Function Family Name: **Linear**

General Equation in ~~Standard Form~~: $y = mx + b$

Variable Meanings: m = slope b = y-intercept

General Graph Shape:

When m > 1: If slope is positive, line goes up & to the right

When m < 1: If slope is negative, line goes down & to the right

General Table Characteristics: Constant Rate of change

$f(x) = 3x + 1$

x	0	1	2	3
	1	4	7	10

+3 +3 +3

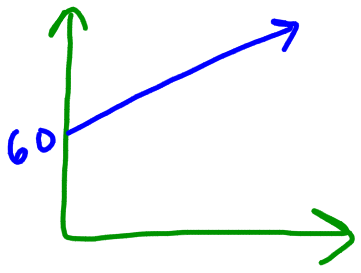
Domain & Range: All real #'s.

Asymptotes: none

Example:

Jim is saving $5 a week to buy snowshoes. He has $60 now.

$f(x) = 5x + 60$

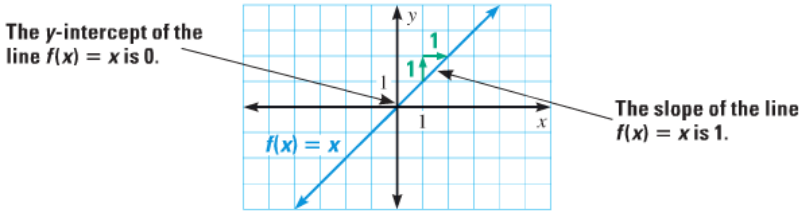


A *family* of functions is a group of functions with shared characteristics. The **parent function** is the most basic function in a family. $f(x) = x$

KEY CONCEPT *For Your Notebook*

Parent Function for Linear Functions $y = 1x$ or $y = 1x + 0$

The parent function for the family of all linear functions is $f(x) = x$. The graph of $f(x) = x$ is shown.



$m = 1$

$b = 0$

In general, a **y-intercept** of a graph is the y-coordinate of a point where the graph intersects the y-axis.

Slope-Intercept Form: $y = mx + b$

or $f(x) = mx + b$

(x, y)

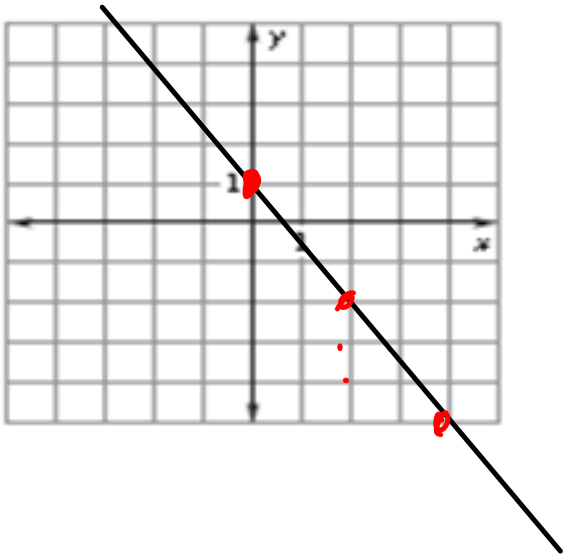
$(x, f(x))$

Graph an equation in slope-intercept form.

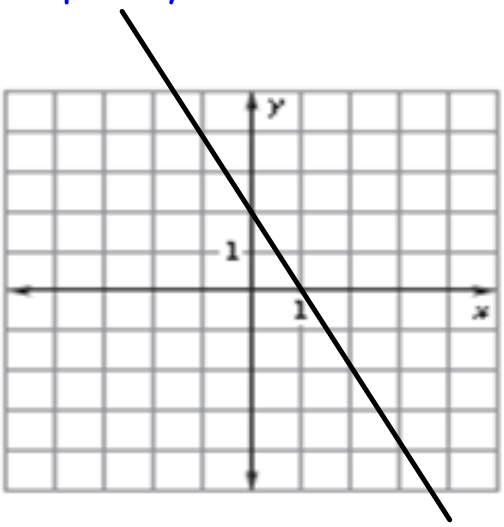
Graph $y = -\frac{3}{2}x + 1$.

$m = \frac{-3}{2} = \frac{\text{down } 3}{\text{right } 2}$

$m = \frac{3}{-2} = \frac{\text{up } 3}{\text{left } 2}$



Graph: $y = -2x + 2$



$-3x + y = -5$

$+3x \quad +3x$

$y = 3x - 5$