

## 2-1 Parent Functions

original, pre-image

Objectives:

**2-1a:** I can identify and graph parent functions.

**2-1b:** I can determine attributes such as: domain, range, increasing, decreasing, intercepts, max, min, and end behavior from a graph.

pre-image

## Domain & Range

**Domain:** x-values - input  
read x's from left to right (smallest to largest)

\*some functions have domain restrictions

can't have a neg. # in a sq. root

to find: set the radicand  $\geq 0$  and solve for x.

**Range:** y-values - output  
read y's from bottom to top (smallest to largest)

## x & y intercepts

y-intercepts: where the graph crosses the y-axis and  $x = 0$

x-intercepts: where the graph crosses the x-axis and  $y = 0$

intercepts are points on a graph & should be written as **ordered pairs!!!**  $(x,y)$

$$2x + 3y = 6$$

x-intercept ( $y = 0$ )

y-intercept ( $x = 0$ )

$(4, 0)$

## Increasing, Decreasing and Constant

- Increasing: as you move from left to right the y-values increase
- Decreasing: as you move from left to right the y-values decrease
- Constant: as you move from left to right the y-values do not change

this behavior is reported using interval notation for the X-VALUES where the graph has a certain behavior

## Extrema

Maximums:

Minimums:

Ordered Pairs!



## Limits

as  $x$  approaches \_\_\_\_\_,  $y$  approaches \_\_\_\_\_

Describe end behavior using limit notation:

$$\lim_{x \rightarrow \infty} f(x) = 1$$

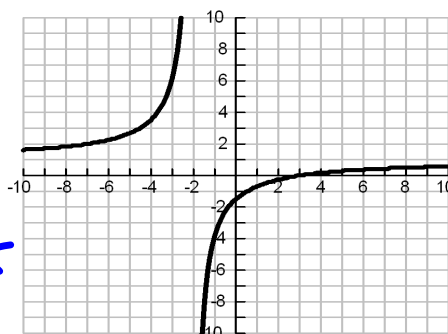
$x \rightarrow \infty$

this means the right ~~+~~

$$\lim_{x \rightarrow -\infty} f(x) = 1$$

$x \rightarrow -\infty$

this means the left end



$$\lim_{x \rightarrow \infty} f(x)$$

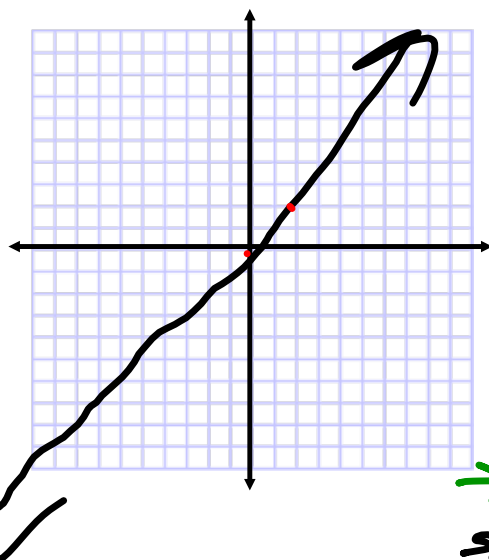
$$\lim_{x \rightarrow -\infty} f(x)$$

**MEMORIZE THIS!!!**

## Linear

Equation:  $f(x) = x$

x	y
0	6
1	1
2	
-1	
-2	



Domain:  $(-\infty, \infty)$

Range:  $(-\infty, \infty)$

Increasing:  $(-\infty, \infty)$

Decreasing: *never*

x-intercepts:  $(0, 0)$

y-intercepts:  $(0, 0)$

Max:  $\infty$ , n/a, none

Min:  $-\infty$ , n/a

→ Left End Behavior:

→ Right End Behavior:

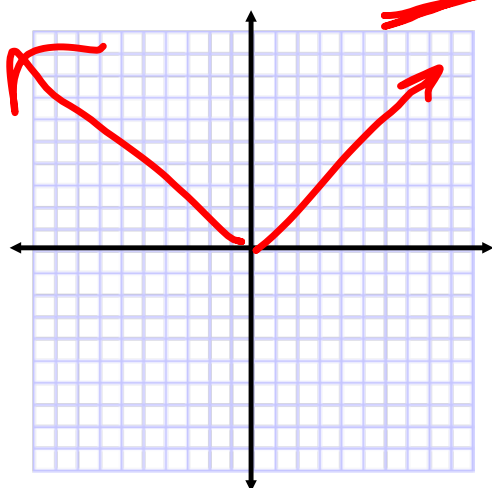
$$\lim_{x \rightarrow -\infty} f(x) = -\infty$$

$$\lim_{x \rightarrow \infty} f(x) = \infty$$

## Absolute Value

x	y
0	
1	
2	✓
-1	
-2	✓

Equation:  $f(x) = |x|$



Domain:

Range:

Increasing:

Decreasing:

x-intercepts:

y-intercepts:

Max:

Min:

Left End Behavior:

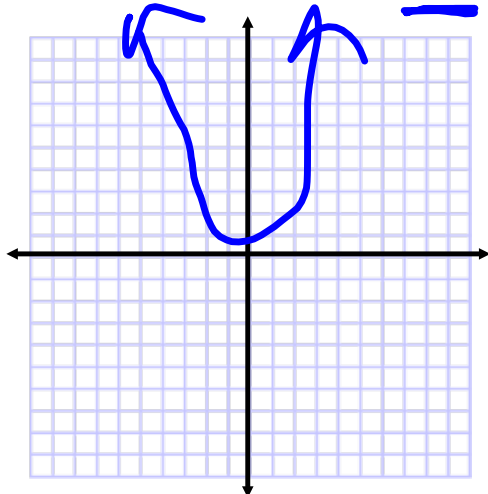
Right End Behavior:



## Quadratic

x	y
0	
1	
2	
-1	
-2	

Equation:  $f(x) = x^2$



Domain:

Range:

Increasing:

Decreasing:

x-intercepts:

y-intercepts:

Max:

Min:

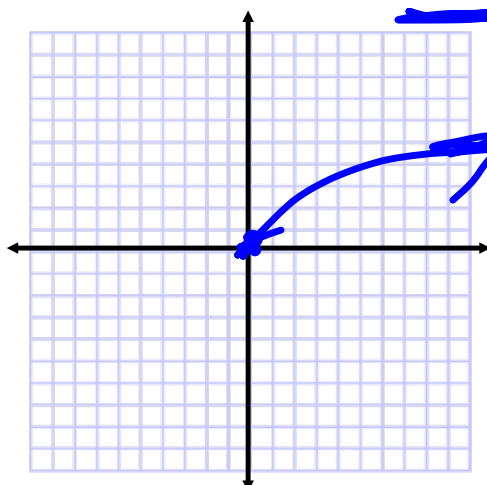
Left End Behavior:

Right End Behavior:

# Square Root

x	y
0	
1	
4	
-1	
-4	

Equation:  $f(x) = \sqrt{x}$



Domain:

Range:

Increasing:

Decreasing:

x-intercepts:

y-intercepts:

Max:

Min:

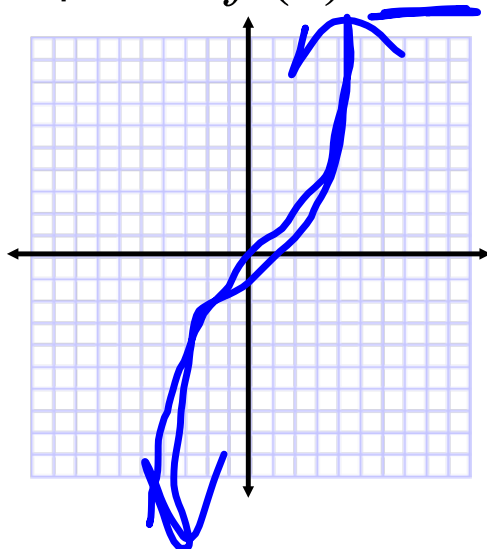
Left End Behavior:

Right End Behavior:

# Cubic

Equation:  $f(x) = x^3$

x	y
0	
1	
2	
-1	
-2	



Domain:

Range:

Increasing:

Decreasing:

x-intercepts:

y-intercepts:

Max:

Min:

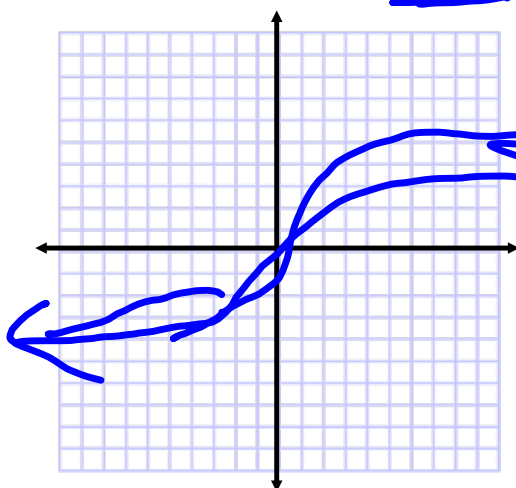
Left End Behavior:

Right End Behavior:

## Cube Root

x	y
0	
1	
8	
-1	
-8	

Equation:  $f(x) = \sqrt[3]{x}$



Domain:

Range:

Increasing:

Decreasing:

x-intercepts:

y-intercepts:

Max:

Min:

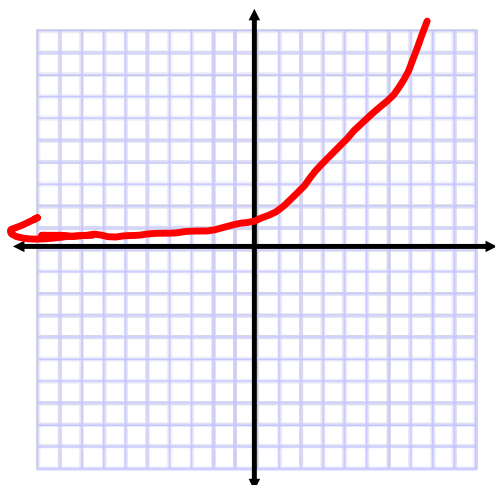
Left End Behavior:

Right End Behavior:

## Exponential

x	y
0	
1	
2	
3	
-1	

Equation:  $f(x) = 2^x$



Domain:

Range:

Increasing:

Decreasing:

x-intercepts:

y-intercepts:

Max:

Min:

Left End Behavior:

Right End Behavior:

September 7, 2018

