

MATHEMATICS 1001 (Calculus II)
Table of Integrals

(a) $\int 0 \, dx = C$

(b) $\int k \, dx = kx + C$

(c) $\int kf(x) \, dx = k \int f(x) \, dx$

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

(e) $\int x^r \, dx = \frac{x^{r+1}}{r+1} + C$ for any $r \neq -1$

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

(g) $\int \cos(x) \, dx = \sin(x) + C$

(h) $\int \sin(x) \, dx = -\cos(x) + C$

(i) $\int \sec^2(x) \, dx = \tan(x) + C$

(j) $\int \sec(x) \tan(x) \, dx = \sec(x) + C$

(k) $\int \csc^2(x) \, dx = -\cot(x) + C$

(l) $\int \csc(x) \cot(x) \, dx = -\csc(x) + C$

(m) $\int e^x \, dx = e^x + C$

(n) $\int b^x \, dx = \frac{b^x}{\ln(b)} + C$

(o) $\int \cosh(x) dx = \sinh(x) + C$

(p) $\int \sinh(x) dx = \cosh(x) + C$

(q) $\int \tan(x) dx = -\ln|\cos(x)| + C = \ln|\sec(x)| + C$

(r) $\int \cot(x) dx = \ln|\sin(x)| + C$

(s) $\int \sec(x) dx = \ln|\sec(x) + \tan(x)| + C$

(t) $\int \csc(x) dx = -\ln|\csc(x) + \cot(x)| + C$

(u) $\int \frac{1}{\sqrt{k^2 - x^2}} dx = \arcsin\left(\frac{x}{k}\right) + C$

(v) $\int \frac{1}{x^2 + k^2} dx = \frac{1}{k} \arctan\left(\frac{x}{k}\right) + C$

(w) $\int \frac{1}{x\sqrt{x^2 - k^2}} dx = \frac{1}{k} \operatorname{arcsec}\left(\frac{x}{k}\right) + C$

(x) linear composition: given constants $m \neq 0$ and b , if $\int f(x) dx = F(x) + C$ then

$$\int f(mx + b) dx = \frac{1}{m} F(mx + b) + C$$

(y) u -substitution: if $u = g(x)$ then

$$\int f(g(x))g'(x) dx = \int f(u) du$$

(z) integration by parts: $\int w dv = wv - \int v dw$