INTEGRAL CHEATSHEET

$$\int 1dx = x + C$$

$$\int x dx = \frac{1}{2}x^2 + C$$

$$\int x^2 dx = \frac{1}{3}x^3 + C$$

$$\int \frac{1}{x^2} dx = -\frac{1}{x} + C$$

$$\int \sqrt{x}\, dx = \frac{2}{3}x^{\frac{3}{2}} + C$$

$$\int \frac{1}{\sqrt{x}} dx = 2\sqrt{x} + C$$

$$\int x^n dx = \frac{x^{n+1}}{n+1} + C$$

$$\int \frac{1}{x} dx = \ln(|x|) + C$$

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

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

$$\int \frac{1}{\sqrt{a^2 - x^2}} dx = \sin^{-1}\frac{x}{a} + C \quad (a > 0)$$

$$\int \frac{1}{\sqrt{a^2 + x^2}} dx = \sinh^{-1}\frac{x}{a} + C$$

$$\int \frac{1}{ax + b} dx = \frac{1}{a}\ln|ax + b| + C$$

$$\int \frac{1}{a^2 + x^2} dx = \frac{1}{a}\tan^{-1}\frac{x}{a} + C$$

$$\int \frac{x}{a^2 + x^2} dx = \frac{1}{2}\ln(a^2 + x^2) + C$$

$$\int \frac{1}{x^2 - a^2} dx = \frac{1}{2a}\ln\left|\frac{x - a}{x + a}\right| + C$$

$$\int \frac{x}{x^2 - a^2} dx = \frac{1}{2}\ln|x^2 - a^2| + C$$

$$\int \sin ax\, dx = -\frac{1}{a}\cos ax + C$$

$$\int \cos ax\, dx = \frac{1}{a}\sin ax + C$$

$$\int \sec^2 ax\, dx = \frac{1}{a}\tan ax + C$$

$$\int \csc^2 ax\, dx = -\frac{1}{a}\cot ax + C$$

$$\int \sec ax \tan ax\, dx = \frac{1}{a}\sec ax + C$$

$$\int \csc ax \cot ax\, dx = -\frac{1}{a}\csc ax + C$$

$$\int \cosh ax\, dx = \frac{1}{a}\sinh ax + C$$

$$\int \sinh ax\, dx = \frac{1}{a}\cosh ax + C$$

$$\int \tanh ax\, dx = \frac{1}{a}\ln(\cosh ax) + C$$

$$\int \tan x\, dx = \ln|\sec x| + C = -\ln|\cos x| + C$$

$$\int \cot x\, dx = \ln|\sin x| + C = -\ln|\csc x| + C$$

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

$$\int \csc x\, dx = -\ln|\csc x + \cot x| + C = \ln|\csc x - \cot x| + C$$

$$\int \cos^2 x\, dx = \frac{1}{2}(x + \sin x \cos x) + C$$

$$\int \sin^2 x\, dx = \frac{1}{2}(x - \sin x \cos x) + C$$

$$\int \tan^2 x\, dx = \tan x - x + C$$

$$\int \sec^3 x\, dx = \frac{1}{2}\sec x \tan x + \frac{1}{2}\ln|\sec x + \tan x| + C$$

$$\int (Af(x) + B(g(x))dx = A\int f(x)dx + B\int g(x)dx$$

$$\int f\big(u(x)\big)\frac{du}{dx}dx = \int f(u)du$$

$$\int f(x)g'(x)dx = f(x)g(x) - \int f'(x)g(x)dx$$