Table of Integrals (Note: '+ C' is omitted.)

$$\int [f(x) \pm g(x) \pm \ldots]\, dx = \int f(x)\, dx \pm \int g(x)\, dx \pm \ldots$$

$$\int kf(x)\, dx = k \int f(x)\, dx\,, \quad \text{where } k \text{ is constant}$$

$$\int_a^b f(x)\, dx = \big[F(x)\big]_a^b = F(b) - F(a)\,, \quad \text{where } F'(x) = f(x)$$

$$\int x^n\, dx = \frac{x^{n+1}}{n+1}\,, \quad n \neq -1$$

$$\int [f(x)]^n\, f'(x)\, dx = \int [f(x)]^n\; d\,[f(x)] = \frac{[f(x)]^{n+1}}{n+1}\,, \quad n \neq -1$$

$$\int (ax+b)^n\; dx = \frac{(ax+b)^{n+1}}{a\,(n+1)}\,, \quad \neq -1$$

$$\int \frac{1}{x}\, dx = \ln|x|$$

$$\int \frac{f'(x)}{f(x)}\, dx = \ln|f(x)|$$

$$\int \frac{dx}{ax+b} = \frac{1}{a} \ln(ax+b)$$

$$\int e^x\, dx = e^x$$

$$\int a^x\, dx = \frac{a^x}{\ln a}$$

$$\int e^{f(x)} f'(x)\, dx = e^{f(x)}$$

$$\int e^{ax+b}\, dx = \frac{1}{a} e^{ax+b}$$

$$\int \frac{1}{a^2+b^2x^2}\, dx = \frac{1}{ab} \tan^{-1} \frac{bx}{a}\,, \quad ab \neq 0$$

$$\int \frac{1}{a^2-b^2x^2}\, dx = \frac{1}{2ab} \ln\left|\frac{a+bx}{a-bx}\right|\,, \quad ab \neq 0 \qquad \left(= \frac{1}{ab} \tanh^{-1} \frac{bx}{a}\,, \text{ when } -\left|\frac{a}{b}\right| < x < \left|\frac{a}{b}\right|\right)$$

$$\int \frac{1}{\sqrt{a^2-b^2x^2}}\, dx = \frac{1}{b} \sin^{-1} \frac{bx}{a}\,, \quad a \neq 0\,, \quad b \neq 0\,, \quad -\left|\frac{a}{b}\right| < x < \left|\frac{a}{b}\right|$$

$$\int \frac{1}{\sqrt{b^2x^2-a^2}}\, dx = \frac{1}{b} \ln\left|bx + \sqrt{b^2x^2-a^2}\right|\,, \quad a \neq 0\,, \quad b \neq 0\,, \quad 0 < \left|\frac{a}{b}\right| < |x|$$

$$\int \frac{1}{\sqrt{b^2x^2+a^2}}\, dx = \frac{1}{b} \ln\left|bx + \sqrt{b^2x^2+a^2}\right|\,, \quad a \neq 0\,, \quad b \neq 0$$

$$\int \sqrt{a^2-b^2x^2}\, dx = \frac{x}{2}\sqrt{a^2-b^2x^2} + \frac{a^2}{2b} \sin^{-1} \frac{bx}{a}\,, \quad a \neq 0\,, \quad b \neq 0\,, \quad -\left|\frac{a}{b}\right| < x < \left|\frac{a}{b}\right|$$

$$\int \sqrt{b^2x^2-a^2}\, dx = \frac{x}{2}\sqrt{b^2x^2-a^2} - \frac{a^2}{2b} \ln\left|bx + \sqrt{b^2x^2-a^2}\right|\,, \quad a \neq 0\,, \quad b \neq 0\,, \quad 0 < \left|\frac{a}{b}\right| < |x|$$

$$\int \sqrt{b^2x^2+a^2}\, dx = \frac{x}{2}\sqrt{b^2x^2+a^2} + \frac{a^2}{2b} \ln\left|bx + \sqrt{b^2x^2+a^2}\right|\,, \quad a \neq 0\,, \quad b \neq 0$$