

# Misc Math Properties

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## 1 Trigonometric Integrals

$$\int \tan(x) = -\ln |\cos(x)| + C.$$

## 2 Integrate Involving Inverse Trigonometric Functions

$$\begin{aligned}\int \frac{du}{\sqrt{a^2 - u^2}} &= \arcsin\left(\frac{u}{a}\right) + C \\ \int \frac{du}{a^2 + u^2} &= \frac{1}{a} \arctan\left(\frac{u}{a}\right) + C \\ \int \frac{du}{u\sqrt{u^2 - a^2}} &= \frac{1}{a} \operatorname{arcsec}\left(\frac{|u|}{a}\right) + C.\end{aligned}$$

### 3 Integrate Involving Hyperbolic Functions

$$\begin{aligned}\int \frac{1}{\sqrt{x^2 - a^2}} dx &= \operatorname{arccosh} \left( \frac{x}{a} \right) + C \\ \int \frac{1}{a^2 - x^2} dx &= \operatorname{artanh} \left( \frac{x}{a} \right) + C \\ \int \frac{-1}{x\sqrt{x^2 - a^2}} dx &= \operatorname{arcsech} \left( \frac{x}{a} \right) + C \\ \int \frac{1}{\sqrt{x^2 + a^2}} dx &= \operatorname{arsinh} \left( \frac{x}{a} \right) + C \\ \int \frac{1}{a^2 - x^2} dx &= \operatorname{arcoth} \left( \frac{x}{a} \right) + C \\ \int \frac{1}{|x|\sqrt{x^2 + a^2}} dx &= \operatorname{arccsch} \left( \frac{x}{a} \right) + C\end{aligned}$$