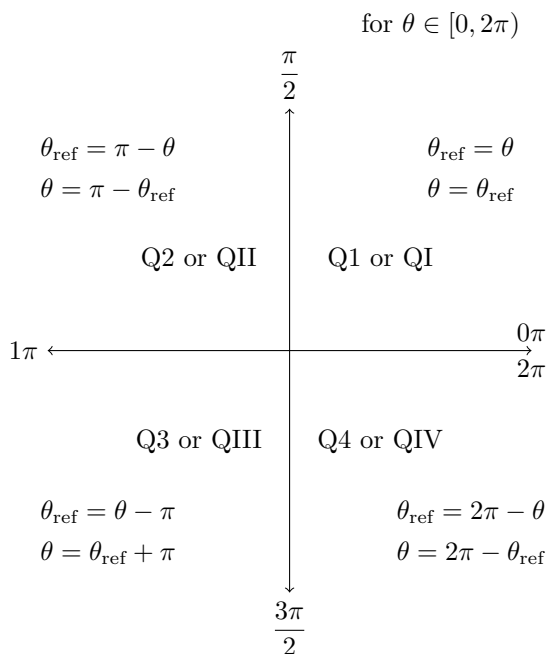
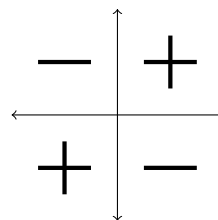


Quadrants and reference angles



Tangent and Cotangent



$\tan \theta$ and $\cot \theta$ are positive in Q1 and Q3

Sine inverse

$\sin^{-1}(\theta)$ or $\arcsin(\theta)$

Domain: $[-1, 1]$

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

$\sin^{-1}(-\theta) = -\sin^{-1}(\theta)$

Cosine inverse

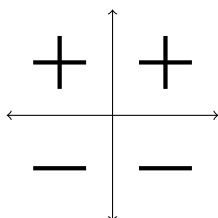
$\cos^{-1}(\theta)$ or $\arccos(\theta)$

Domain: $[-1, 1]$

Range: $[0, \pi]$

$\cos^{-1}(-\theta) = \pi - \cos^{-1}(\theta)$

Sine and Cosecant



$\sin \theta$ and $\csc \theta$ are positive in Q1 and Q2

Tangent inverse

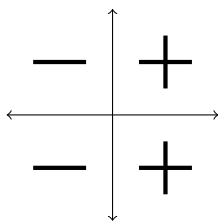
$\tan^{-1}(\theta)$ or $\arctan(\theta)$

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

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

$\tan^{-1}(-\theta) = -\tan^{-1}(\theta)$

Cosine and Secant



$\cos \theta$ and $\sec \theta$ are positive in Q1 and Q4

Derivative Formulas (Calculus)

$$\frac{d}{dx} (\sin^{-1}(x)) = \frac{1}{\sqrt{1-x^2}}$$

$$\frac{d}{dx} (\cos^{-1}(x)) = \frac{-1}{\sqrt{1-x^2}}$$

$$\frac{d}{dx} (\tan^{-1}(x)) = \frac{1}{\sqrt{1+x^2}}$$

$$\frac{d}{dx} (\cot^{-1}(x)) = \frac{-1}{\sqrt{1+x^2}}$$

$$\frac{d}{dx} (\sec^{-1}(x)) = \frac{1}{|x|\sqrt{x^2-1}}$$

$$\frac{d}{dx} (\csc^{-1}(x)) = \frac{-1}{|x|\sqrt{x^2-1}}$$