What's Going On?

Checking In

Minds on   Finishing Function Notation

Action!   Parent Functions

Consolidation   Function Creation

Learning Goal - I will be able to graph the 5 parent functions.

What's happening at
gilbertmath.com?

Minds on

As You Come In

x	f(x)
-2	2
-1	0
0	-2
1	-4
2	-2

Copy the table of values and the function, **f(x)**, into your notes. Then, fill in the table of values for the given function, **f(x)**.

$$f(x) = \frac{4\sqrt{(x-1)^2} + 6}{2} - 7$$

Challenge: Try to do it without a calculator! Or use one, whatever..

Action!

First, some new terms.

NEW TERM

A **family** is a collection of functions (or lines or curves) sharing common characteristics.

NEW TERM

A **parent function** is the simplest, or base, function in a family.

Action!

First, some new terms.

NEW TERM

The **absolute value** of x, written as |x|, is the distance from x to zero.

Examples

$$|3| = 3$$

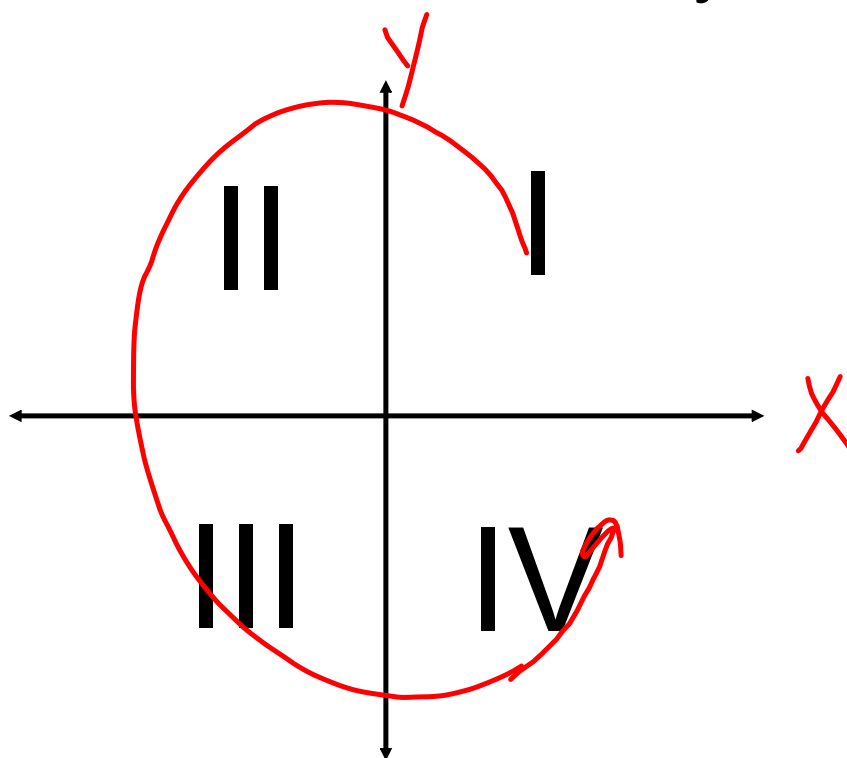$$|-3| = 3$$

$$|-2.372| = 2.372$$

Action!

First, some new terms.

NEW TERM

An **asymptote** is a line that the graph of a relation or function gets closer and closer to, but never meets, on some portion of its domain.

Action!

The 4 Quadrants of the x,y Plane

Action!

Parent Functions

(NEW TERM)

A **parent function** is the simplest, or base, function in a "family".

Action!

Investigating the Parents

1. We will randomly divide into families.

2. With your family, complete the table of values for your given parent function.

   Make sure more than one person crunches each number.

3. Use your table of values to make your graph IN PENCIL.

4. When you are happy with your graph, get someone with a steady hand to go over it in marker.
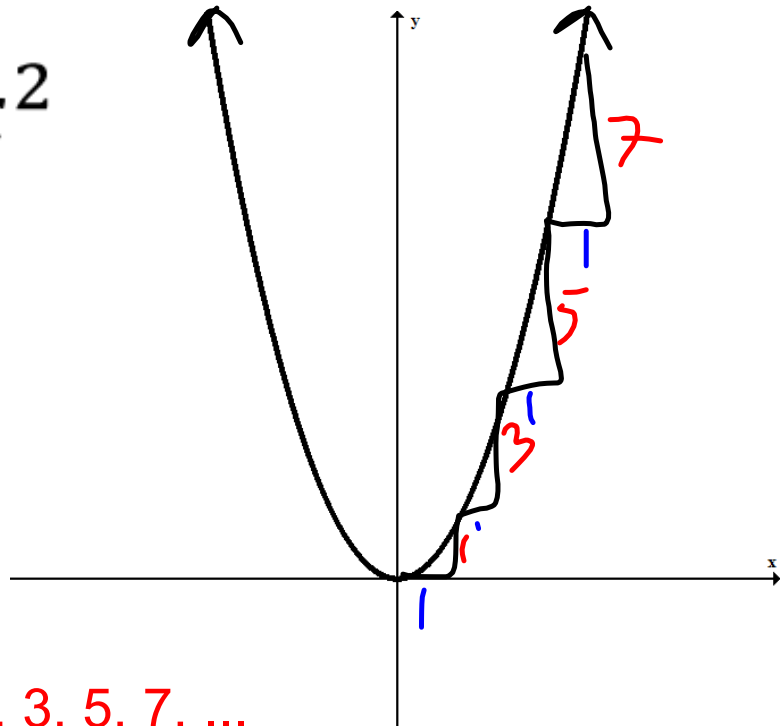
Linear Function

$$f(x) = x$$
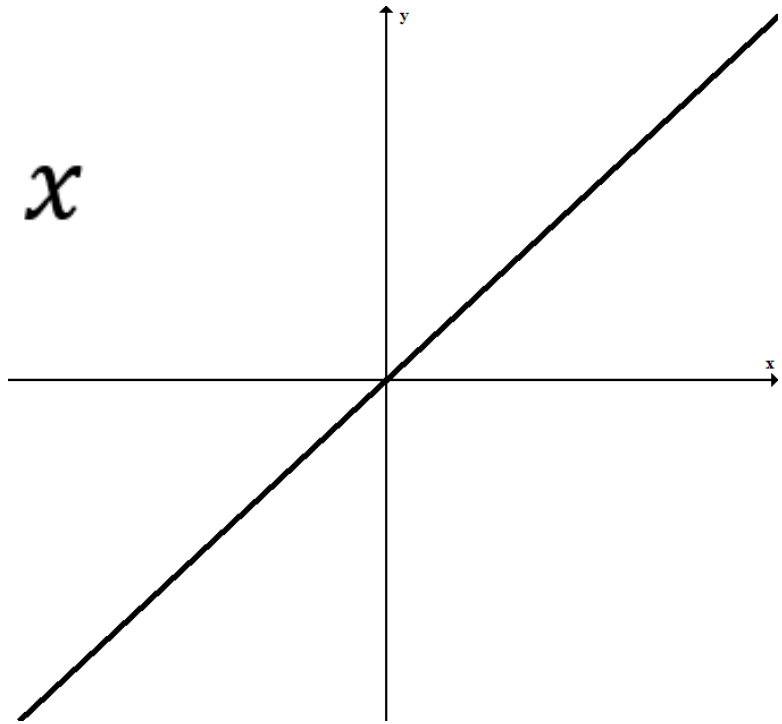
- it's a line!

- goes through the origin

- slope of 1 (m)

- y-intercept of 0 (b)

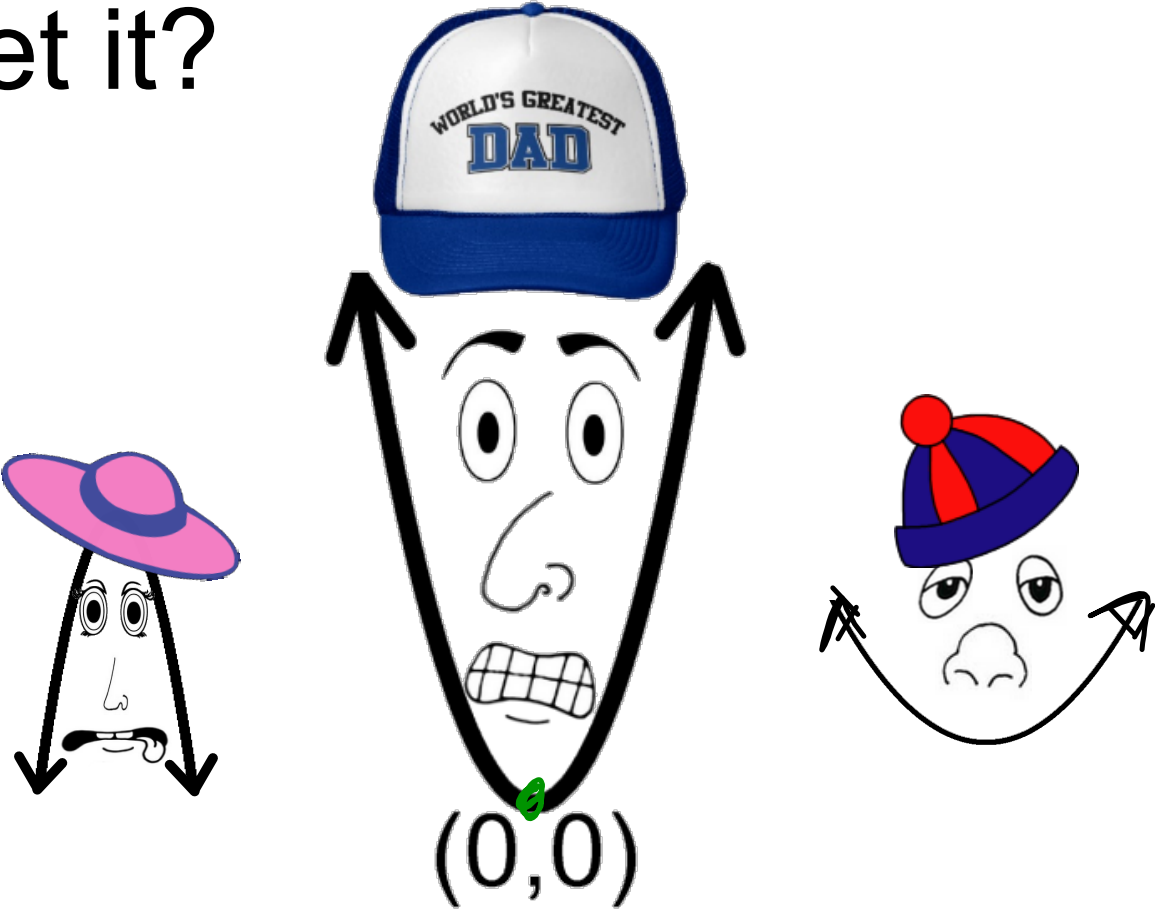- x-intercept of 0

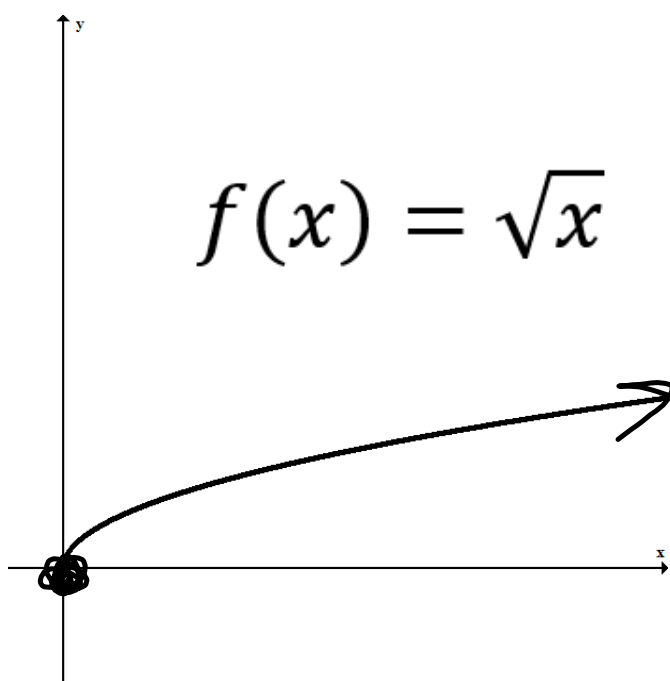- y=mx+b form is y = 1x + 0

Quadratic Function

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

- it's a parabola

- opens up

- vertex at (0, 0)

- step pattern is 1, 3, 5, 7, ...

- x and y-intercepts are both 0

- in vertex form y=a(x - h)² + k $\longrightarrow y = x^2$
   a = 1, h = 0, k = 0

- the curve has not been stretched
   or compressed

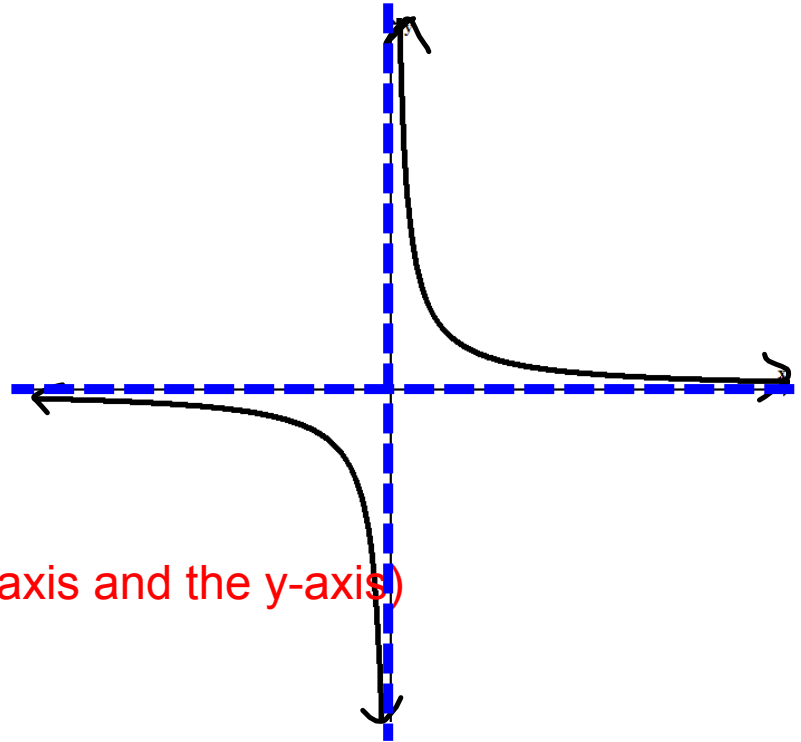- has a minimum but no maximum

Get it?

(0,0)

Square Root Function

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

- starts at (0,0)

- x is always positive or 0

- y is always positive or 0

- when x = 1, y = 1

- increasing from left to right

- growth slows down

Reciprocal Function

$$f(x) = \frac{1}{x}$$

- two asymptotes (the x-axis and the y-axis)

   - **x = 0** and **y = 0**

- When x is POSITIVE

   - as |x| increases, f(x) decreases (approaches zero)

   - as |x| decreases, f(x) increases (approaches infinity)

- When x is NEGATIVE

   - as |x| increases, f(x) decreases (approaches zero)

   - as |x| decreases, f(x) increases (approaches negative infinity)
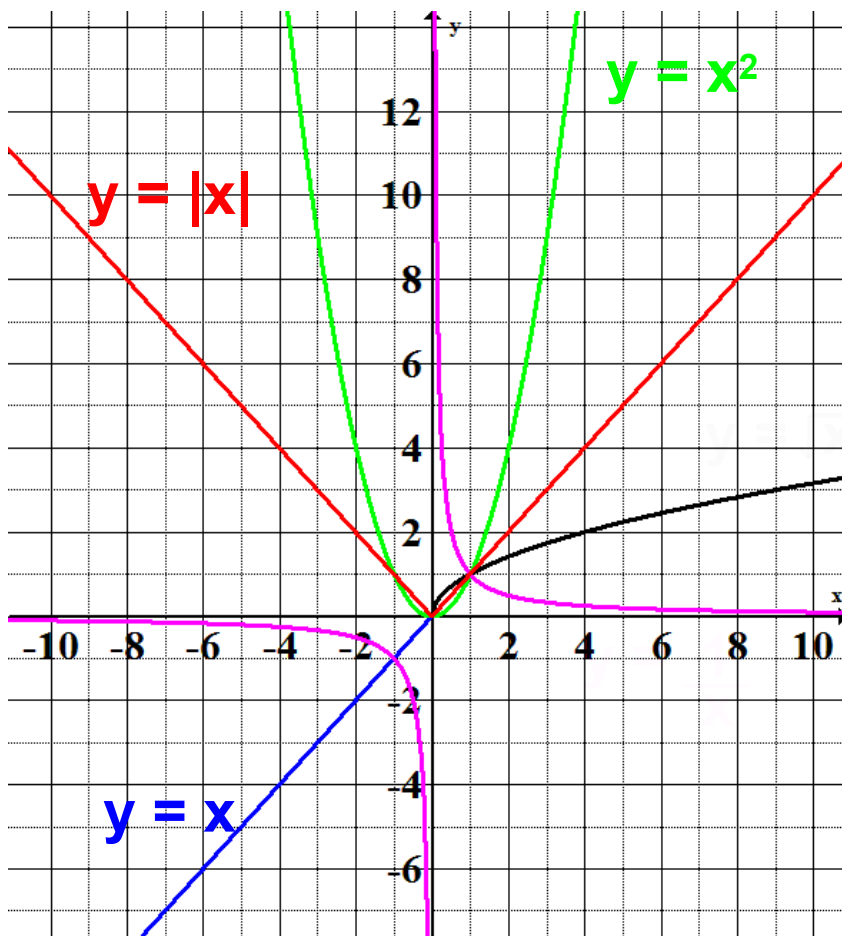
Absolute Value Function

$$f(x) = |x|$$

- only in quadrants I and II
- starts at (0,0)
- both parts are at a 45 degree angle to the horizontal
- slope of right side is 1
- slope of left side is -1
- f(x) = f(-x) for any x
- f(x) is always POSITIVE or ZERO

45° 45°
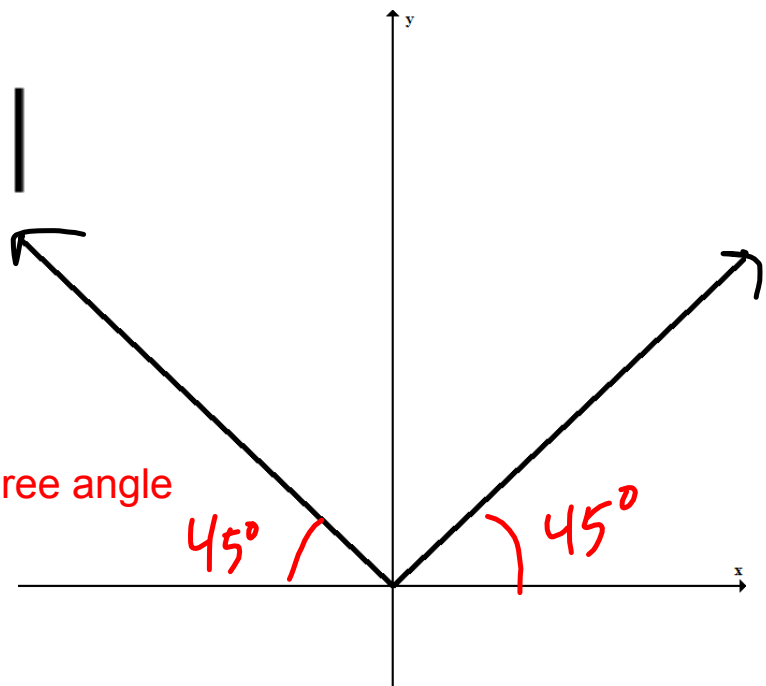
Consolidation

Match 'em Up!

$y = x^2$

$y = |x|$

$y = x$

$y = x \qquad y = |x|$

$y = x^2 \qquad y = \dfrac{1}{x}$

$y = \sqrt{x}$

Consolidation

NEW TERMS

Family

Parent Function

Absolute Value

Asymptote