

Graphing Linear Functions

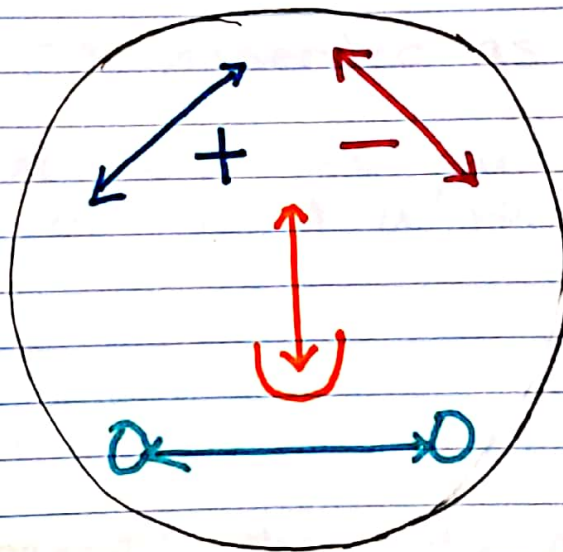
Recall:

$$y = mx + b$$

Point (x, y) ← (x, y)
Slope ← m
y-intercept ← b

Slope: the steepness of a line

- represented by m
- can be +, -, 0, undefined

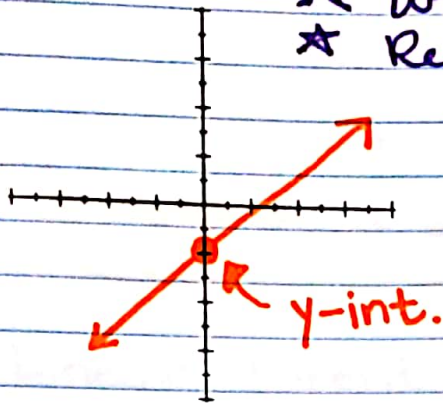


This is
Slope
Guy!

y-intercept: where the graph crosses the y-axis

★ when $x=0$

★ Represented by a point



Point: a place on the coordinate plane

- Represented as (x, y)

★ Make sure your point has $()$ or it is not a point!

New Vocabulary

x-intercept: where the graph crosses the x-axis

★ Also called: Zero, Solution, Root ★

Domain: all x-values, independent

Range: all y-values, dependent

Characteristics of a graph:

- Slope
- y-intercept
- x-intercept
- Domain
- Range

Graph of a Linear Parent Function

Linear Parent Function is:

$$y = x \quad \text{OR} \quad f(x) = x$$

The parent function is the most basic function, we use it to compare to other functions.

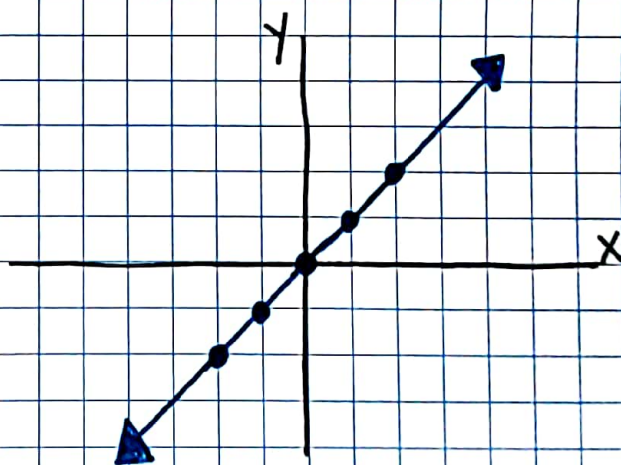
Step 1:

- Create a table

x	y = x	y
-2	y = -2	-2
-1	y = -1	-1
0	y = 0	0
1	y = 1	1
2	y = 2	2

Step 2:

- Create the graph



Step 3: Identify key features (characteristics)

Slope: $m = 1$

Domain:

$$-\infty < x < \infty$$

y-int: $(0, 0)$

Range:

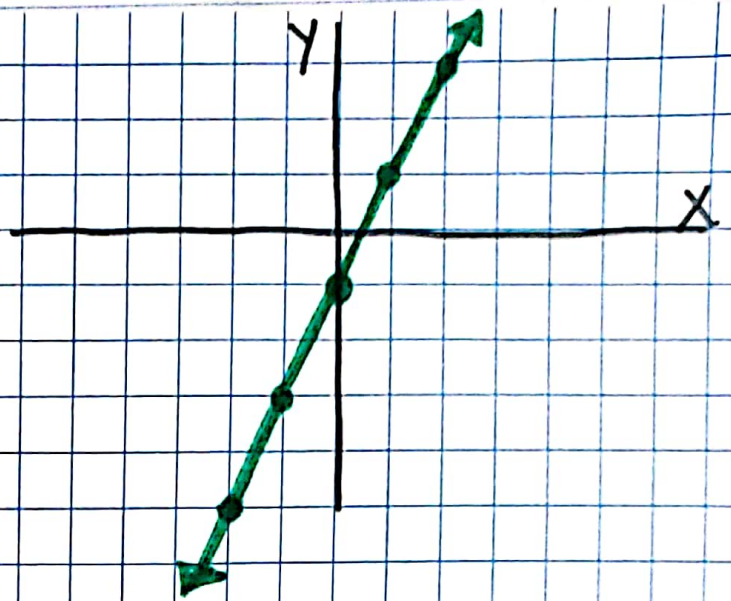
x-int: $(0, 0)$

$$-\infty < y < \infty$$

Graph and identify the key features.

① $y = 2x - 1$

X	$y = 2x - 1$	Y
-2	$y = 2(-2) - 1$	-5
-1	$y = 2(-1) - 1$	-3
0	$y = 2(0) - 1$	-1
1	$y = 2(1) - 1$	1
2	$y = 2(2) - 1$	3



To find x-int: we plug in 0 for y.

$$\begin{array}{l} 0 = 2x - 1 \\ +1 \quad \quad \quad +1 \\ \hline 1 = 2x \\ \frac{1}{2} = \frac{2x}{2} \\ \frac{1}{2} = x \end{array}$$

Slope: $m = 2$

y-int: $(0, -1)$

x-int: $(\frac{1}{2}, 0)$

Domain: $-\infty < x < \infty$

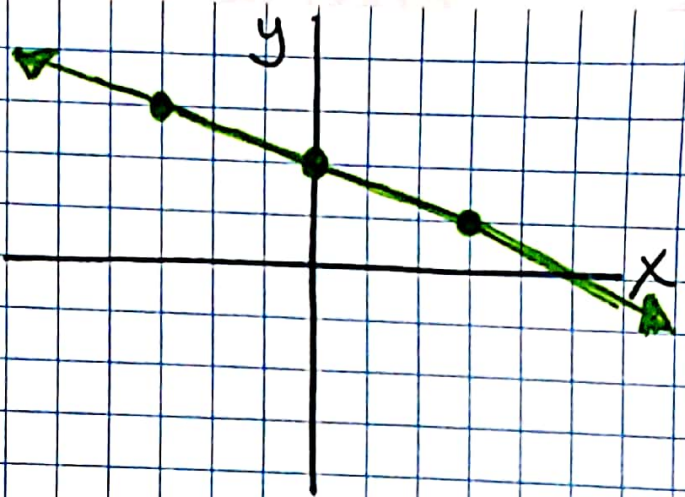
Range: $-\infty < y < \infty$

$$\textcircled{2} \quad y = -\frac{1}{3}x + 2$$

x	$y = -\frac{1}{3}x + 2$
-3	$y = -\frac{1}{3}(-3) + 2$
0	$y = -\frac{1}{3}(0) + 2$
3	$y = -\frac{1}{3}(3) + 2$

$$y = 0$$

$$\begin{array}{l} -3 \left(0 = -\frac{1}{3}x + 2 \right) \\ 0 = x - 6 \\ +6 \quad +6 \\ \hline 6 = x \end{array}$$



Slope: $m = -\frac{1}{3}$

y-int: $(0, 2)$

x-int: $(6, 0)$

Domain: $-\infty < x < \infty$

Range: $-\infty < y < \infty$