

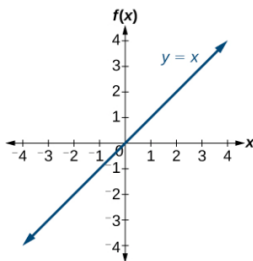
PreCalculus-Graphs for Basic Functions

APMA Faculty
University of Virginia

July 26, 2024

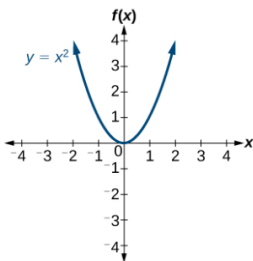
Graphs of $y = x$, $y = x^2$ and $y = \sqrt{x}$

Identity



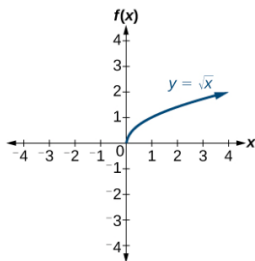
Domain: $(-\infty, \infty)$
Range: $(-\infty, \infty)$

Square



Domain: $(-\infty, \infty)$
Range: $[0, \infty)$

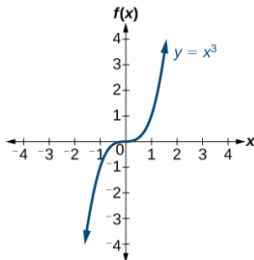
Square Root



Domain: $[0, \infty)$
Range: $[0, \infty)$

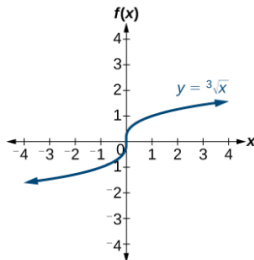
Graphs of $y = x^3$, $y = \sqrt[3]{x}$ and $y = \frac{1}{x}$

Cubic



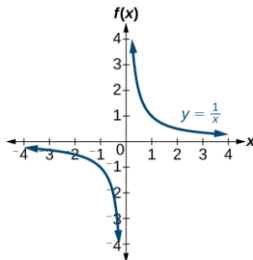
Domain: $(-\infty, \infty)$
Range: $(-\infty, \infty)$

Cube Root



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

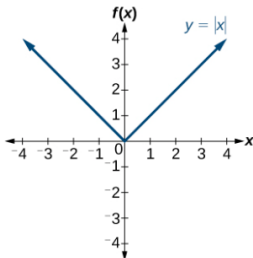
Reciprocal



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

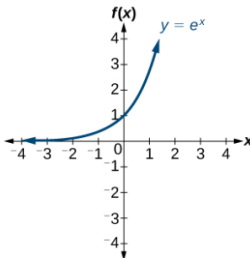
Graphs of $y = |x|$, $y = e^x$ and $y = \ln(x)$

Absolute Value



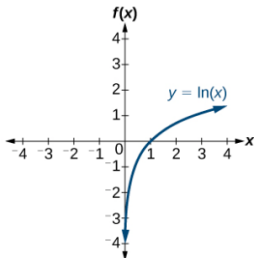
Domain: $(-\infty, \infty)$
Range: $[0, \infty)$

Exponential



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

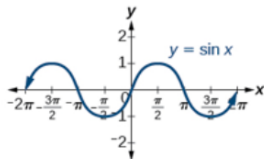
Natural Logarithm



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

Graphs of $y = \sin x$, $y = \cos x$ and $y = \tan x$

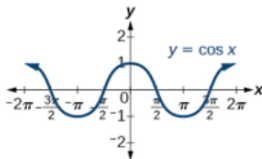
Sine



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

Range: $[-1, 1]$

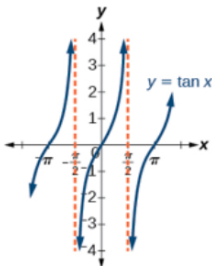
Cosine



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

Range: $[-1, 1]$

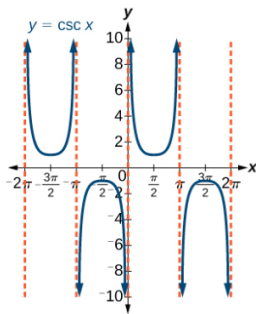
Tangent



Domain: $x \neq \frac{\pi}{2}k$,
where k is an odd integer
Range: $(-\infty, \infty)$

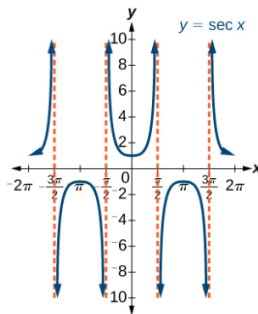
Graphs of $y = \csc x$, $y = \sec x$ and $y = \cot x$

Cosecant



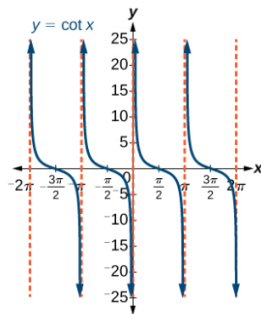
Domain: $x \neq \pi k$,
where k is an integer
Range: $(-\infty, -1] \cup [1, \infty)$

Secant



Domain: $x \neq \frac{\pi}{2}k$,
where k is an odd integer
Range: $(-\infty, -1] \cup [1, \infty)$

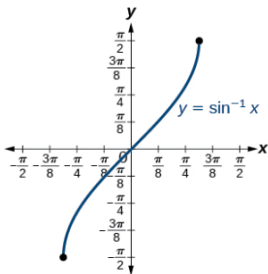
Cotangent



Domain: $x \neq \pi k$,
where k is an integer
Range: $(-\infty, \infty)$

Graphs of $y = \sin^{-1} x$, $y = \cos^{-1} x$ and $y = \tan^{-1} x$

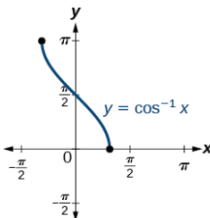
Inverse Sine



Domain: $[-1, 1]$

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

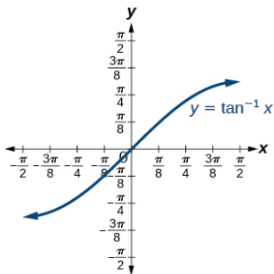
Inverse Cosine



Domain: $[-1, 1]$

Range: $[0, \pi]$

Inverse Tangent

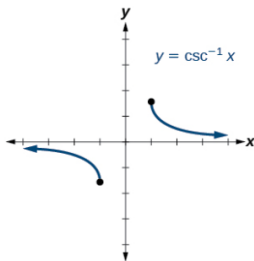


Domain: $(-\infty, \infty)$

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

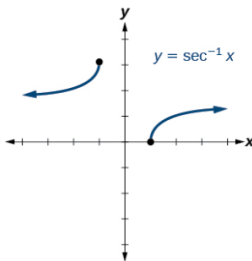
Graphs of $y = \csc^{-1} x$, $y = \sec^{-1} x$ and $y = \cot^{-1} x$

Inverse Cosecant



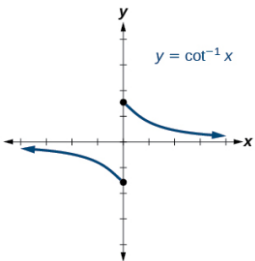
Domain: $(-\infty, -1] \cup [1, \infty)$
Range: $[-\frac{\pi}{2}, 0) \cup (0, \frac{\pi}{2}]$

Inverse Secant



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

Inverse Cotangent



Domain: $(-\infty, \infty)$
Range: $(-\frac{\pi}{2}, 0) \cup (0, \frac{\pi}{2}]$