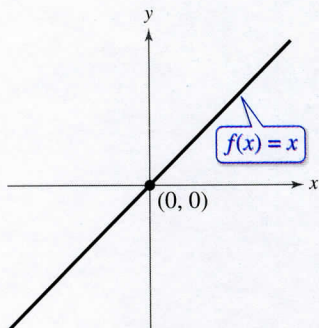




Library of Parent Functions Summary

Linear Function (p. 6)

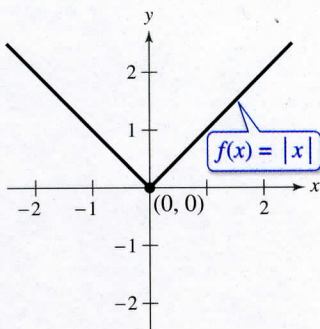
$$f(x) = x$$



Domain: $(-\infty, \infty)$
Range: $(-\infty, \infty)$
Intercept: $(0, 0)$
Increasing

Absolute Value Function (p. 19)

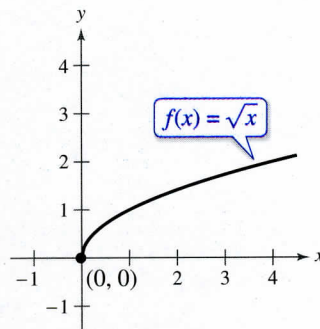
$$f(x) = |x| = \begin{cases} x, & x \geq 0 \\ -x, & x < 0 \end{cases}$$



Domain: $(-\infty, \infty)$
Range: $[0, \infty)$
Intercept: $(0, 0)$
Decreasing on $(-\infty, 0)$
Increasing on $(0, \infty)$
Even function
y-axis symmetry

Square Root Function (p. 20)

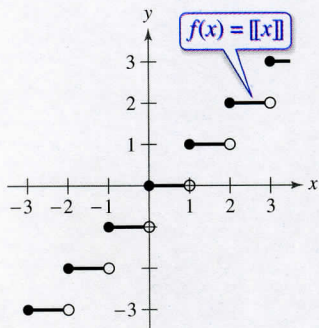
$$f(x) = \sqrt{x}$$



Domain: $[0, \infty)$
Range: $[0, \infty)$
Intercept: $(0, 0)$
Increasing on $(0, \infty)$

Greatest Integer Function (p. 34)

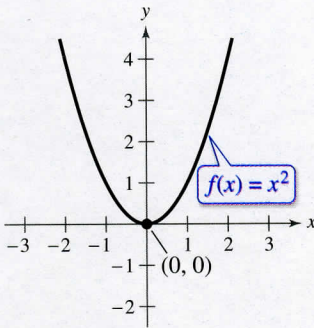
$$f(x) = \llbracket x \rrbracket$$



Domain: $(-\infty, \infty)$
Range: the set of integers
x-intercepts: in the interval $[0, 1)$
y-intercept: $(0, 0)$
Constant between each pair of consecutive integers
Jumps vertically one unit at each integer value

Quadratic Function (p. 92)

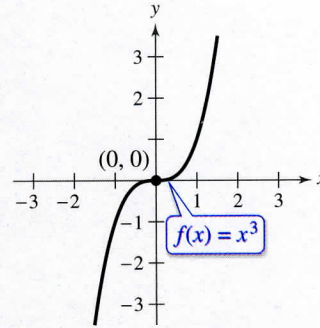
$$f(x) = ax^2$$



Domain: $(-\infty, \infty)$
Range: $[0, \infty)$
Intercept: $(0, 0)$
Decreasing on $(-\infty, 0)$
Increasing on $(0, \infty)$
Even function
Axis of symmetry: $x = 0$
Relative minimum or vertex: $(0, 0)$

Cubic Function (p. 101)

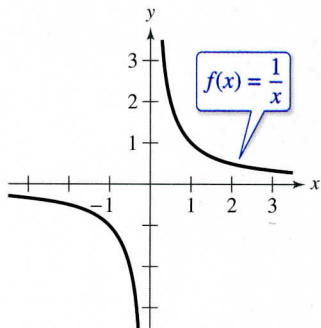
$$f(x) = x^3$$



Domain: $(-\infty, \infty)$
Range: $(-\infty, \infty)$
Intercept: $(0, 0)$
Increasing on $(-\infty, \infty)$
Odd function
Origin symmetry

Rational Function (p. 152)

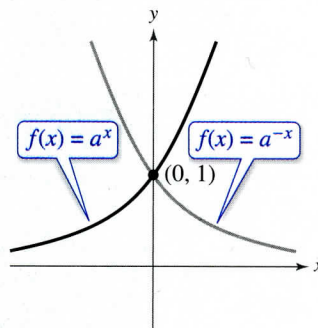
$$f(x) = \frac{1}{x}$$



Domain: $(-\infty, 0) \cup (0, \infty)$
 Range: $(-\infty, 0) \cup (0, \infty)$
 No intercepts
 Decreasing on $(-\infty, 0)$ and $(0, \infty)$
 Odd function
 Origin symmetry
 Vertical asymptote: y -axis
 Horizontal asymptote: x -axis

Exponential Function (p. 182)

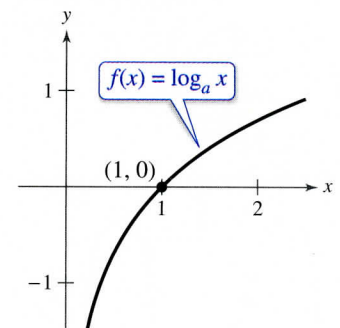
$$f(x) = a^x, a > 0, a \neq 1$$



Domain: $(-\infty, \infty)$
 Range: $(0, \infty)$
 Intercept: $(0, 1)$
 Increasing on $(-\infty, \infty)$
 for $f(x) = a^x$
 Decreasing on $(-\infty, \infty)$
 for $f(x) = a^{-x}$
 x -axis is a horizontal asymptote
 Continuous

Logarithmic Function (p. 195)

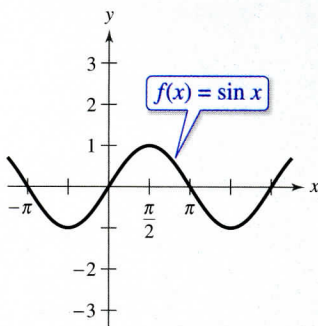
$$f(x) = \log_a x, a > 0, a \neq 1$$



Domain: $(0, \infty)$
 Range: $(-\infty, \infty)$
 Intercept: $(1, 0)$
 Increasing on $(0, \infty)$
 y -axis is a vertical asymptote
 Continuous
 Reflection of graph of $f(x) = a^x$
 in the line $y = x$

Sine Function (p. 293)

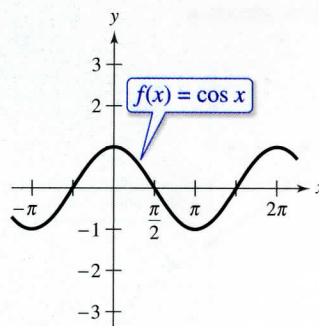
$$f(x) = \sin x$$



Domain: $(-\infty, \infty)$
 Range: $[-1, 1]$
 Period: 2π
 x -intercepts: $(n\pi, 0)$
 y -intercept: $(0, 0)$
 Odd function
 Origin symmetry

Cosine Function (p. 293)

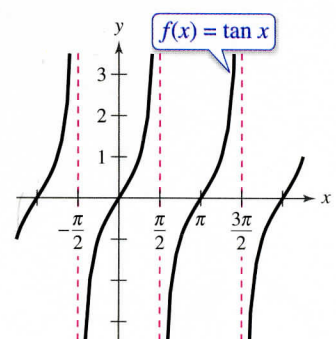
$$f(x) = \cos x$$



Domain: $(-\infty, \infty)$
 Range: $[-1, 1]$
 Period: 2π
 x -intercepts: $(\frac{\pi}{2} + n\pi, 0)$
 y -intercept: $(0, 1)$
 Even function
 y -axis symmetry

Tangent Function (p. 304)

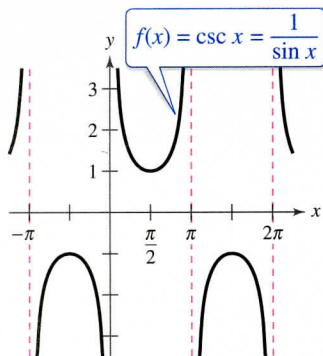
$$f(x) = \tan x$$



Domain: $x \neq \frac{\pi}{2} + n\pi$
 Range: $(-\infty, \infty)$
 Period: π
 x -intercepts: $(n\pi, 0)$
 y -intercept: $(0, 0)$
 Vertical asymptotes: $x = \frac{\pi}{2} + n\pi$
 Odd function
 Origin symmetry

Cosecant Function (p. 307)

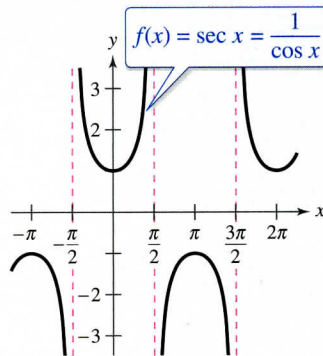
$$f(x) = \csc x$$



Domain: $x \neq n\pi$
 Range: $(-\infty, -1] \cup [1, \infty)$
 Period: 2π
 No intercepts
 Vertical asymptotes: $x = n\pi$
 Odd function
 Origin symmetry

Secant Function (p. 307)

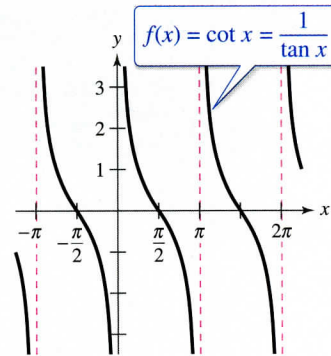
$$f(x) = \sec x$$



Domain: $x \neq \frac{\pi}{2} + n\pi$
 Range: $(-\infty, -1] \cup [1, \infty)$
 Period: 2π
 y-intercept: $(0, 1)$
 Vertical asymptotes:
 $x = \frac{\pi}{2} + n\pi$
 Even function
 y-axis symmetry

Cotangent Function (p. 306)

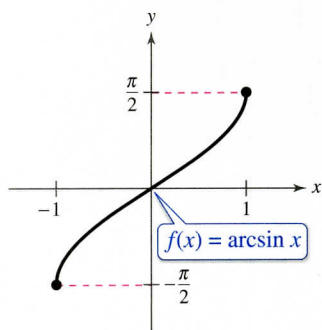
$$f(x) = \cot x$$



Domain: $x \neq n\pi$
 Range: $(-\infty, \infty)$
 Period: π
 x-intercepts: $(\frac{\pi}{2} + n\pi, 0)$
 Vertical asymptotes: $x = n\pi$
 Odd function
 Origin symmetry

Inverse Sine Function (p. 319)

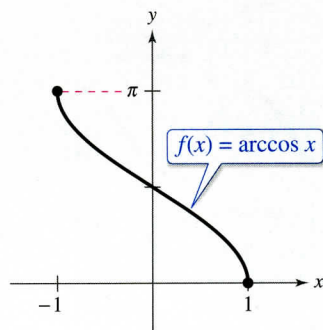
$$f(x) = \arcsin x$$



Domain: $[-1, 1]$
 Range: $[-\frac{\pi}{2}, \frac{\pi}{2}]$
 Intercept: $(0, 0)$
 Odd function
 Origin symmetry

Inverse Cosine Function (p. 319)

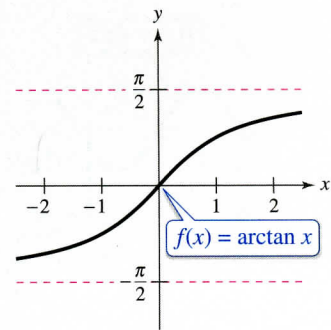
$$f(x) = \arccos x$$



Domain: $[-1, 1]$
 Range: $[0, \pi]$
 y-intercept: $(0, \frac{\pi}{2})$

Inverse Tangent Function (p. 319)

$$f(x) = \arctan x$$



Domain: $(-\infty, \infty)$
 Range: $(-\frac{\pi}{2}, \frac{\pi}{2})$
 Intercept: $(0, 0)$
 Horizontal asymptotes: $y = \pm\frac{\pi}{2}$
 Odd function
 Origin symmetry