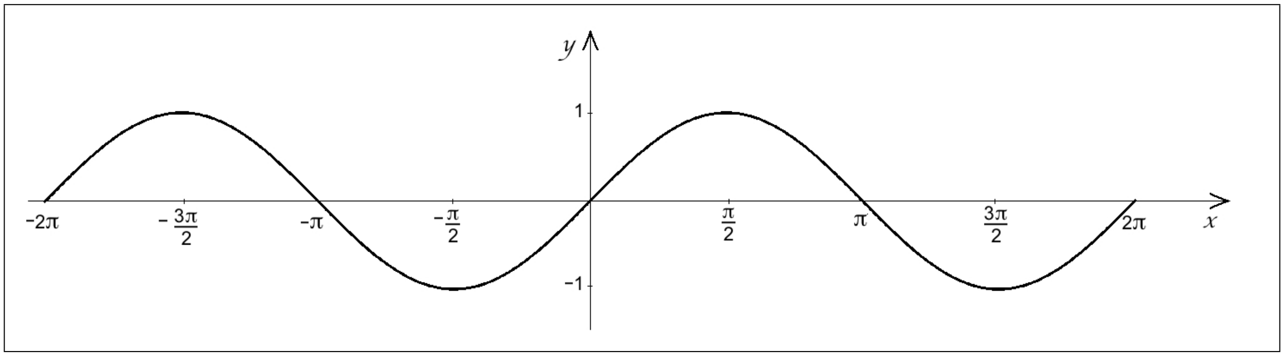
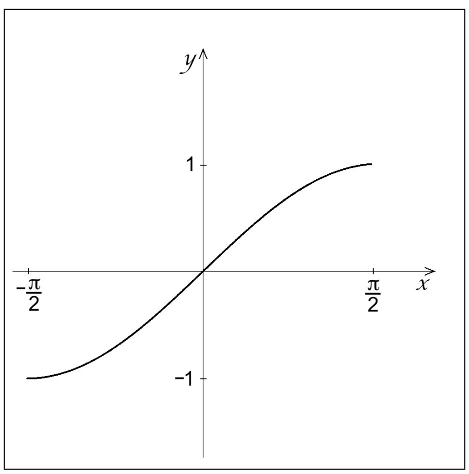
$$\boxed{f(x) = \sin x}$$

domain: $\mathbb{R}$ periodic with period 2π: for all x, $\sin(x + 2\pi) = \sin x$

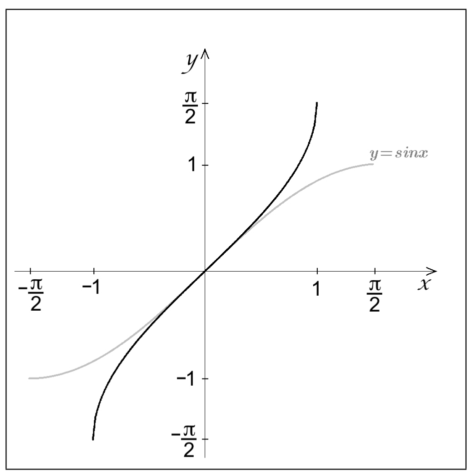
range: $[-1, 1]$ odd function: for all x, $\sin(-x) = -\sin x$



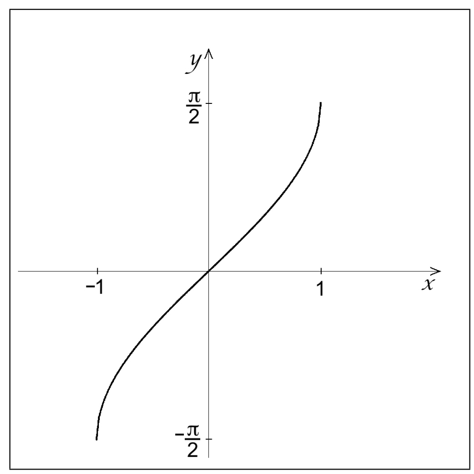
inverse function: $y = \sin^{-1} x = \arcsin x$



Restrict the domain of $\sin x$ to $\left[-\dfrac{\pi}{2}, \dfrac{\pi}{2}\right]$



Reverse function assignment

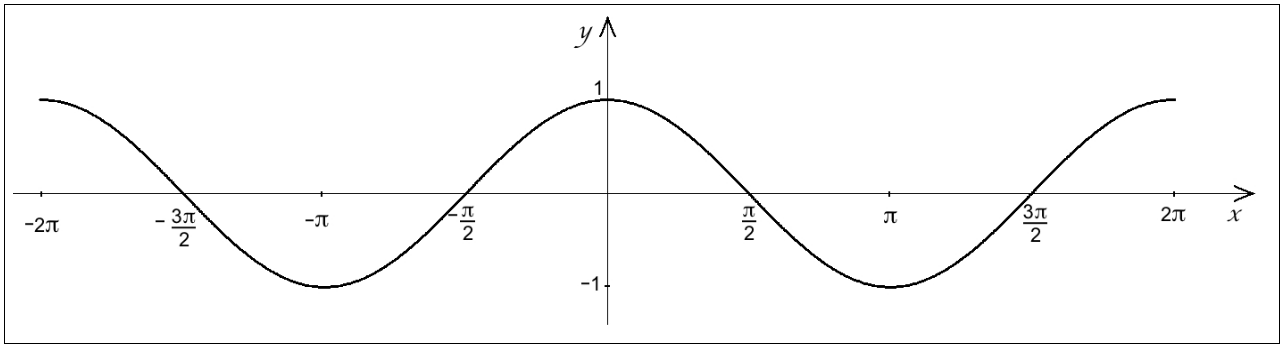


The graph of $y = \sin^{-1} x$

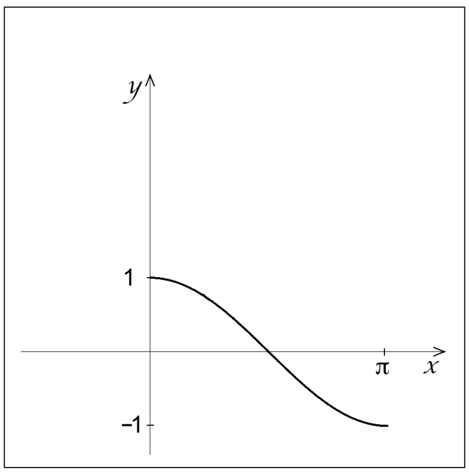
For $\sin^{-1} x$, the domain is $[-1, 1]$ and the range is $\left[-\dfrac{\pi}{2}, \dfrac{\pi}{2}\right]$

$f(x) = \cos x$

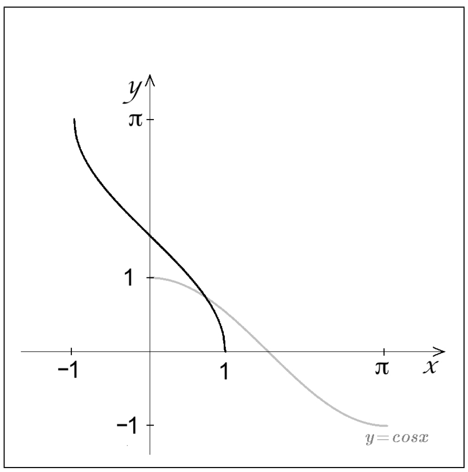
domain: $\mathbb{R}$ periodic with period 2π: for all x, $\cos(x + 2\pi) = \cos x$
range: $[-1, 1]$ even function: for all x, $\cos(-x) = \cos x$



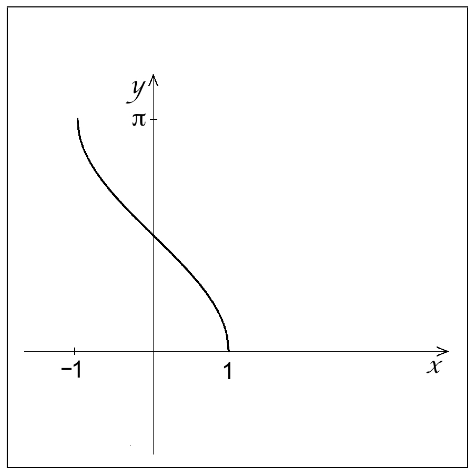
inverse function: $y = \cos^{-1} x = \arccos x$



Restrict the domain of $\cos x$ to $[0, \pi]$



Reverse function assignment



The graph of $y = \cos^{-1} x$

For $\cos^{-1} x$, the domain is $[-1, 1]$ and the range is $[0, \pi]$

$$\boxed{f(x) = \tan x = \frac{\sin x}{\cos x}}$$

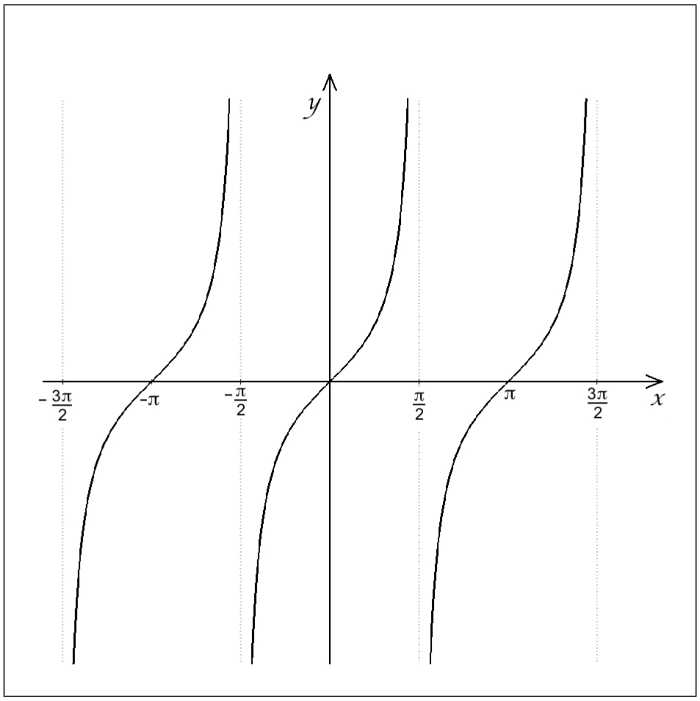
domain: $x \neq \frac{\pi}{2} + k\pi$ where $k \in \mathbb{Z}$

range: $\mathbb{R}$

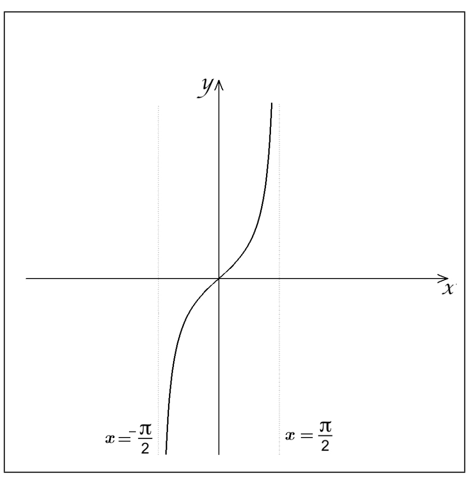
odd function: for all x, $\tan(-x) = -\tan x$

periodic with period π: for all x, $\tan(x + \pi) = \tan x$

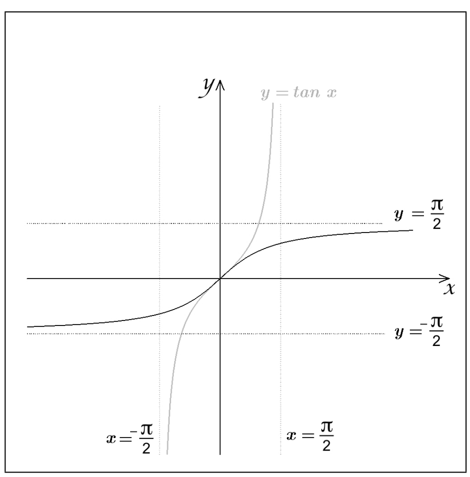
vertical asymptotes at $x = \frac{\pi}{2} + k\pi$ where $k \in \mathbb{Z}$



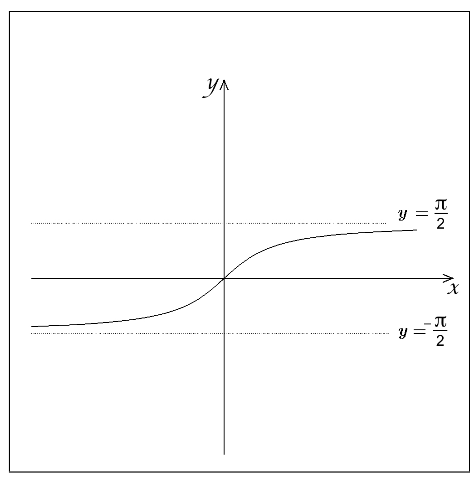
inverse function: $y = \tan^{-1} x = \arctan x$



Restrict the domain of $\tan x$ to $\left[-\frac{\pi}{2}, \frac{\pi}{2}\right]$



Reverse function assignment



The graph of $y = \tan^{-1} x$

For $\tan^{-1} x$, the domain is $\mathbb{R}$ and the range is $\left(-\frac{\pi}{2}, \frac{\pi}{2}\right)$. Horizontal asymptotes: $y = \frac{\pi}{2}$ and $y = -\frac{\pi}{2}$.

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

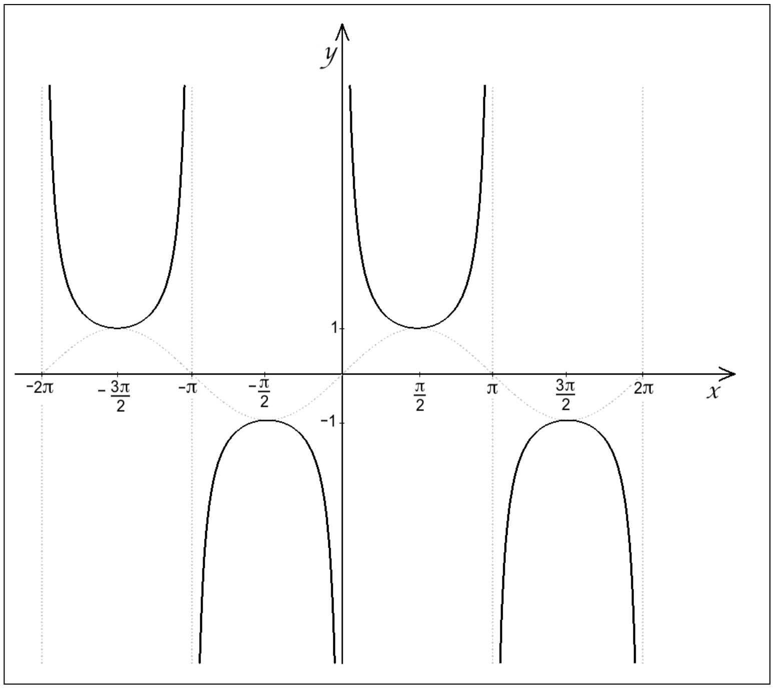
domain: $x \neq k\pi$

vertical asymptotes at $x = k\pi$ where $k \in \mathbb{Z}$

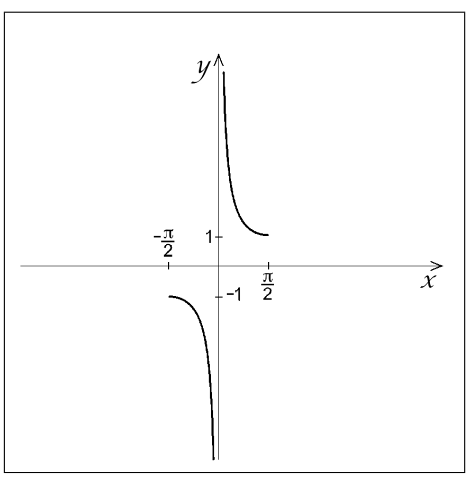
range: $(-\infty, -1] \cup [1, \infty)$

odd function: for all x, $\csc(-x) = -\csc x$

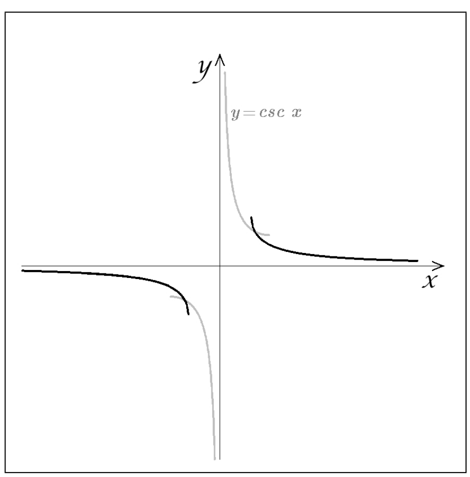
periodic with period 2π: for all x, $\csc(x + 2\pi) = \csc x$



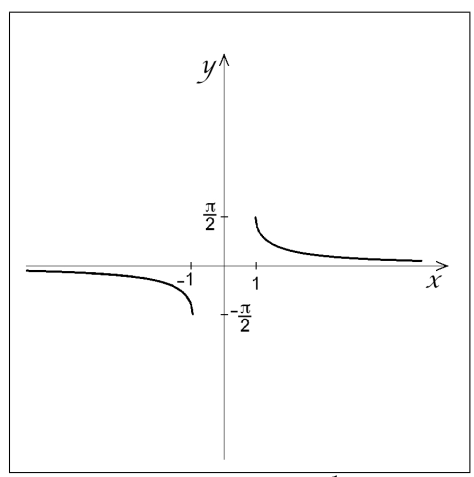
inverse function: $y = \csc^{-1} x = \operatorname{arccsc} x$



Restrict the domain of $\csc x$ to $\left[-\frac{\pi}{2}, 0\right) \cup \left(0, \frac{\pi}{2}\right]$



Reverse function assignment



The graph of $y = \csc^{-1} x$

For $\csc^{-1} x$, the domain is $(-\infty, -1] \cup [1, \infty)$ and the range is $\left(-\frac{\pi}{2}, 0\right) \cup \left(0, \frac{\pi}{2}\right)$. Horizontal asymptote: $y = 0$.

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

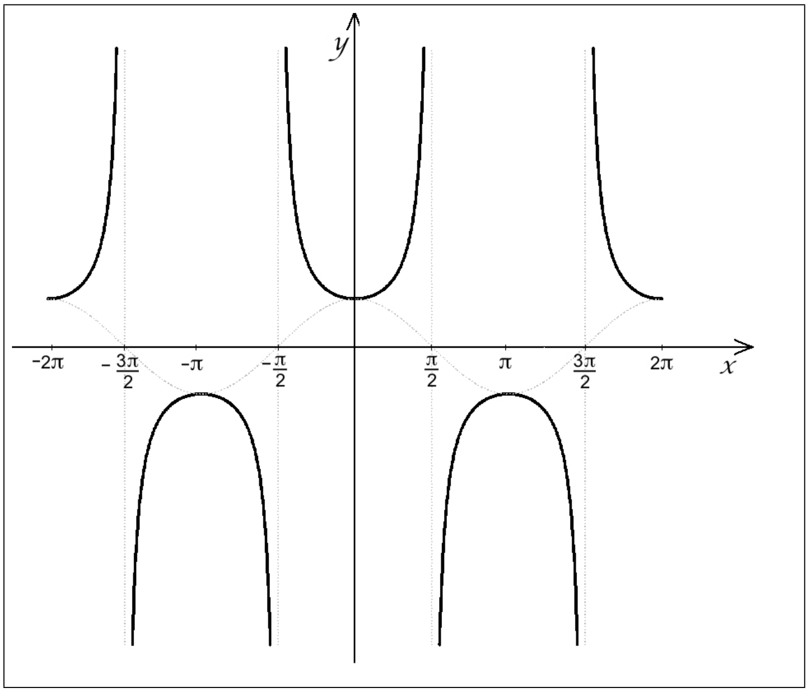
domain: $x \neq \frac{\pi}{2} + k\pi$ where $k \in \mathbb{Z}$

vertical asymptotes at $x = \frac{\pi}{2} + k\pi$ where $k \in \mathbb{Z}$

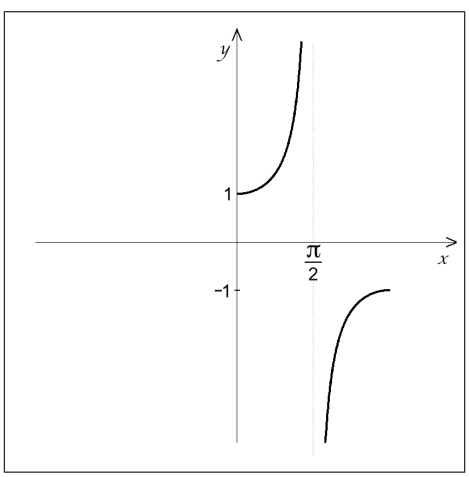
range: $(-\infty, -1] \cup [1, \infty)$

even function: for all x, $\sec(-x) = \sec x$

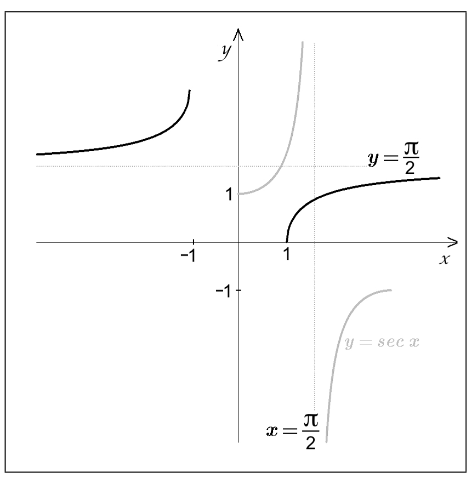
periodic with period 2π: for all x, $\sec(x + 2\pi) = \sec x$



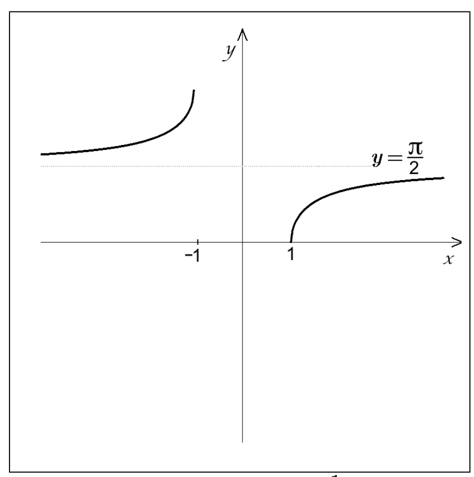
inverse function: $y = \sec^{-1} x = \operatorname{arcsec} x$



Restrict the domain of $\sec x$ to $\left[0, \frac{\pi}{2}\right) \cup \left(\frac{\pi}{2}, \pi\right]$



Reverse function assignment



The graph of $y = \sec^{-1} x$

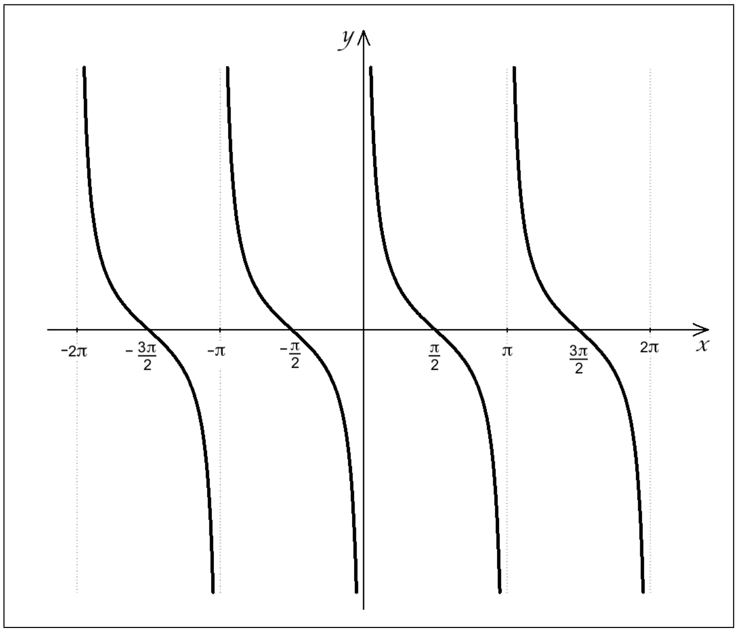
For $\sec^{-1} x$, the domain is $(-\infty, -1] \cup [1, \infty)$ and the range is $\left[0, \frac{\pi}{2}\right) \cup \left(\frac{\pi}{2}, \pi\right]$. Horizontal asymptote: $y = \frac{\pi}{2}$.

$$\boxed{f(x) = \cot x = \frac{\cos x}{\sin x}}$$

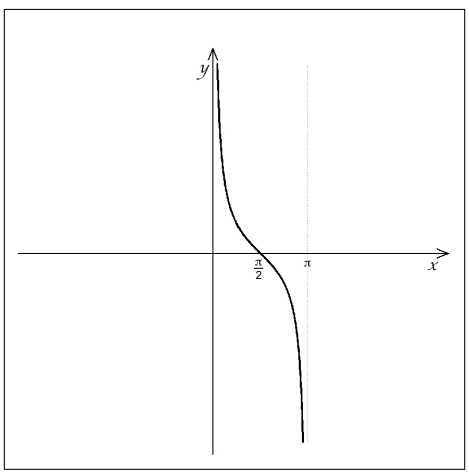
domain: $x \neq k\pi$ vertical asymptotes at $x = k\pi$ where $k \in \mathbb{Z}$

range: $\mathbb{R}$ odd function: for all x, $\cot(-x) = -\cot x$

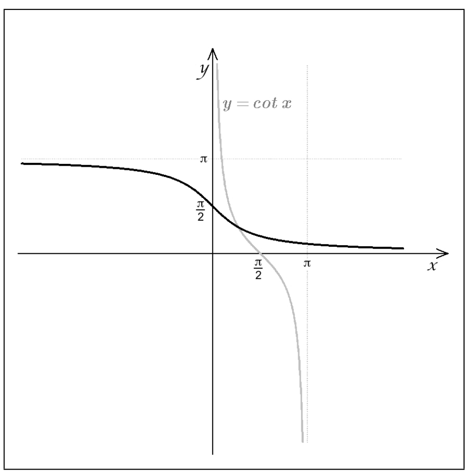
periodic with period π: for all x, $\cot(x + \pi) = \csc x$



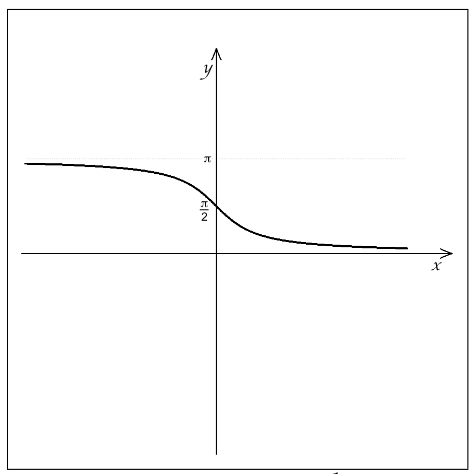
inverse function: $y = \cot^{-1} x = \operatorname{arccot} x$



Restrict the domain of $\cot x$ to $(0, \pi)$.



Reverse function assignment



The graph of $y = \cot^{-1} x$

For $\cot^{-1} x$, the domain is $\mathbb{R}$ and the range is $(0, \pi)$. Horizontal asymptote: $y = 0$ and $y = \pi$

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