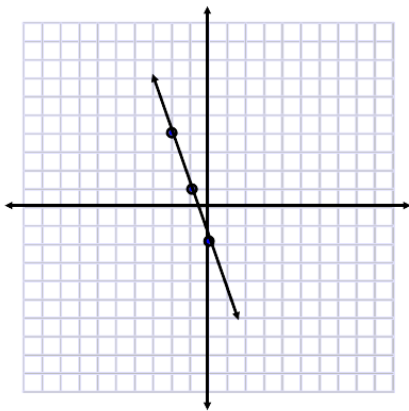


**Step 2:** Use your slope which gives you  $\frac{\text{rise}}{\text{run}}$ . The rise is -3 and the run is 1. (A slope of -3 is the same as  $-\frac{3}{1}$ ) That means that FROM YOUR POINT (-2, 4), count down 3 (rise is negative so you go down) and move right 1 (run is positive so you move right). Here is where you will put the next point.



**Step 3:** You can either join these points or you can continue the process to find another point and then join.

Your finished product should look like this:



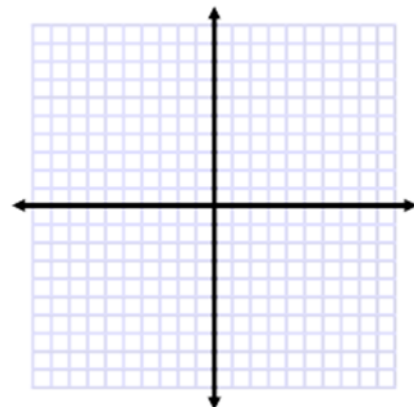
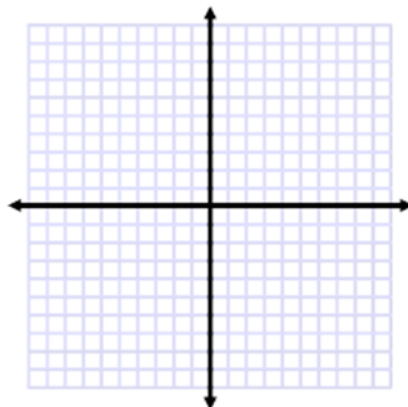
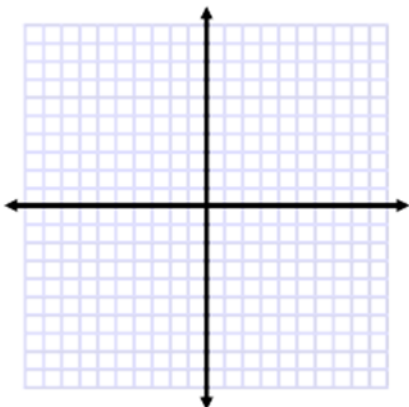
Practice #5

Graph the following linear relations

a)  $y + 5 = 4(x + 2)$

b)  $y - 1 = 2(x - 2)$

c)  $y - 3 = -3(x + 2)$





### Example

Graph  $5x + 2y - 8 = 0$

\*\*\*There is more than one strategy to do this. If you know an alternate correct strategy, feel free to use it. The strategy that will be shown here is to graph using slope and y-intercept.

The equation needs to be put in the form  $y = mx + b$ , so we can determine the slope ( $m$ ) and the y-intercept ( $b$ ).

Step 1: Rewrite the equation (isolate  $y$ )

$$5x + 2y - 8 = 0 \quad (\text{add } 8 \text{ to both sides})$$

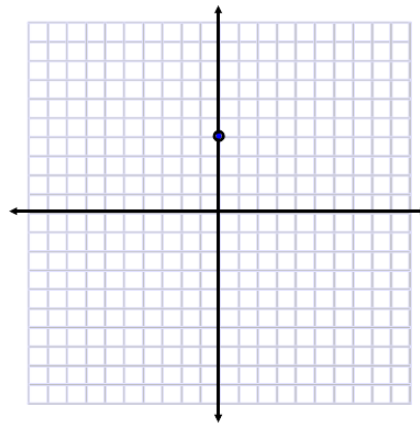
$$5x + 2y = 8 \quad (\text{subtract } 5x \text{ from both sides})$$

$$2y = -5x + 8 \quad (\text{divide ALL terms by } 2)$$

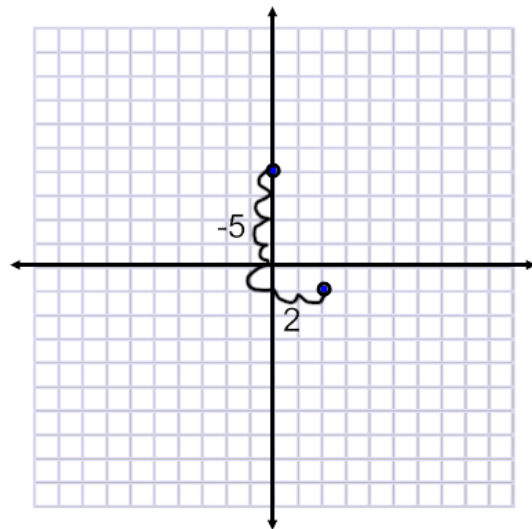
$$y = -\frac{5}{2}x + 4 \quad \text{The equation is now in } y = mx + b \text{ form}$$

The slope is  $-\frac{5}{2}$  and the y-intercept is 4

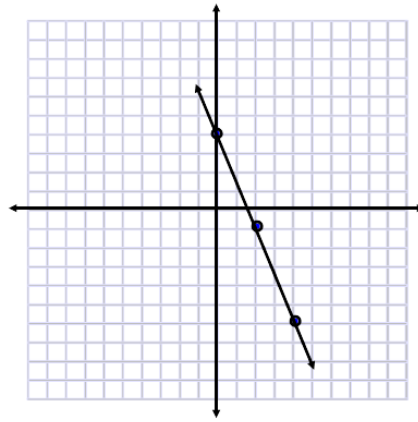
Step 2: Plot the y-intercept. (Go up 4 from the origin)



Step 3: Use your slope which gives you  $\frac{\text{rise}}{\text{run}}$ . The rise is -5 and the run is 2. That means that FROM YOUR Y-INTERCEPT (+4), count down 5 (rise is negative so you go down) and move right 2 (run is positive so you move right). Here is where you will put the next point.



Step 4: Continue again and join the points.



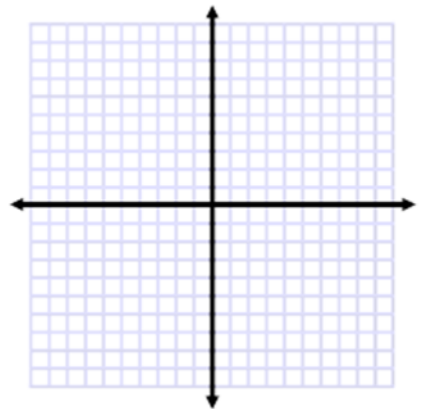
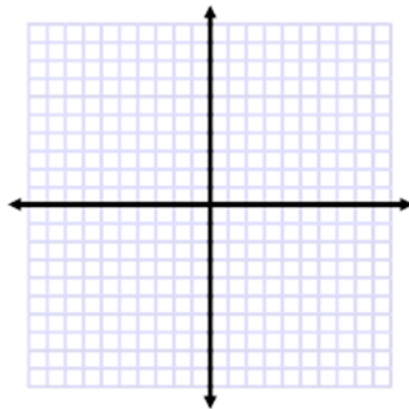
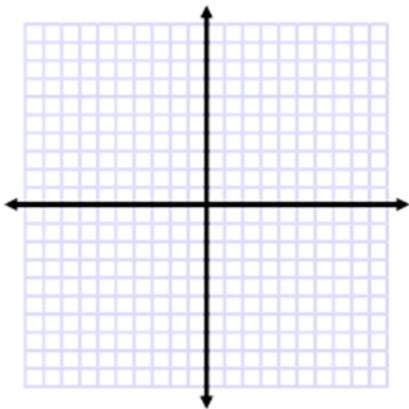
Practice 6

Graph the following linear relations

a)  $4x + 3y - 9 = 0$

b)  $-3x + 2y - 6 = 0$

c)  $4x + y - 2 = 0$



d)  $-4x + 2y - 6 = 0$

e)  $x + 4y - 12 = 0$

f)  $3x + 5y + 10 = 0$

