Chapter 9

Integral Calculus

Functions: f, g, u, v

Independent variables: x, t, ξ

Indefinite integral of a function: $\int f(x)dx$, $\int g(x)dx$, ...

Derivative of a function: $y'(x)$, $f'(x)$, $F'(x)$, ...

Real constants: C, a, b, c, d, k

Natural numbers: m, n, i, j

9.1 Indefinite Integral

865. $\int f(x)dx = F(x) + C$ if $F'(x) = f(x)$.

866. $\left(\int f(x)dx\right)' = f(x)$

867. $\int kf(x)dx = k\int f(x)dx$

868. $\int [f(x) + g(x)]dx = \int f(x)dx + \int g(x)dx$

869. $\int [f(x) - g(x)]dx = \int f(x)dx - \int g(x)dx$

870. $\int f(ax)dx = \dfrac{1}{a}F(ax) + C$

871. $\int f(ax+b)dx = \dfrac{1}{a}F(ax+b)+C$

872. $\int f(x)f'(x)dx = \dfrac{1}{2}f^2(x)+C$

873. $\int \dfrac{f'(x)}{f(x)}dx = \ln|f(x)|+C$

874. Method of Substitution
$\int f(x)dx = \int f(u(t))u'(t)dt$ if $x = u(t)$.

875. Integration by Parts
$\int udv = uv - \int vdu$,
where $u(x)$, $v(x)$ are differentiable functions.