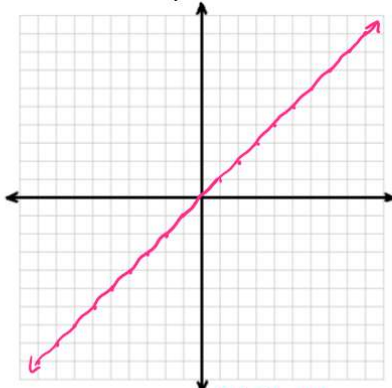


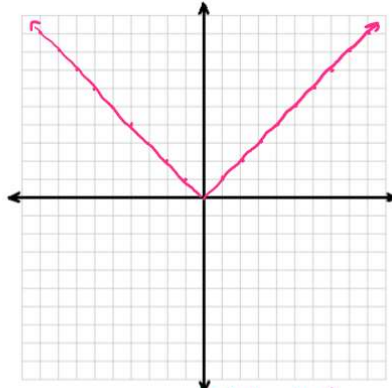
Library of Functions

The Identity Function



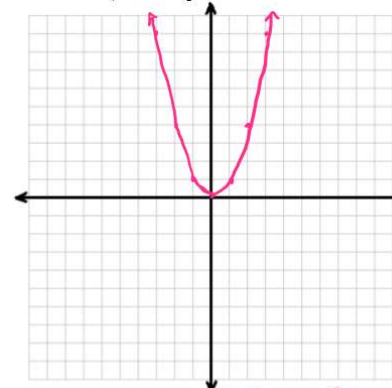
Function Rule  $f(x) = x$   
 Domain  $(-\infty, \infty)$   
 Range  $(-\infty, \infty)$   
 Continuous YES/NO  
 Type of Discontinuity N/A  
 Increasing  $(-\infty, \infty)$   
 Decreasing none  
 Constant none  
 Bounded Above/Bounded Below/  
 Bounded/Unbounded  
 Upper Bound \_\_\_\_\_ Lower Bound \_\_\_\_\_  
 Local Mins none  
 Local Maxs none  
 Absolute Min none  
 Absolute Max none  
Odd/Even/Neither  
 Vertical Asymptotes none  
 Horizontal Asymptotes none

The Absolute Value Function



Function Rule  $f(x) = |x|$   
 Domain  $(-\infty, \infty)$   
 Range  $[0, \infty)$   
 Continuous YES/NO  
 Type of Discontinuity N/A  
 Increasing  $(0, \infty)$   
 Decreasing  $(-\infty, 0)$   
 Constant none  
 Bounded Above/Bounded Below/  
 Bounded/Unbounded  
 Upper Bound \_\_\_\_\_ Lower Bound 0  
 Local Mins 0  
 Local Maxs none  
 Absolute Min 0  
 Absolute Max none  
 Odd/Even/Neither  
 Vertical Asymptotes none  
 Horizontal Asymptotes none

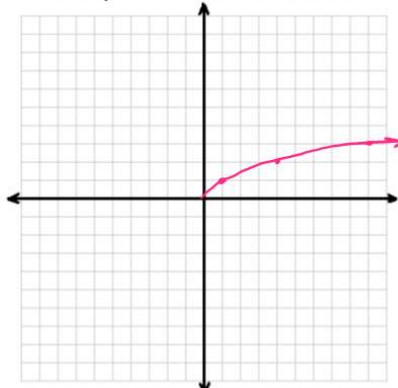
The Squaring Function



Function Rule  $f(x) = x^2$   
 Domain  $(-\infty, \infty)$   
 Range  $[0, \infty)$   
 Continuous YES/NO  
 Type of Discontinuity N/A  
 Increasing  $(0, \infty)$   
 Decreasing  $(-\infty, 0)$   
 Constant none  
 Bounded Above/Bounded Below/  
 Bounded/Unbounded  
 Upper Bound \_\_\_\_\_ Lower Bound 0  
 Local Mins 0  
 Local Maxs none  
 Absolute Min 0  
 Absolute Max none  
 Odd/Even/Neither  
 Vertical Asymptotes none  
 Horizontal Asymptotes none

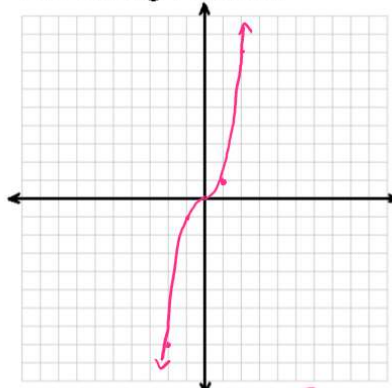
LIBRARY OF FUNCTIONS

The Square Root Function



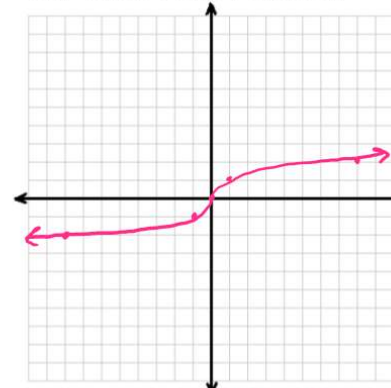
Function Rule  $f(x) = \sqrt{x}$   
 Domain  $(0, \infty)$   
 Range  $(0, \infty)$   
 Continuous YES/NO  
 Type of Discontinuity N/A  
 Increasing  $(0, \infty)$   
 Decreasing none  
 Constant none  
 Bounded Above/Bounded Below/  
 Bounded/Unbounded  
 Upper Bound \_\_\_\_\_ Lower Bound 0  
 Local Mins 0  
 Local Maxs none  
 Absolute Min 0  
 Absolute Max none  
 Odd/Even/Neither  
 Vertical Asymptotes none  
 Horizontal Asymptotes none

The Cubing Function



Function Rule  $f(x) = x^3$   
 Domain  $(-\infty, \infty)$   
 Range  $(-\infty, \infty)$   
 Continuous YES/NO  
 Type of Discontinuity N/A  
 Increasing  $(-\infty, \infty)$   
 Decreasing none  
 Constant none  
 Bounded Above/Bounded Below/  
 Bounded/Unbounded  
 Upper Bound \_\_\_\_\_ Lower Bound \_\_\_\_\_  
 Local Mins none  
 Local Maxs none  
 Absolute Min none  
 Absolute Max none  
Odd/Even/Neither  
 Vertical Asymptotes none  
 Horizontal Asymptotes none

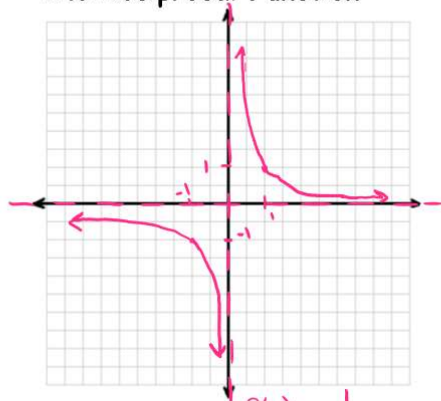
The Cube Root Function



Function Rule  $f(x) = \sqrt[3]{x}$   
 Domain  $(-\infty, \infty)$   
 Range  $(-\infty, \infty)$   
 Continuous YES/NO  
 Type of Discontinuity N/A  
 Increasing  $(-\infty, \infty)$   
 Decreasing none  
 Constant none  
 Bounded Above/Bounded Below/  
 Bounded/Unbounded  
 Upper Bound \_\_\_\_\_ Lower Bound \_\_\_\_\_  
 Local Mins none  
 Local Maxs none  
 Absolute Min none  
 Absolute Max none  
Odd/Even/Neither  
 Vertical Asymptotes none  
 Horizontal Asymptotes none

Library of Functions

### The Reciprocal Function



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

Domain  $(-\infty, 0) \cup (0, \infty)$

Range  $(-\infty, 0) \cup (0, \infty)$

Continuous YES/NO NO

Type of Discontinuity infinite

Increasing none

Decreasing  $(-\infty, 0) \cup (0, \infty)$

Constant none

Bounded Above/Bounded Below/  
Bounded/Unbounded

Upper Bound \_\_\_\_\_ Lower Bound \_\_\_\_\_

Local Mins none

Local Maxs none

Absolute Min none

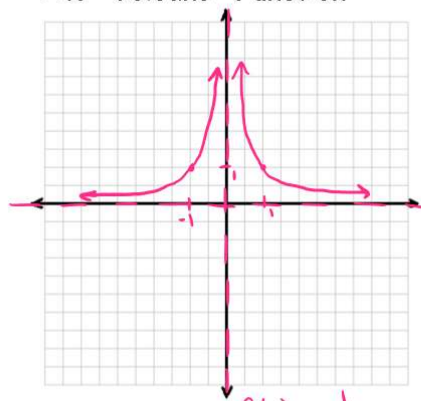
Absolute Max none

Odd/Even/Neither

Vertical Asymptotes  $x=0$

Horizontal Asymptotes  $y=0$

### The "Volcano" Function



Function Rule  $f(x) = \frac{1}{x^2}$

Domain  $(-\infty, 0) \cup (0, \infty)$

Range  $(0, \infty)$

Continuous YES/NO NO

Type of Discontinuity infinite

Increasing  $(-\infty, 0)$

Decreasing  $(0, \infty)$

Constant none

Bounded Above/Bounded Below/  
Bounded/Unbounded

Upper Bound \_\_\_\_\_ Lower Bound 0

Local Mins none

Local Maxs none

Absolute Min none

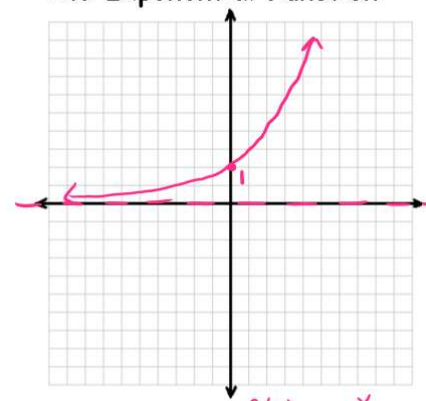
Absolute Max none

Odd/Even/Neither

Vertical Asymptotes  $x=0$

Horizontal Asymptotes  $y=0$

### The Exponential Function



Function Rule  $f(x) = e^x$

Domain  $(-\infty, \infty)$

Range  $(0, \infty)$

Continuous YES/NO

Type of Discontinuity N/A

Increasing  $(-\infty, \infty)$

Decreasing none

Constant none

Bounded Above/Bounded Below/  
Bounded/Unbounded

Upper Bound \_\_\_\_\_ Lower Bound 0

Local Mins none

Local Maxs none

Absolute Min none

Absolute Max none

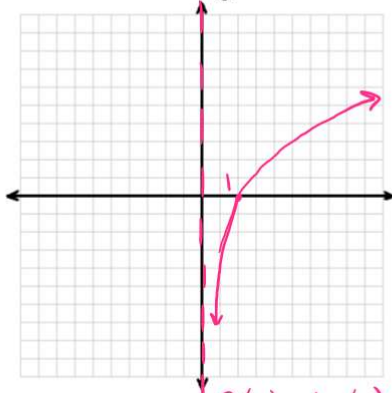
Odd/Even/Neither

Vertical Asymptotes none

Horizontal Asymptotes  $y=0$

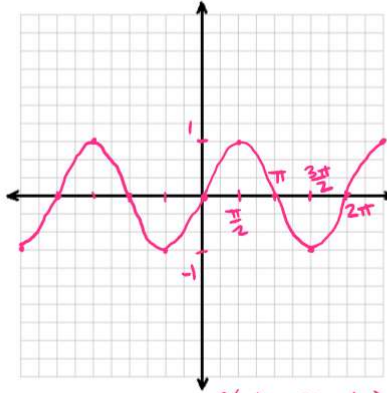


### The Natural Log Function



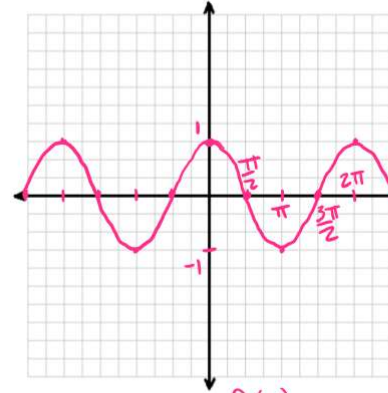
Function Rule  $f(x) = \ln(x)$   
 Domain  $(0, \infty)$   
 Range  $(-\infty, \infty)$   
 Continuous YES/NO  
 Type of Discontinuity N/A  
 Increasing  $(0, \infty)$   
 Decreasing none  
 Constant none  
 Bounded Above/Bounded Below/  
 Bounded/Unbounded  
 Upper Bound \_\_\_\_\_ Lower Bound \_\_\_\_\_  
 Local Mins none  
 Local Maxs none  
 Absolute Min none  
 Absolute Max none  
 Odd/Even/Neither  
 Vertical Asymptotes  $x=0$   
 Horizontal Asymptotes none

### The Sine Function



Function Rule  $f(x) = \sin(x)$   
 Domain  $(-\infty, \infty)$   
 Range  $[-1, 1]$   
 Continuous YES/NO  
 Type of Discontinuity N/A  
 Increasing  $(0, \frac{\pi}{2}) \cup (\frac{3\pi}{2}, 2\pi)$   
 Decreasing  $(\frac{\pi}{2}, \frac{3\pi}{2})$   
 Constant none  
 Bounded Above/Bounded Below/  
Bounded/Unbounded  
 Upper Bound 1 Lower Bound -1  
 Local Mins -1  
 Local Maxs 1  
 Absolute Min -1  
 Absolute Max 1  
Odd/Even/Neither  
 Vertical Asymptotes none  
 Horizontal Asymptotes none

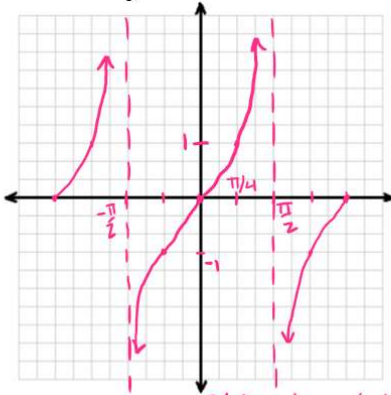
### The Cosine Function



Function Rule  $f(x) = \cos(x)$   
 Domain  $(-\infty, \infty)$   
 Range  $[-1, 1]$   
 Continuous YES/NO  
 Type of Discontinuity N/A  
 Increasing  $(\pi, 2\pi)$   
 Decreasing  $(0, \pi)$   
 Constant none  
 Bounded Above/Bounded Below/  
Bounded/Unbounded  
 Upper Bound 1 Lower Bound -1  
 Local Mins -1  
 Local Maxs 1  
 Absolute Min -1  
 Absolute Max 1  
Odd/Even/Neither  
 Vertical Asymptotes none  
 Horizontal Asymptotes none

Library of Functions

The Tangent Function



Function Rule  $f(x) = \tan(x)$

Domain  $x \neq \frac{\pi}{2} + n\pi$

Range  $(-\infty, \infty)$

Continuous YES/NO

Type of Discontinuity infinite

Increasing  $(-\frac{\pi}{2}, \frac{\pi}{2})$

Decreasing none

Constant none

Bounded Above/Bounded Below/  
Bounded/Unbounded

Upper Bound \_\_\_\_\_ Lower Bound \_\_\_\_\_

Local Mins none

Local Maxs none

Absolute Min none

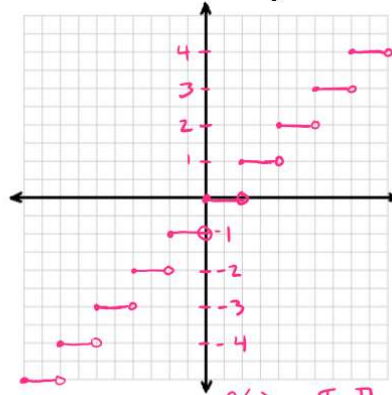
Absolute Max none

Odd/Even/Neither

Vertical Asymptotes  $x \neq \frac{\pi}{2} + n\pi$

Horizontal Asymptotes none

The Greatest Integer Function



Function Rule  $f(x) = \lfloor x \rfloor$

Domain  $(-\infty, \infty)$

Range all integers

Continuous YES/NO

Type of Discontinuity jump

Increasing none

Decreasing none

Constant  $(-5, -4) \cup (-4, -3) \cup (-3, -2) \dots$

Bounded Above/Bounded Below/  
Bounded/Unbounded

Upper Bound \_\_\_\_\_ Lower Bound \_\_\_\_\_

Local Mins none

Local Maxs none

Absolute Min none

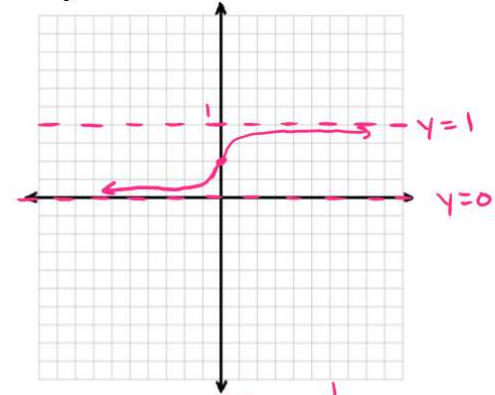
Absolute Max none

Odd/Even/Neither

Vertical Asymptotes none

Horizontal Asymptotes none

Logistic Function



Function Rule  $f(x) = \frac{1}{1+e^x}$

Domain  $(-\infty, \infty)$

Range  $(0, 1)$

Continuous YES/NO

Type of Discontinuity N/A

Increasing  $(-\infty, \infty)$

Decreasing none

Constant none

Bounded Above/Bounded Below/  
Bounded/Unbounded

Upper Bound 1 Lower Bound 0

Local Mins none

Local Maxs none

Absolute Min none

Absolute Max none

Odd/Even/Neither

Vertical Asymptotes none

Horizontal Asymptotes  $y=0, y=1$