Calculus: Integral Formulas

Common Integrals

$$\int x^n dx = \frac{x^{n+1}}{n+1} + C$$

$$\int \frac{1}{x} dx = \ln|x| + C$$

$$\int e^x dx = e^x + C$$

$$\int a^x dx = \frac{a^x}{\ln a} + C$$

Double Angle Formulas

$$\sin 2\theta = 2\sin\theta\cos\theta$$

$$\cos 2\theta = \cos^2\theta - \sin^2\theta$$

$$= 1 - 2\sin^2\theta$$

$$= 2\cos^2\theta - 1$$

Trig Integrals

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

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

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

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

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

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

Power Reducing Formulas (helpful for trig integrals)

$$\sin^2 X = \frac{1 - \cos 2X}{2}$$

$$\cos^2 X = \frac{1 + \cos 2X}{2}$$

Washer and Shell Formulas

$$V = \pi \int_a^b (R^2 - r^2) dx$$

$$V = 2\pi \int_a^b h(x) \cdot r(x) dx = 2\pi \int_a^b \left[f(x) - g(x) \right] (x - c) dx$$

Integration by parts

$$\int u \, dv = uv - \int v \, du$$

Arc Length

$$s = \int \sqrt{1 + [f'(x)]^2} \, dx$$

$$s = \int \sqrt{1 + [f'(y)]^2} \, dy$$