2.3 Linear Equations and Slope – Intercept Form

Learning Targets for today

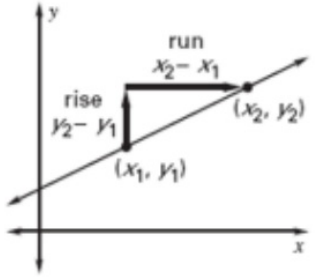
- To be able to graph a linear equation.
- To be able to find the slope of a line. (m)
- To be able to write an equations of lines.
- To be able to graph an equation in slope-intercept form.

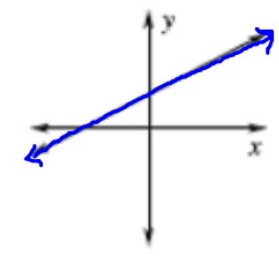
$y = mx + b$ (Slope: m; y-intercept: b)

Slope – Basic Information You Need to Know!

Calculating Slope	Classifying Slope
When you have two points (x_1, y_1) and (x_2, y_2)…	

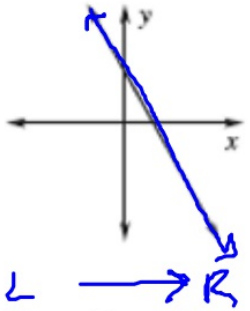
$$m = \frac{y_2 - y_1}{x_2 - x_1} = \frac{\text{rise}}{\text{run}}$$





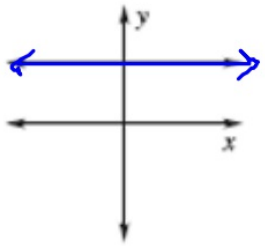
Positive slope
Rises from left to right

$m = +$



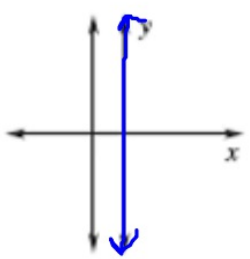
Negative slope
Falls from left to right

$m = -$



Zero slope
Horizontal

$m = 0$



Undefined slope
Vertical

$m = ?$

Calculating Slope

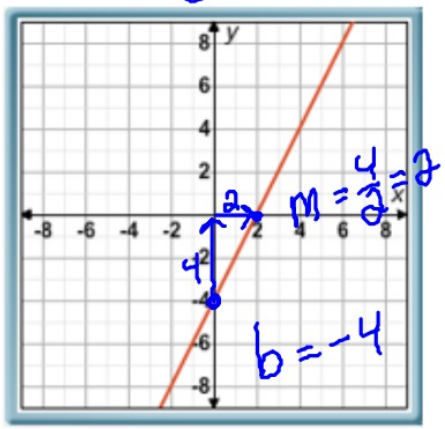
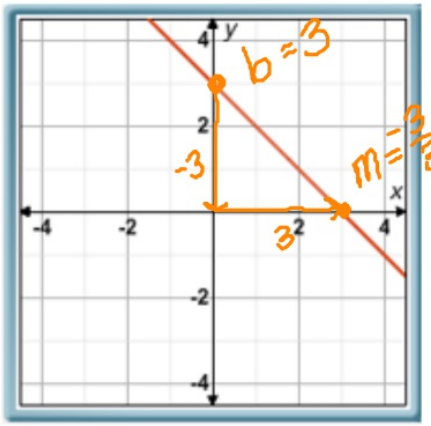
Example for you...	Your turn to try...
Find the slope of the line of the given points and identify the type of line that passes through them. $x_1\ y_1$ $x_2\ y_2$ $m = \frac{y_2 - y_1}{x_2 - x_1}$ 1. (1, 3) and (6, 7) $m = \frac{7-3}{6-1} = \boxed{\frac{4}{5}}$ POSITIVE SLOPE ★ GOING UP FROM L→R	Find the slope of the line of the given points and identify the type of line that passes through them. $x_1\ y_1$ $x_2\ y_2$ 1. (2, –1) and (2, 2) $m = \frac{2--1}{2-2} = \frac{3}{0}$ = undefined VERTICAL LINE

Vocabulary

Slope – Intercept Form – $y = mx + b$ where m is the slope and b is the y – intercept.

Ex: $y = 3x + 2$ $m = \frac{3}{1}$ $b = 2$

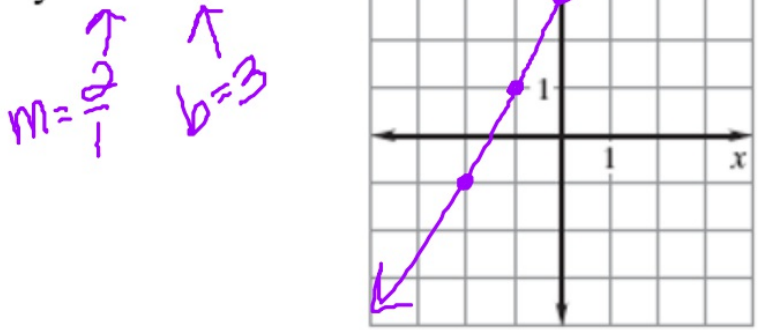
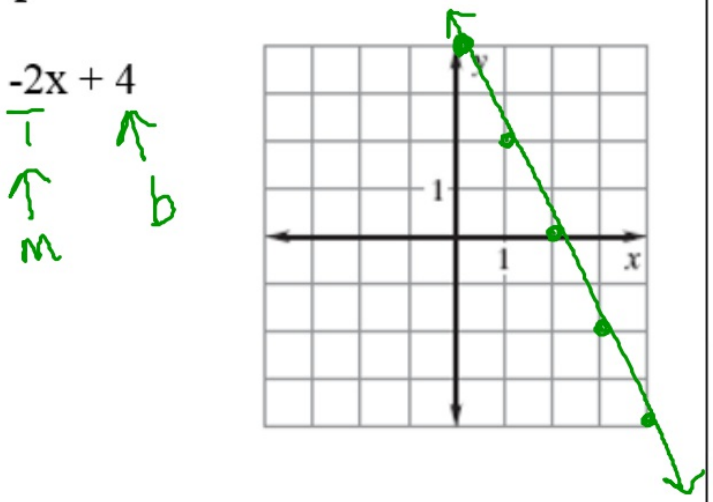
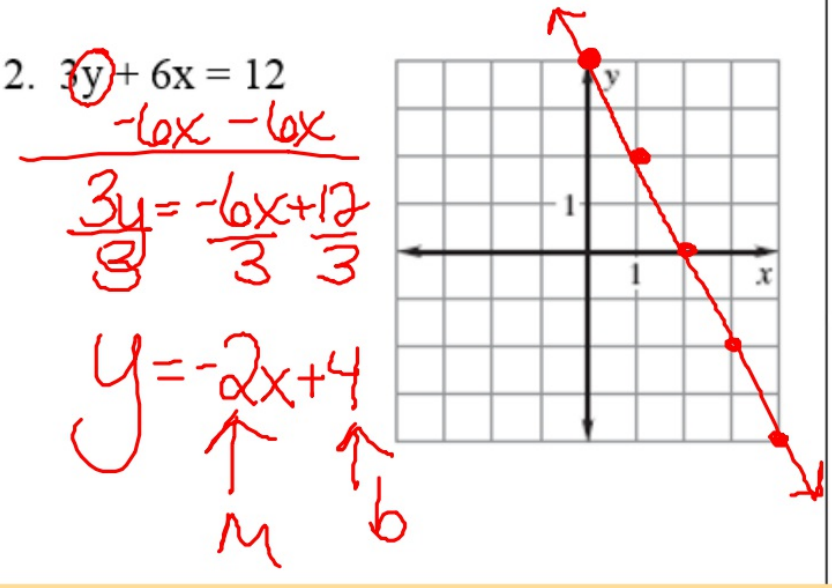
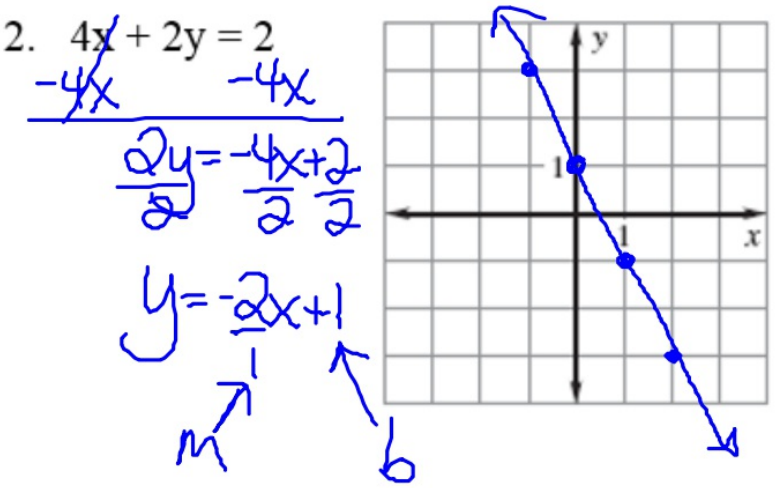
Writing an equation given the slope and y – intercept.

Example for you.	**Your turn to try….**
Write an equation of the line. $y=mx+b$	Write an equation of the line.
1.  $y=mx+b$ $y=2x-4$	1. $y=-x+3$ 
2. m = 4 and the y – intercept is (0,-3). $y=4x-3$	2. m = -9 and the y – intercept is (0,5). $y=-9x+5$

Writing Equation in Slope – Intercept Form

Example for you...	Your turn to try...
Write the equation in slope-intercept form and then state the slope and y-intercept.	Write the equation in slope-intercept form and then state the slope and y-intercept.
1. $3x + y = 9$ $-3x \quad -3x$ $y = -3x + 9$ $m = \frac{-3}{1}$ $b = 9$	1. $6x + y = -10$ $-6x \quad -6x$ $y = -6x - 10$ $m = \frac{-6}{1}$ $b = -10$
2. $7x + 14y = 28$ $-7x \quad -7x$ $\frac{14y}{14} = \frac{-7x}{14} + \frac{28}{14}$ $y = \frac{-1}{2}x + 2$ $m = \frac{-1}{2}$ $b = 2$	2. $6x - 3y = 18$ $-6x \quad -6x$ $\frac{-3y}{-3} = \frac{-6x}{3} + \frac{18}{3}$ $y = 2x - 6$ $m = \frac{2}{1}$ $b = -6$

Graphing a line in slope – intercept form.

Example for you.	Your turn to try….
Graph the following line in slope – intercept form.	**Graph the following line in slope – intercept form.**
1. $y = 2x + 3$ 	1. $y = -2x + 4$ 
2. $3y + 6x = 12$ 	2. $4x + 2y = 2$