Parent Functions

Sept 13/2019

A parent function is the simplest, unmodified version of a particular type of function.

function	parent	sample child
quadratic	$f(x)=x^2$	$g(x)=3(x-2)^2-5$
radical	$f(x)=\sqrt{x}$	$h(x)=-2\sqrt{x+3}-1$
reciprocal	$f(x)=\frac{1}{x}$	$k(x)=\frac{4}{x+2}-6$
absolute value	$f(x)=\lvert x\rvert$	$m(x)=-\lvert x+1\rvert+7$
cubic	$f(x)=x^3$	$r(x)=\frac{1}{2}x^3+2$

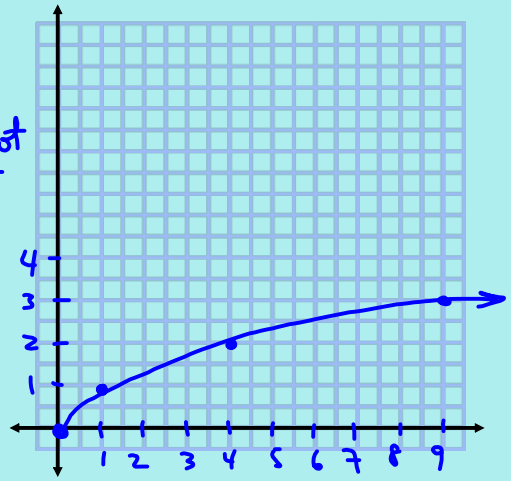
Feb 24-10:27 AM

The Radical Function

see handout

Consider the relation $y=\sqrt{x}$

x	y
-4	$\sqrt{-4}$ does not exist DNE
-1	$\sqrt{-1}$
0	$\sqrt{0}=0$
1	$\sqrt{1}=1$
4	$\sqrt{4}=2$
9	$\sqrt{9}=3$



Domain: $\{x \in \mathbb{R} \mid x \geq 0\}$

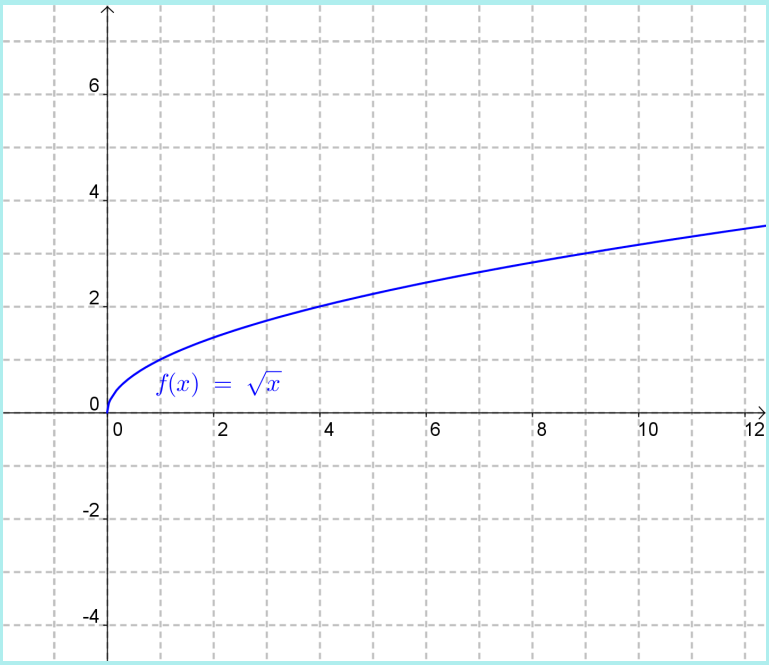
Range: $\{y \in \mathbb{R} \mid y \geq 0\}$

max/min? min at $y=0$

asymptotes? NONE

Feb 22-9:25 PM

The radical function, $f(x) = \sqrt{x}$ see handout



$D = \{x \in \mathbb{R} \mid x \geq 0\}$ $R = \{y \in \mathbb{R} \mid y \geq 0\}$

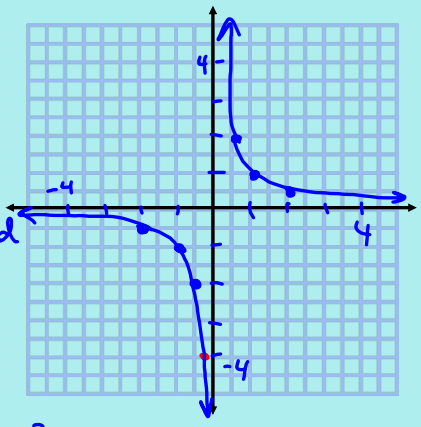
Feb 22-9:49 PM

The Reciprocal Function see handout

Consider the relation $y = \frac{1}{x}$

x	y
-2	$-\frac{1}{2}$
-1	-1
-0.5	-2
0	$\frac{1}{0}$ undefined
0.5	2
1	1
2	$\frac{1}{2}$

-0.25 <-4



Domain: $\{x \in \mathbb{R} \mid x \neq 0\}$

Range: $\{y \in \mathbb{R} \mid y \neq 0\}$

max/min? none

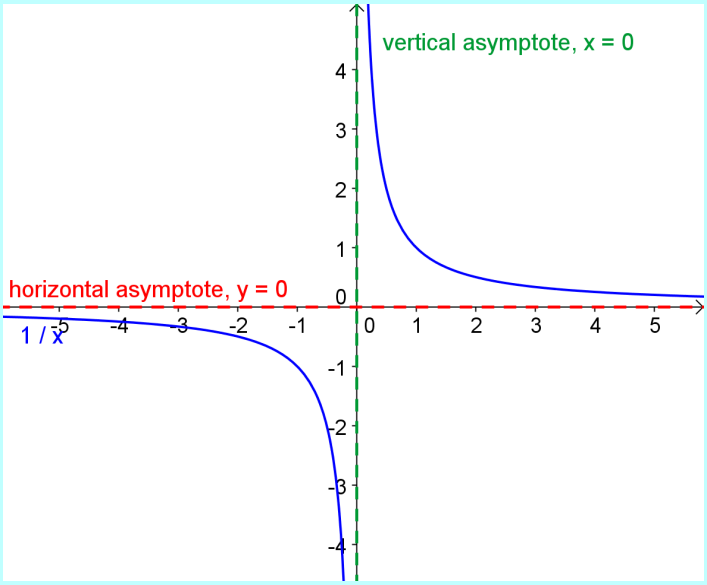
asymptotes?

horizontal asymptote: $y = 0$

Vertical asymptote: $x = 0$

Feb 22-9:25 PM

The reciprocal function, $f(x)=\frac{1}{x}$ see handout



$D=\{x\in\mathbb{R}\mid x\neq 0\}$ $R=\{y\in\mathbb{R}\mid y\neq 0\}$

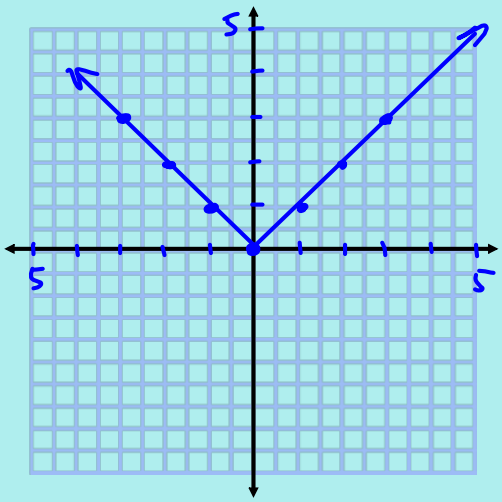
Feb 23-9:20 PM

The Absolute Value Function

see handout

Consider $f(x)=|x|$

x	$y=\|x\|$
-3	3
-2	2
-1	1
0	0
1	1
2	2
3	3



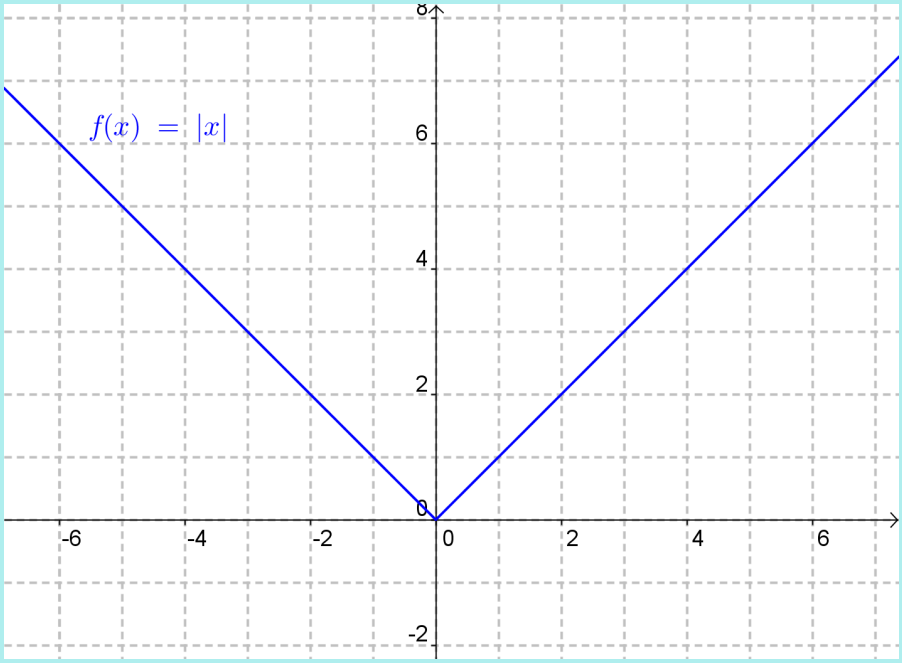
Domain: $\{x\in\mathbb{R}\}$ max/min? min at $y=0$

Range: $\{y\in\mathbb{R}\mid y\geq 0\}$ ~~asymptotes?~~

Feb 22-9:25 PM

The absolute value function, $f(x) = |x|$

see handout



$D = \{x \in \mathbb{R}\}$ $R = \{y \in \mathbb{R} \mid y \geq 0\}$

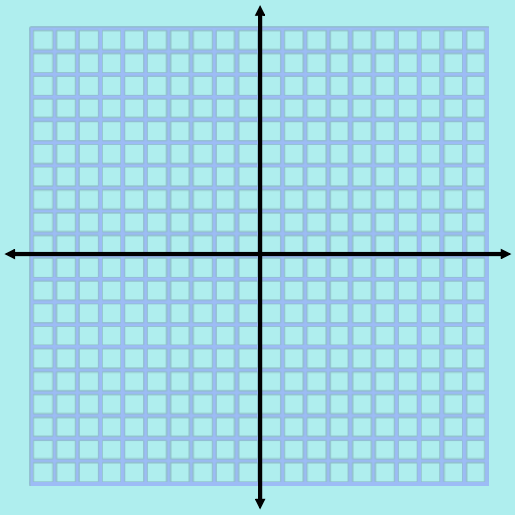
Feb 22-9:49 PM

The Cubic Function

see handout

Consider $f(x) = x^3$

x	$y = x^3$
-3	
-2	
-1	
0	
1	
2	
3	

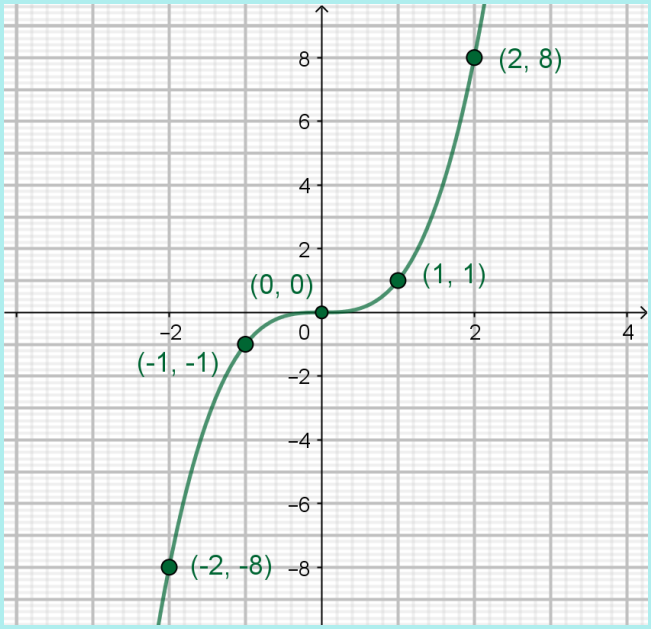


Domain: max/min?

Range: asymptotes?

Feb 22-9:25 PM

The Cubic Function $f(x) = x^3$



$D = \{x \in \mathbb{R}\}$ $R = \{y \in \mathbb{R}\}$

Sep 12-8:33 AM

Asymptotes

A line that a curve approaches, but never touches, is called an asymptote. The reciprocal function has two asymptotes:

Vertical Asymptote (VA): x = 0

Horizontal Asymptote (HA): y = 0

Note how these asymptotes correspond to the restrictions on the domain and range of the function.

$$D = \{x \in \mathbb{R} \mid x \neq 0\}$$

$$R = \{y \in \mathbb{R} \mid y \neq 0\}$$

Feb 27-10:16 PM

Absolute Value Function

Sometimes, we are only concerned with the size of a value, rather than the sign (positive or negative).

This is called the magnitude of the value.

To represent this concept algebraically, we make use of the absolute value notation:

$$y = |x| \qquad \text{or} \qquad f(x) = |x|$$

The result will always be positive.

Mar 2-12:23 PM

Assigned Work:

Worksheet: Function Notation

Feb 10-10:23 PM