

# Integral Applications

**Area between two curves, integrating on the x-axis**

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

**Area between two curves, integrating on the y-axis**

$$A = \int_c^d [u(y) - v(y)] dy$$

**Disk Method along the x-axis**

$$V = \int_a^b \pi [f(x)]^2 dx$$

**Disk Method along the y-axis**

$$V = \int_c^d \pi [g(y)]^2 dy$$

**Washer Method**

$$V = \int_a^b \pi [(f(x))^2 - (g(x))^2] dx$$

**Method of Cylindrical Shells**

$$V = \int_a^b (2\pi x f(x)) dx$$

**Arc Length of a Function of x**

$$\text{Arc Length} = \int_a^b \sqrt{1 + [f'(x)]^2} dx$$

**Arc Length of a Function of y**

$$\text{Arc Length} = \int_c^d \sqrt{1 + [g'(y)]^2} dy$$

**Surface Area of a Function of x**

$$\text{Surface Area} = \int_a^b \left( 2\pi f(x) \sqrt{1 + (f'(x))^2} \right) dx$$