

INTEGRALS

function

$$f(x) \frac{dg(x)}{dx}$$

$$x^n (n \neq -1)$$

$$\frac{1}{x}$$

$$e^x$$

$$\sin x$$

$$\cos x$$

$$\tan x$$

$$\operatorname{cosec} x$$

$$\sec x$$

$$\cot x$$

$$\frac{1}{a^2 + x^2}$$

$$\frac{1}{a^2 - x^2}$$

$$\frac{1}{x^2 - a^2}$$

$$\frac{1}{\sqrt{a^2 - x^2}}$$

$$\frac{1}{\sqrt{a^2 + x^2}}$$

$$\frac{1}{\sqrt{x^2 - a^2}}$$

$$\sinh x$$

$$\cosh x$$

$$\tanh x$$

$$\operatorname{cosech} x$$

$$\operatorname{sech} x$$

$$\operatorname{coth} x$$

integral

$$f(x)g(x) - \int \frac{df(x)}{dx} g(x) dx$$

$$\frac{x^{n+1}}{n+1}$$

$$\ell n|x|$$

$$e^x$$

$$-\cos x$$

$$\sin x$$

$$\ell n|\sec x|$$

$$-\ell n|\operatorname{cosec} x + \cot x| \quad \text{or} \quad \ell n\left|\tan \frac{x}{2}\right|$$

$$\ell n|\sec x + \tan x| = \ell n\left|\tan\left(\frac{\pi}{4} + \frac{x}{2}\right)\right|$$

$$\ell n|\sin x|$$

$$\frac{1}{a} \tan^{-1} \frac{x}{a}$$

$$\frac{1}{2a} \ell n \frac{a+x}{a-x} \quad \text{or} \quad \frac{1}{a} \tanh^{-1} \frac{x}{a} \quad (|x| < a)$$

$$\frac{1}{2a} \ell n \frac{x-a}{x+a} \quad \text{or} \quad -\frac{1}{a} \operatorname{coth}^{-1} \frac{x}{a} \quad (|x| > a)$$

$$\sin^{-1} \frac{x}{a} \quad (a > |x|)$$

$$\sinh^{-1} \frac{x}{a} \quad \text{or} \quad \ell n(x + \sqrt{x^2 + a^2})$$

$$\cosh^{-1} \frac{x}{a} \quad \text{or} \quad \ell n|x + \sqrt{x^2 - a^2}| \quad (|x| > a)$$

$$\cosh x$$

$$\sinh x$$

$$\ell n \cosh x$$

$$-\ell n|\operatorname{cosech} x + \operatorname{coth} x| \quad \text{or} \quad \ell n\left|\tanh \frac{x}{2}\right|$$

$$2 \tan^{-1} e^x$$

$$\ell n|\sinh x|$$

Double integral

$$\iint f(x, y) dx dy = \iint g(r, s) J dr ds$$

where

$$J = \frac{\partial(x, y)}{\partial(r, s)} = \begin{vmatrix} \frac{\partial x}{\partial r} & \frac{\partial x}{\partial s} \\ \frac{\partial y}{\partial r} & \frac{\partial y}{\partial s} \end{vmatrix}$$