$$d[cu] = cdu$$

$$d[u \pm v] = du + dv$$

$$d[uv] = udv + vdu$$

$$d\left[\frac{u}{v}\right] = \frac{vdu - udv}{v^2}$$

$$\frac{d}{dx}\left[f\left(g(x)\right)\right] = f'\left(g(x)\right) \bullet g'(x)$$

$$\frac{d}{dx}\left[\int f(x)dx\right] = f(x)$$

$$\int F'(x)dx = F(x) + C$$

Differentiation Formulas

$$\frac{d}{dx}[C] = 0$$

$$\frac{d}{dx}[kx] = k$$

$$\frac{d}{dx}[kf(x)] = kf'(x)$$

$$\frac{d}{dx}[f(x) \pm g(x)] = f'(x) \pm g'(x)$$

$$\frac{d}{dx}\left[x^n\right] = nx^{n-1}$$

$$\frac{d}{dx}[\sin x] = \cos x$$

$$\frac{d}{dx}[\cos x] = -\sin x$$

$$\frac{d}{dx}[\tan x] = \sec^2 x$$

$$\frac{d}{dx}[\sec x] = \sec x \tan x$$

$$\frac{d}{dx}[\cot x] = -\csc^2 x$$

$$\frac{d}{dx}[\csc x] = -\csc x \cot x$$

Integration Formulas

$$\int 0dx = C$$

$$\int kdx = kx + C$$

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

$$\int f(x) \pm g(x)dx = \int f(x)dx \pm \int g(x)dx$$

$$\int x^n dx = \frac{x^{n+1}}{n+1} + C, \quad n \neq -1$$

$$\int \cos x dx = \sin x + C$$

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

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

$$\int \sec x \tan x dx = \sec x + C$$

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

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

$$\int_a^a f(x)dx = 0$$

$$\int_b^a f(x)dx = -\int_a^b f(x)dx$$

$$\int_a^b f(x)dx = \int_a^c f(x)dx + \int_c^b f(x)dx$$

$$\int_a^b kf(x)dx = k\int_a^b f(x)dx$$

$$\int_a^b [f(x) \pm g(x)dx] = \int_a^b f(x)dx \pm \int_a^b g(x)dx$$