Integral formulas to date

$$\int u^n\,du = \frac{u^{n+1}}{n+1} + C \qquad (n \neq 1) \qquad\qquad \int \frac{du}{u} = \ln|u| + C$$

$$\int \sin u\,du = -\cos u + C \qquad\qquad \int \sec^2 u\,du = \tan u + C$$

$$\int \cos u\,du = \sin u + C \qquad\qquad \int \sec u \tan u\,du = \sec u + C$$

$$\int \tan u\,du = \ln|\sec u| + C \qquad\qquad \int \sec u\,du = \ln|\sec u + \tan u| + C$$

$$\int e^u\,du = e^u + C \qquad\qquad \int a^u\,du = \frac{a^u}{\ln a} + C$$

$$\int \sinh u\,du = \cosh u + C \qquad\qquad \int \cosh u\,du = \sinh u + C$$

$$\int \frac{du}{\sqrt{a^2-u^2}} = \sin^{-1}\left(\frac{u}{a}\right) + C \qquad\qquad \int \frac{du}{u\sqrt{u^2-a^2}} = \frac{1}{a}\sec^{-1}\left(\left|\frac{u}{a}\right|\right) + C$$

$$\int \frac{du}{a^2+u^2} = \frac{1}{a}\tan^{-1}\left(\frac{u}{a}\right) + C \qquad\qquad \int \frac{du}{\sqrt{u^2+a^2}} = \frac{1}{a}\sinh^{-1}\left(\frac{u}{a}\right) + C$$

Note: $\ln x$ and $\sec^{-1} x$ are only defined for $x > 0$, so absolute value signs are needed when these functions occur.

Useful Trig Identities:

$$\sin^2\theta = \frac{1-\cos 2\theta}{2} \qquad\qquad \cos^2\theta = \frac{1+\cos 2\theta}{2}$$