Important Integrals

$$\int x^a dx = \frac{1}{a+1} x^{a+1} + C (a \neq -1)$$

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

$$\int e^{ax} dx = \frac{1}{a} e^{ax} + C \quad (a \neq 0)$$

$$\int a^x dx = \frac{1}{\ln a} a^x + C \quad (a > 0 \text{ and } a \neq 1)$$

Integration by Substitution

$$\int f(g(x))g'(x)dx = \int f(u)du$$

$$(where\ u = g(x))$$

Integration by Parts

$$\int f(x)g'(x) = f(x)g(x) - \int f'(x)g(x)$$

AKA $\int u * dv = uv - \int v * du$