

Table of Standard Integrals

$$1. \int x^n dx = \frac{x^{n+1}}{n+1} + C \quad (n \neq -1)$$

$$9. \int \sec^2 x dx = \tan x + C$$

$$2. \int \frac{dx}{x} = \ln|x| + C$$

$$10. \int \operatorname{cosec}^2 x dx = -\cot x + C$$

$$3. \int e^x dx = e^x + C$$

$$11. \int \sec x dx = \ln|\sec x + \tan x| + C$$

$$4. \int \sin x dx = -\cos x + C$$

$$12. \int \operatorname{cosec} x dx = \ln|\operatorname{cosec} x - \cot x| + C$$

$$5. \int \cos x dx = \sin x + C$$

$$13. \int \sinh x dx = \cosh x + C$$

$$6. \int \tan x dx = -\ln|\cos x| + C$$

$$14. \int \cosh x dx = \sinh x + C$$

$$7. \int \cot x dx = \ln|\sin x| + C$$

$$15. \int \tanh x dx = \ln \cosh x + C$$

$$8. \int \frac{dx}{a^2 + x^2} = \frac{1}{a} \tan^{-1}\left(\frac{x}{a}\right) + C$$

$$16. \int \frac{dx}{\sqrt{a^2 - x^2}} = \sin^{-1}\left(\frac{x}{a}\right) + C \quad (|x| < a)$$

$$17. \int \frac{dx}{\sqrt{x^2 + a^2}} = \sinh^{-1}\left(\frac{x}{a}\right) + C = \ln\left(x + \sqrt{x^2 + a^2}\right) + C'$$

$$18. \int \frac{dx}{\sqrt{x^2 - a^2}} = \cosh^{-1}\left(\frac{x}{a}\right) + C = \ln\left(x + \sqrt{x^2 - a^2}\right) + C' \quad (x > a)$$

$$\text{Linearity: } \int (\lambda f(x) + \mu g(x)) dx = \lambda \int f(x) dx + \mu \int g(x) dx$$

$$\text{Integration by substitution: } \int f(u(x)) \frac{du}{dx} dx = \int f(u) du$$

$$\text{Integration by parts: } \int f(x)g'(x) dx = f(x)g(x) - \int f'(x)g(x) dx$$
