MATHEMATICS 1001 (Calculus II)
Table of Integrals

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

(x) linear composition: given constants $m \neq 0$ and b, if $\displaystyle\int f(x)\,dx = F(x) + C$ 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: $\displaystyle\int w\,dv = wv - \int v\,dw$