

A.3 Table of Integrals

$$\int u dv = uv - \int v du$$

$$\int \cos x dx = \sin x$$

$$\int \sin x dx = -\cos x$$

$$\int \tan x dx = -\ln |\cos x|$$

$$\int \sin^2 x dx = \frac{1}{2}x - \frac{1}{4}\sin 2x$$

$$\int \cos^2 x dx = \frac{1}{2}x + \frac{1}{4}\sin 2x$$

$$\int \tan^2 x dx = \tan x - x$$

$$\int \sin^n x dx = -\frac{\sin^{n-1} x \cos x}{n} + \frac{n-1}{n} \int \sin^{n-2} x dx$$

$$\int \cos^n x dx = \frac{\cos^{n-1} x \sin x}{n} + \frac{n-1}{n} \int \cos^{n-2} x dx$$

$$\int \sin ax \sin bxdx = -\frac{\sin(a+b)x}{2(a+b)} + \frac{\sin(a-b)x}{2(a-b)}, \quad a^2 \neq b^2$$

$$\int \cos ax \cos bxdx = \frac{\sin(a+b)x}{2(a+b)} + \frac{\sin(a-b)x}{2(a-b)}, \quad a^2 \neq b^2$$

$$\int \sin ax \cos bxdx = -\frac{\cos(a+b)x}{2(a+b)} - \frac{\cos(a-b)x}{2(a-b)}, \quad a^2 \neq b^2$$

$$\int \sec^2 x dx = \tan x$$

$$\int \csc^2 x dx = -\cot x$$

$$\int \sec x \tan x dx = \sec x$$

$$\int \frac{dx}{\sqrt{a^2 - x^2}} = \arcsin \frac{x}{a}$$

$$\int \frac{dx}{x\sqrt{x^2 - a^2}} = \frac{1}{a} \operatorname{arccos} \frac{a}{x}$$

$$\int \frac{dx}{a^2 + x^2} = \frac{1}{a} \arctan \frac{x}{a},$$

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

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

$$\int \sinh x dx = \cosh x$$

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$$\int e^{ax} \sin nxdx = \frac{e^{ax}(a \sin nx - n \cos nx)}{a^2 + n^2}$$

$$\int e^{ax} \cos nxdx = \frac{e^{ax}(a \cos nx + n \sin nx)}{a^2 + n^2}$$