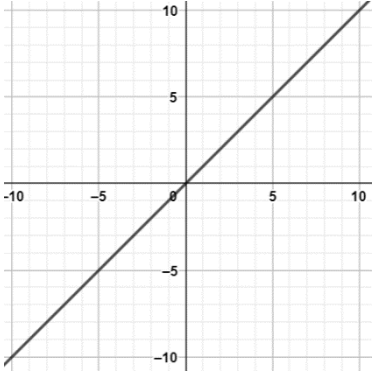
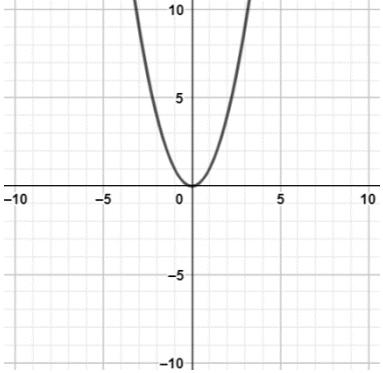
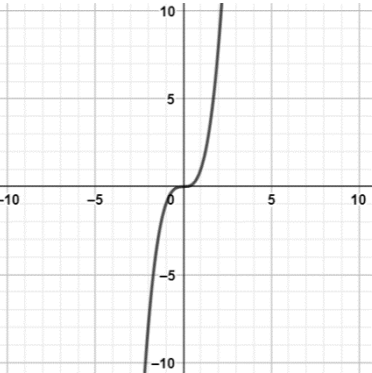
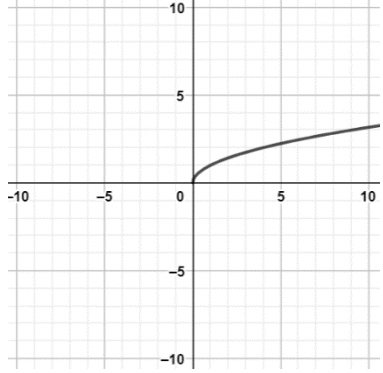
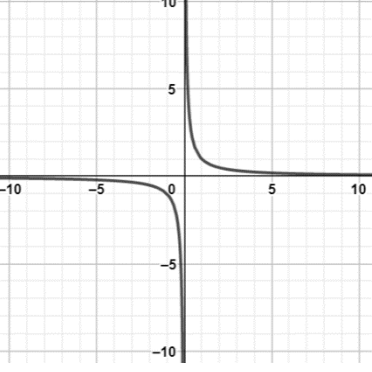
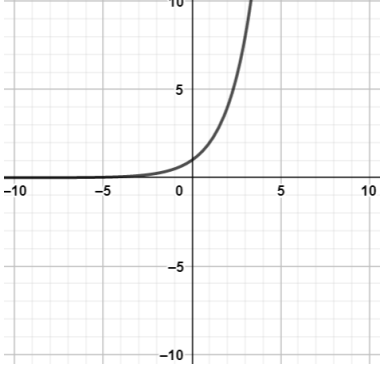
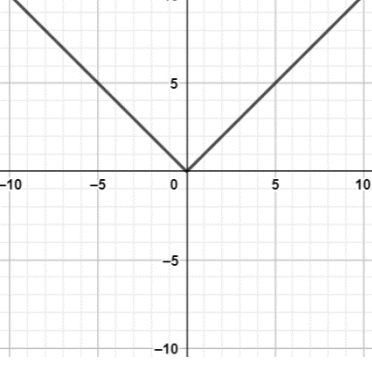
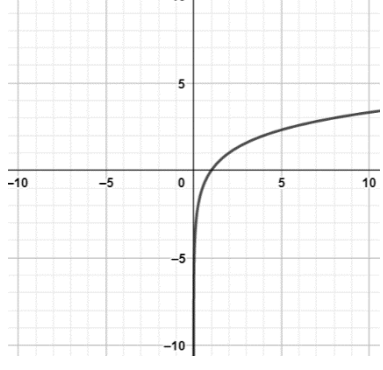


Precalculus – Parent Functions used in Transformations

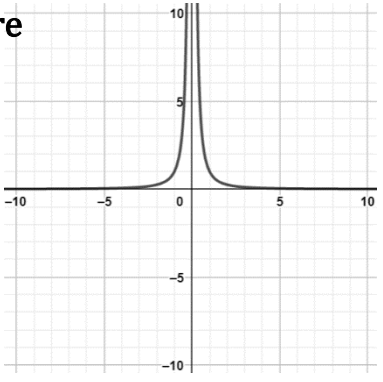
A **family of functions** is a group of functions with graphs that have one or more defining characteristics. The **Parent Function** is the simplest function with the defining characteristics of the family.

Functions in the same family are **transformations** of their parent functions.

<p>Linear</p> <p>Parent:</p> $y = x$ <p>Domain: $(-\infty, \infty)$</p> <p>Range: $(-\infty, \infty)$</p> 	<p>Quadratic</p> <p>Parent:</p> $y = x^2$ <p>Domain: $(-\infty, \infty)$</p> <p>Range: $[0, \infty)$</p> 
<p>Cubic</p> <p>Parent:</p> $y = x^3$ <p>Domain: $(-\infty, \infty)$</p> <p>Range: $(-\infty, \infty)$</p> 	<p>Square Root</p> <p>Parent:</p> $y = \sqrt{x}$ <p>Domain: $[0, \infty)$</p> <p>Range: $[0, \infty)$</p> 
<p>Reciprocal</p> <p>Parent:</p> $y = \frac{1}{x}$ <p>Domain: $(-\infty, 0) \cup (0, \infty)$</p> <p>Range: $(-\infty, 0) \cup (0, \infty)$</p> 	<p>Exponential</p> <p>Parent:</p> $y = a^x$ <p>graphed:</p> $y = 2^x$ <p>Domain: $(-\infty, \infty)$</p> <p>Range: $(0, \infty)$</p> 
<p>Absolute Value</p> <p>Parent:</p> $y = x $ <p>Domain: $(-\infty, \infty)$</p> <p>Range: $[0, \infty)$</p> 	<p>Logarithm</p> <p>Parent:</p> $y = \log_a x$ <p>graphed:</p> $y = \log_2 x$ <p>Domain: $(0, \infty)$</p> <p>Range: $(-\infty, \infty)$</p> 

Inverse Square

Parent:

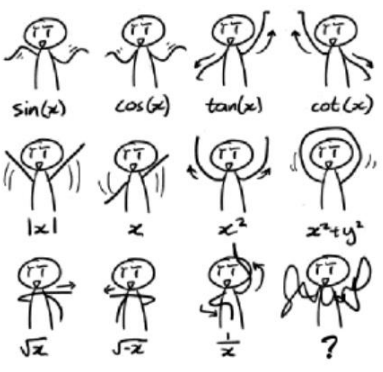
$$y = \frac{1}{x^2}$$


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

Range: $(0, \infty)$

Functions as Dance Moves

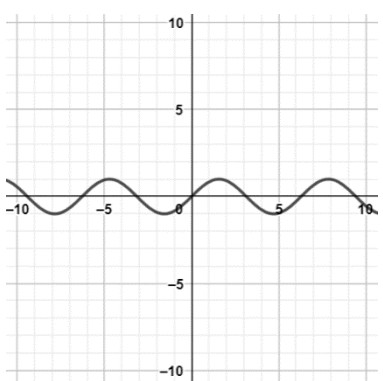
(author unknown)



Trigonometric Functions:

Sine

Parent:

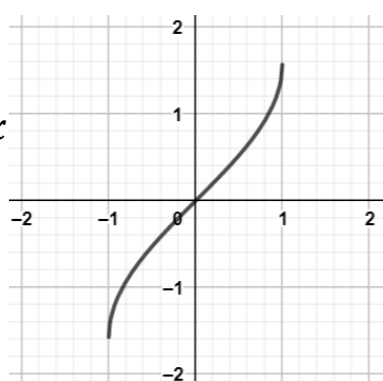
$$y = \sin x$$


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

Range: $[-1, 1]$

Arcsine

Parent:

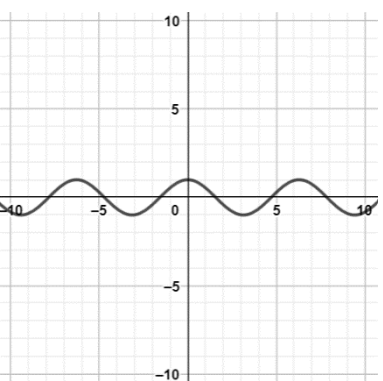
$$y = \sin^{-1} x$$


Domain: $[-1, 1]$

Range: $[-\frac{\pi}{2}, \frac{\pi}{2}]$

Cosine

Parent:

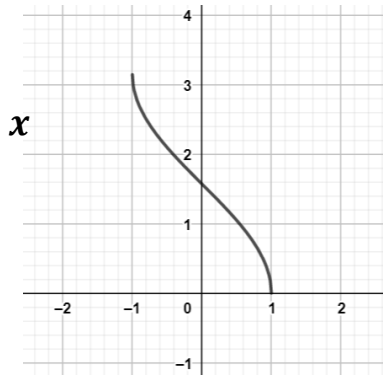
$$y = \cos x$$


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

Range: $[-1, 1]$

Arccosine

Parent:

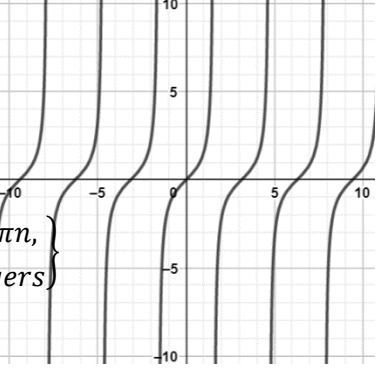
$$y = \cos^{-1} x$$


Domain: $[-1, 1]$

Range: $[0, \pi]$

Tangent

Parent:

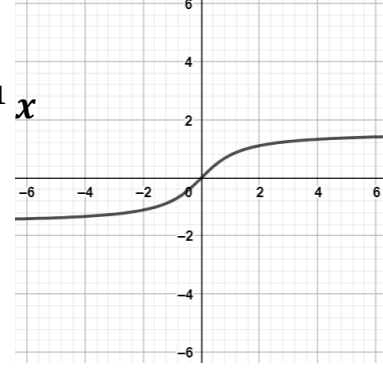
$$y = \tan x$$


Domain: $\left\{ x \in \mathbb{R} \mid x \neq \frac{\pi}{2} + \pi n, n \in \text{integers} \right\}$

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

Arctangent

Parent:

$$y = \tan^{-1} x$$


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

Range: $(-\frac{\pi}{2}, \frac{\pi}{2})$