PRINCIPLES - LESSON 7B
THE SLOPE-INTERCEPT FORM

Recall: Slope is a measure of steepness.

$$\text{SLOPE} = \frac{\text{rise}}{\text{run}}$$

$$m = \frac{y_2 - y_1}{x_2 - x_1}$$

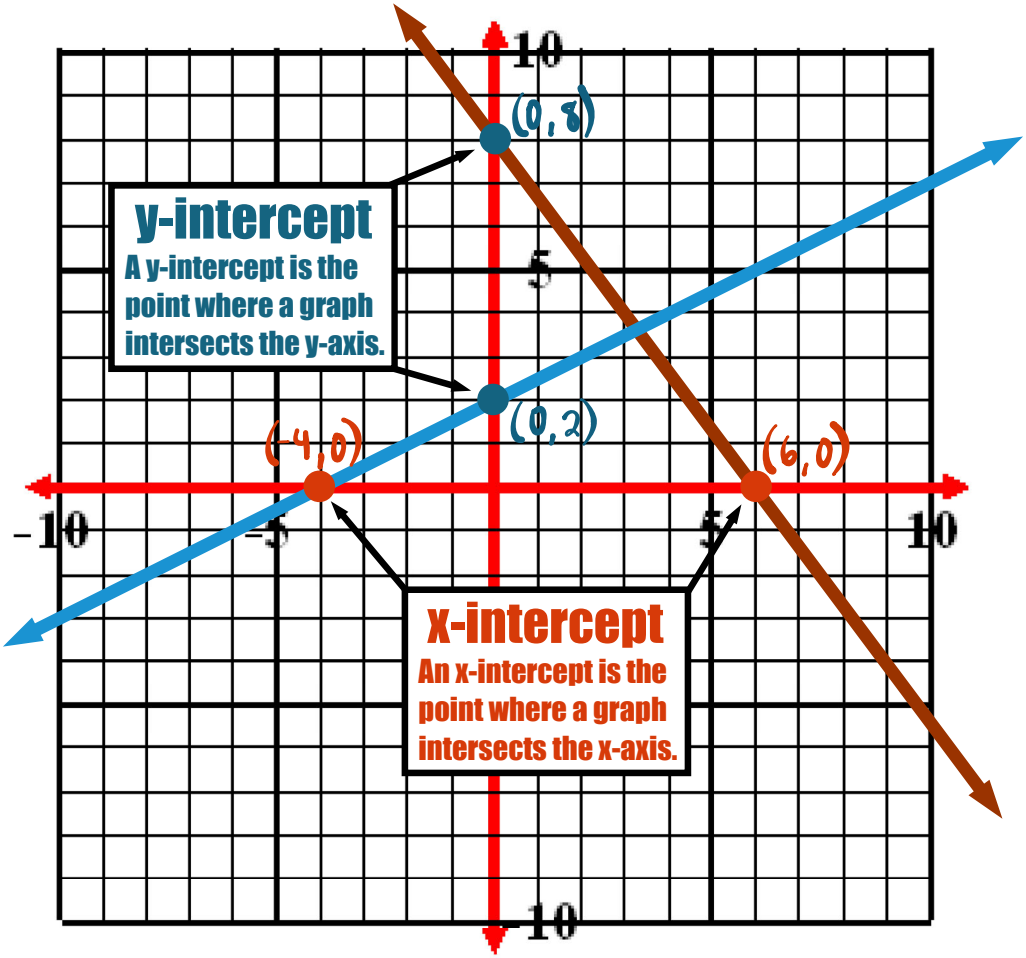
Positive Slope: 

Zero Slope: 

Negative Slope: 

Undefined Slope: 

FINDING INTERCEPTS



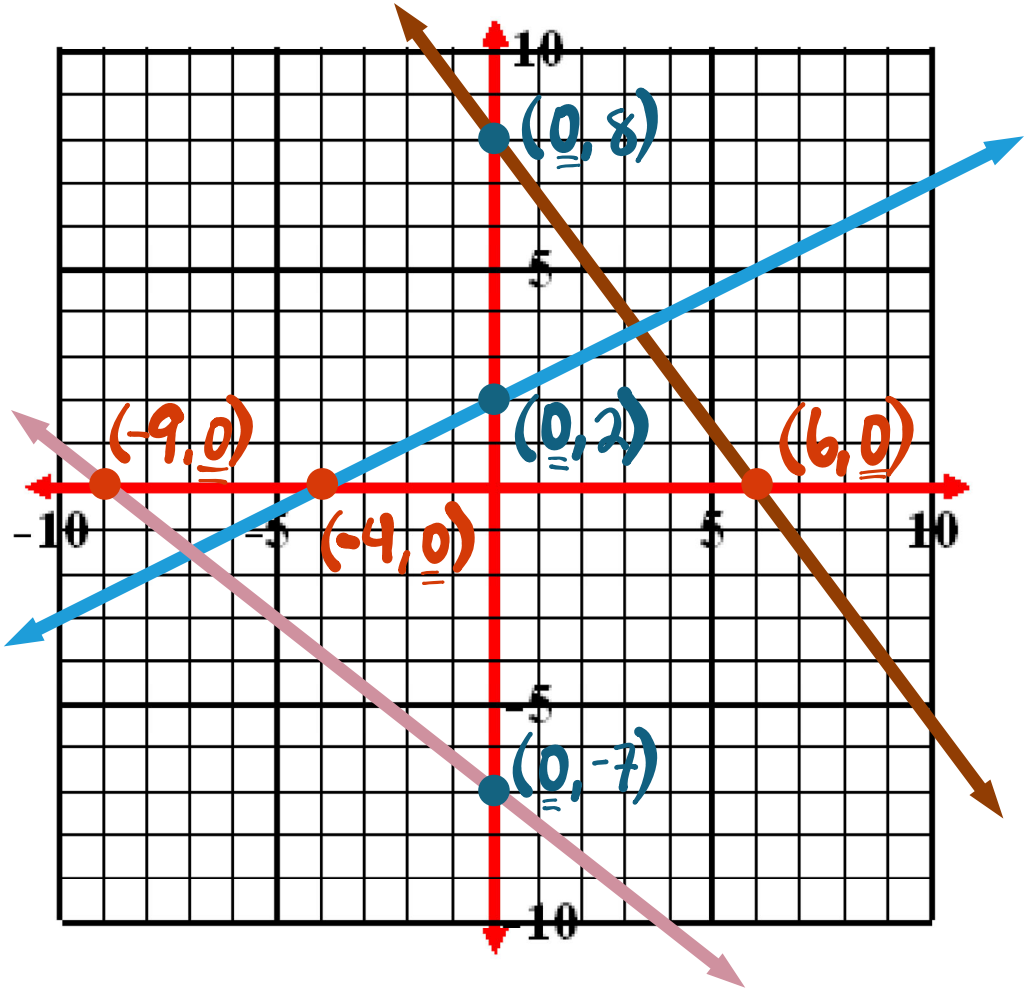
x-int: (-4,0)

y-int: (0,2)

x-int: (6,0)

y-int: (0,8)

INTERCEPTS



What do all x-intercepts have in common?

All x-intercepts have a y-coordinate of ZERO.

What do all y-intercepts have in common?

All y-intercepts have a x-coordinate of ZERO.

EXPLORATION

Make a table and graph each equation. Find the slope and y-intercept.

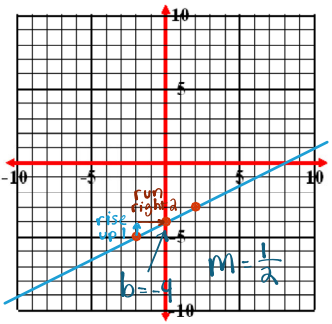
ex1) $y = \frac{1}{2}x - 4$ (m, b)

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

x	y
0	-4
2	-3
-2	-5

slope = $\frac{\text{rise}}{\text{run}}$

Choose 2 points on the line and determine the rise and run between them.



(y-intercept) b = -4

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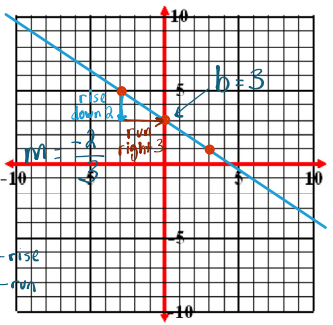
ex2) $y = -\frac{2}{3}x + 3$ (m, b)

$m = -\frac{2}{3}$

x	y
0	3
3	1
-3	5

Alternatively, we could choose any 2 points from the table and use the slope formula to calculate slope of the line.

(It's still just $\frac{\text{rise}}{\text{run}}$) $m = \frac{y_2 - y_1}{x_2 - x_1}$ ← rise / run



(y-intercept) b = 3

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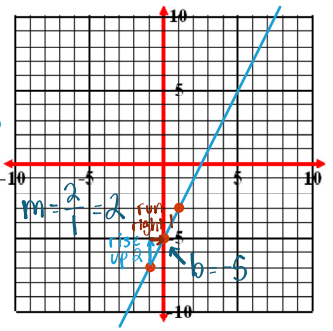
ex3) $y = 2x - 5$ (m, b)

$m = 2$

x	y
0	-5
1	-3
-1	-7

Do we notice anything when looking at an equation along with its slope and y-intercept?



(y-intercept) b = -5

THE SLOPE-INTERCEPT FORM OF A LINEAR EQUATION

When a linear equation is solved for y, the equation is written in slope-intercept form.

The Slope-Intercept Form

$$y = mx + b$$

slope — y-intercept

THE SLOPE-INTERCEPT FORM OF A LINEAR EQUATION

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

ex4) $y = -\frac{3}{4}x + 2$

$y = mx + b$

$m = -\frac{3}{4}$ $b = 2$

ex5) $y = 5x - 4$

$y = mx + b$

$m = 5$ $b = -4$

ex6) $y = 1x - \frac{1}{2}$

$y = mx + b$

$m = 1$ $b = -\frac{1}{2}$

ex7) $y = -4x + 0$

$y = mx + b$

$m = -4$ $b = 0$

THE SLOPE-INTERCEPT FORM OF A LINEAR EQUATION

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

ex8) $5y = -2x + 10$

$$\frac{5y}{5} = \frac{-2x}{5} + \frac{10}{5}$$

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

$$y = mx + b$$

$m = -\frac{2}{5}$ $\quad b = 2$

ex9) $8x - 2y = 14$

$$-8x \quad -8x$$

$$\frac{-2y}{-2} = \frac{-8x}{-2} + \frac{14}{-2}$$

$$y = 4x - 7$$

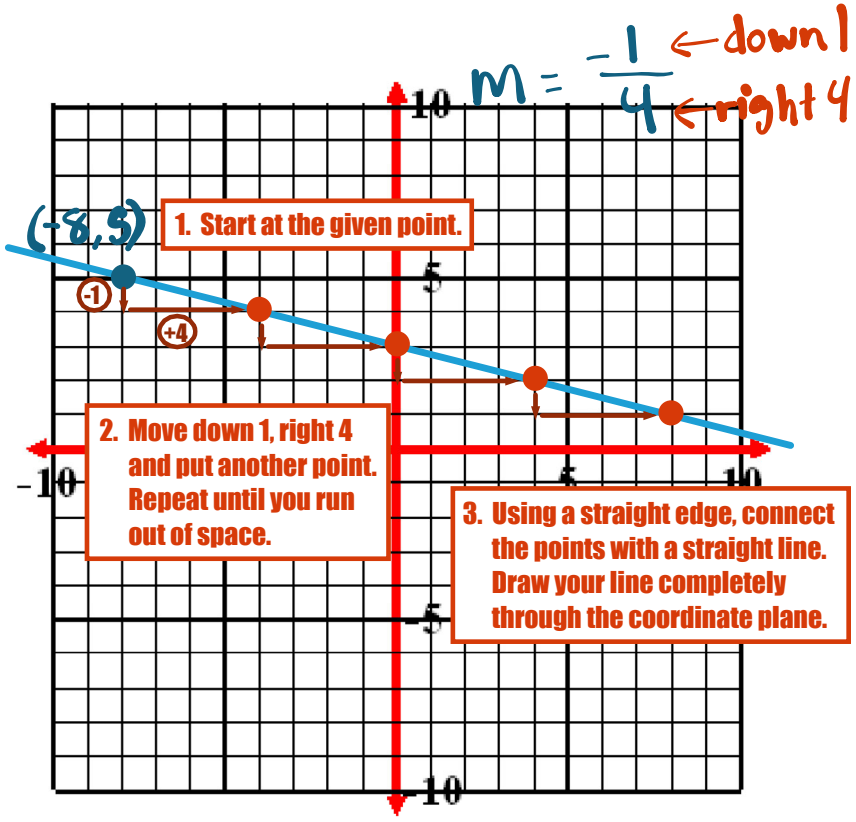
$$y = mx + b$$

$m = 4$ $\quad b = -7$

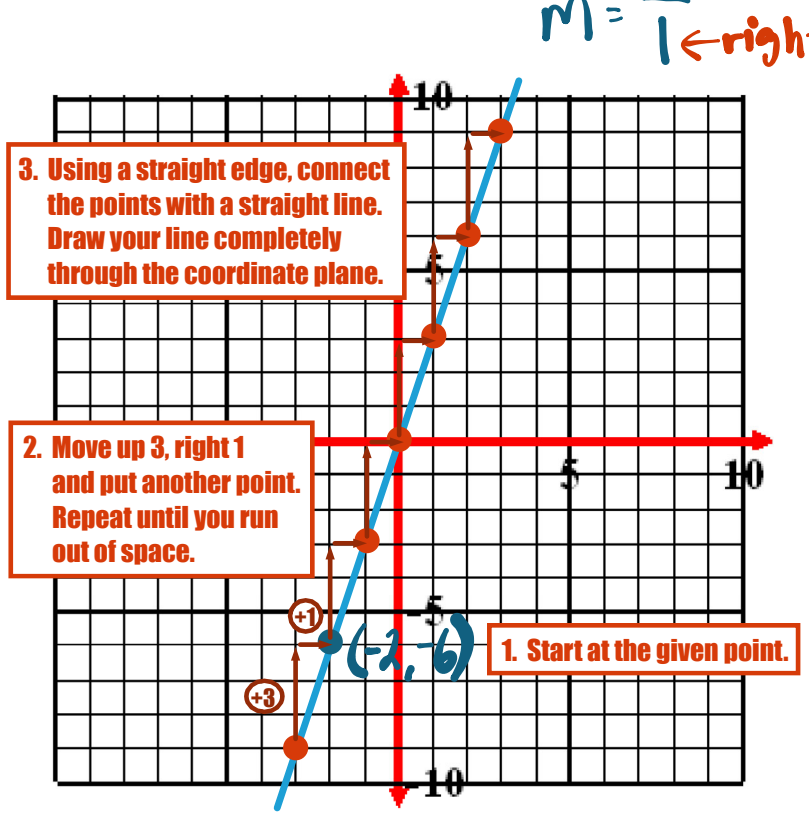
Neither of these equations are in slope-intercept form. If we want to see the slope and y-intercept in each equation, we will have to convert to slope-intercept form by SOLVING FOR Y.

THE SLOPE-INTERCEPT FORM OF A LINEAR EQUATION

ex10) Graph the line that has a slope of -1/4 and passes through (-8, 5).



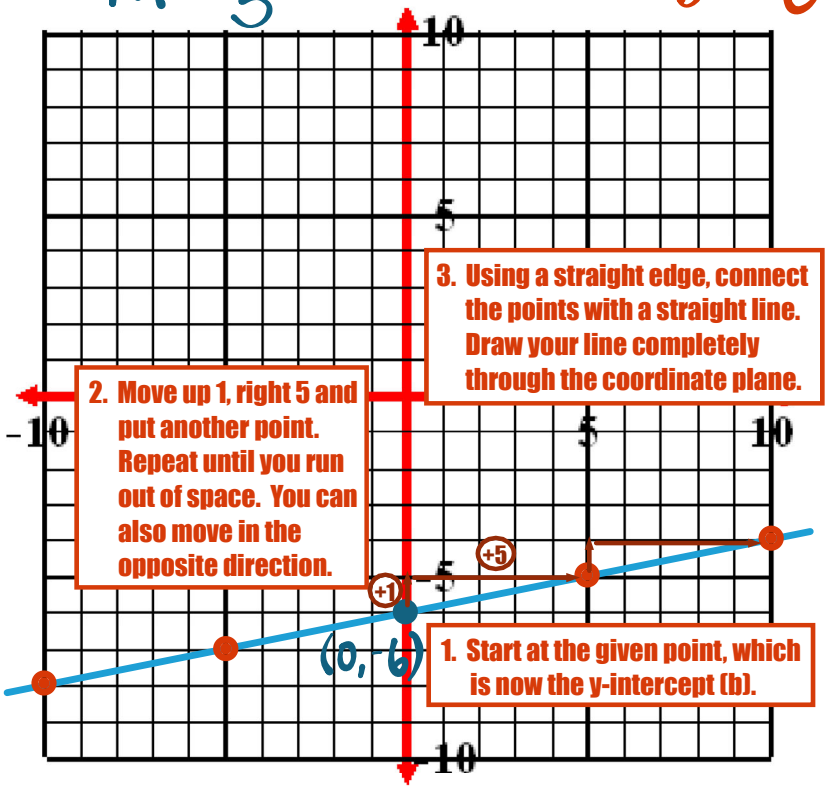
ex11) Graph the line that has a slope of 3 and passes through (-2, -6).



THE SLOPE-INTERCEPT FORM OF A LINEAR EQUATION

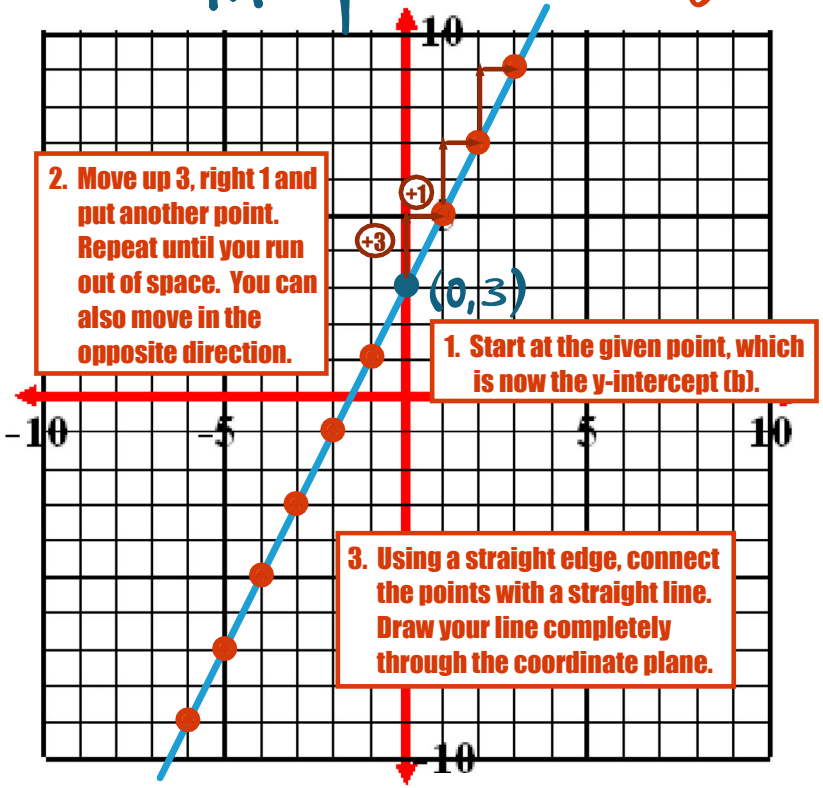
ex12) Graph: $y = \frac{1}{5}x - 6$

$m = \frac{1}{5}$ $b = -6$



ex13) Graph: $y = 2x + 3$

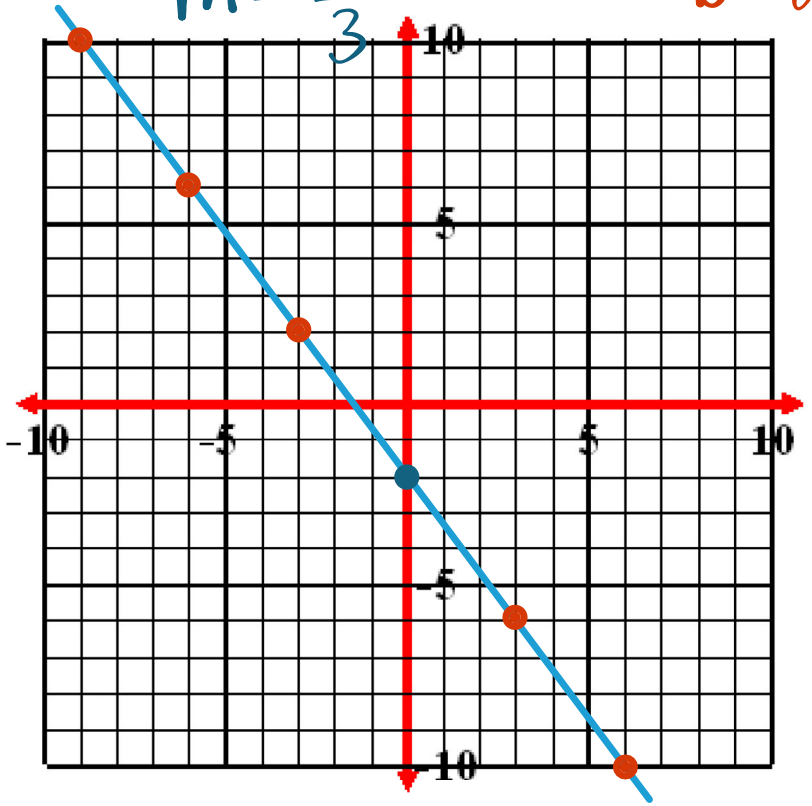
$m = \frac{2}{1}$ $b = 3$



THE SLOPE-INTERCEPT FORM OF A LINEAR EQUATION

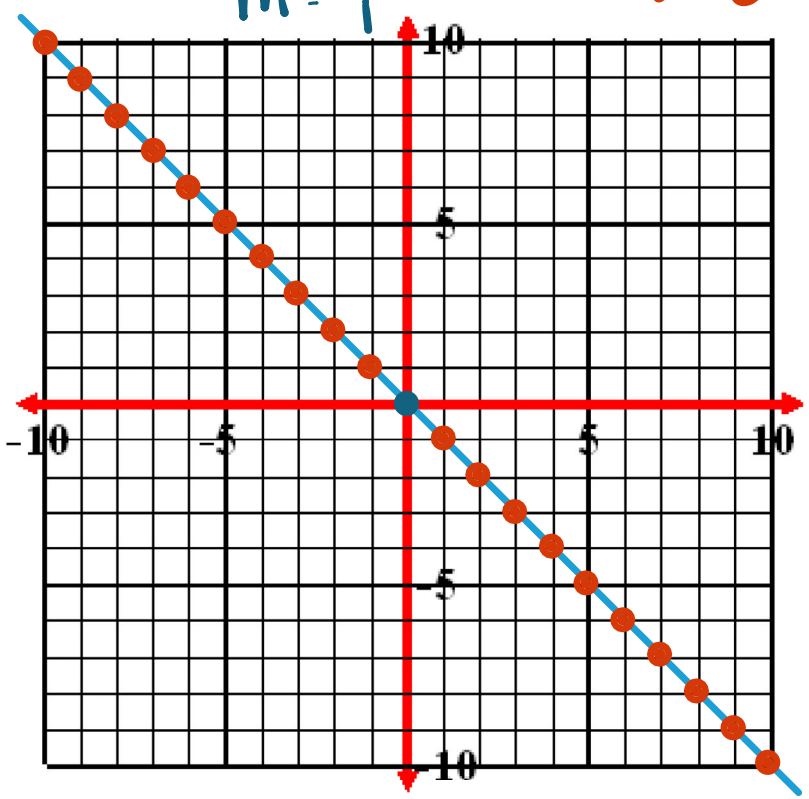
ex14) Graph: $y = -\frac{4}{3}x - 2$

$m = -\frac{4}{3}$ $\quad b = -2$



ex15) Graph: $y = -1x + 0$

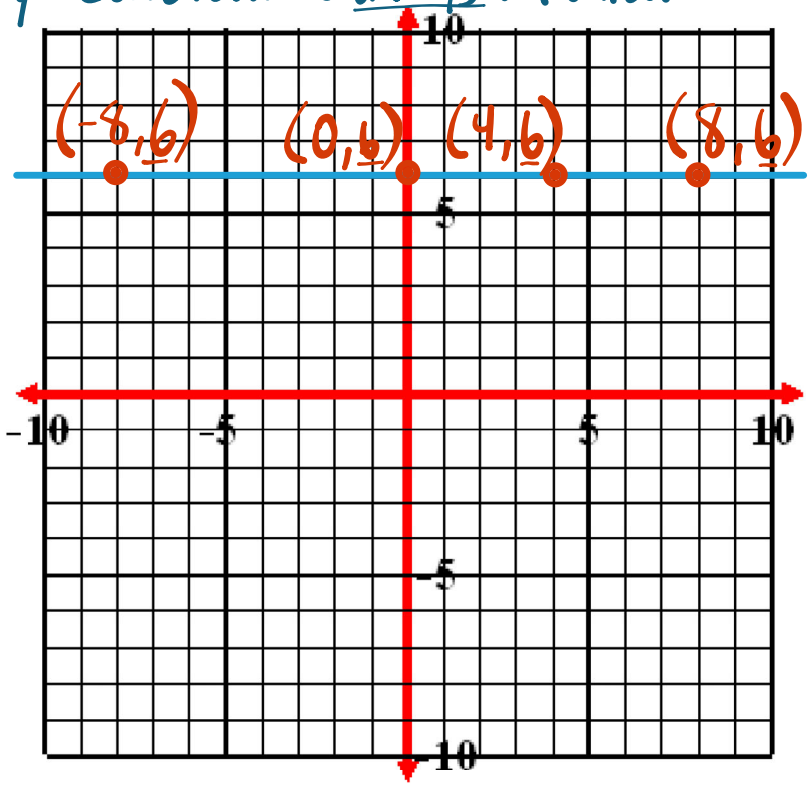
$m = \frac{-1}{1}$ $\quad b = 0$



THE SLOPE-INTERCEPT FORM OF A LINEAR EQUATION

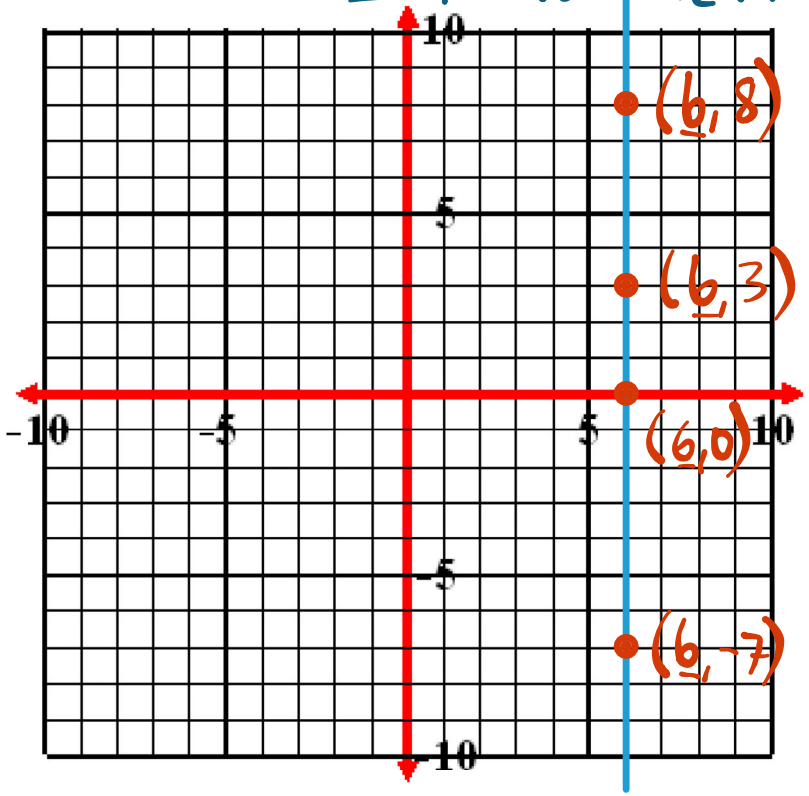
ex16) Graph: $y = 6$ (All points on this line have y-coordinate 6)

y = constant is always a HORIZONTAL line.



ex17) Graph: $x = 6$ (All points on this line have x-coordinate 6)

x = constant is always a VERTICAL line.



THE SLOPE-INTERCEPT FORM OF A LINEAR EQUATION

ex18) Graph: $6y - 5x = -6$

Convert to slope-intercept form by solving for y!

$+5x \quad +5x$

$$\frac{6y}{6} = \frac{5x}{6} - \frac{6}{6}$$

$$y = \frac{5}{6}x - 1$$

$m = \frac{5}{6}$ $\quad b = -1$