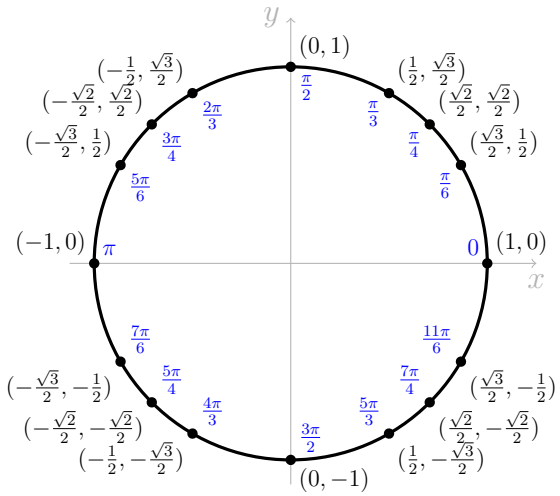
Formula Sheet

Quadratic Formula

$$ax^2 + bx + c = 0 \text{ when } x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$$

Common Angles



Double-Angle Formulas

$$\begin{aligned}\cos 2\theta &= \cos^2\theta - \sin^2\theta \\ &= 2\cos^2\theta - 1\end{aligned}$$

$$\sin 2\theta = 2\sin\theta\cos\theta$$

Principal Logarithm The argument is restricted to $(-\pi, \pi]$.

$$\operatorname{Log}(z) = \ln|z| + i\operatorname{Arg} z$$

Cauchy's Formula for Derivatives When f is holomorphic and C is a simple closed curve around w,

$$f^{(n)}(w) = \frac{n!}{2\pi i}\oint_C \frac{f(z)}{(z-w)^{n+1}}\,dz.$$

Note: *When $n = 0$ this is Cauchy's Integral formula since $0! = 1$.*

Winding Number of γ Around 0 For a piecewise smooth, closed curve $\gamma : [a, b] \to \mathbb{C}$:

$$\text{Winding Number} = \frac{1}{2\pi i}\oint_\gamma \frac{dz}{z} = \frac{1}{2\pi i}\int_a^b \frac{\gamma'(t)}{\gamma(t)}\,dt.$$