Integration

Fundamental Theorem of Calculus:
If $F'(x) = f(x)$,

Then $\displaystyle\int_a^b f(x)\,dx = F(b) - F(a)$

Some Basic Indefinite Integrals

- $\displaystyle\int u^n\,du = \frac{u^{n+1}}{n+1} + C, \quad n \neq -1$

- $\displaystyle\int \frac{du}{u} = \ln|u| + C$

- $\displaystyle\int e^u\,du = e^u + C$

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

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

- $\displaystyle\int \sec^2 x\,dx = \tan x + C$

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

- $\displaystyle\int \sec x \tan x\,dx = \sec x + C$

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

- $\displaystyle\int \frac{du}{\sqrt{1-u^2}} = Sin^{-1}u + C$

- $\displaystyle\int \frac{du}{1+u^2} = Tan^{-1}u + C$