Math 102, Fall 2007: Integrals and Trigonometric Identities to Memorize

Exponential and Power Functions:

$$\int e^u \, du = \boxed{e^u + C}$$

$$\int u^p \, du = \boxed{\frac{1}{p+1} u^{p+1} + C} \qquad (p \neq -1)$$

$$\int \frac{1}{u} \, du = \boxed{\ln|u| + C}$$

Trigonometric Functions:

$$\int \sin u \, du = \boxed{-\cos u + C}$$

$$\int \cos u \, du = \boxed{\sin u + C}$$

$$\int \sec^2 u \, du = \boxed{\tan u + C}$$

$$\int \csc^2 u \, du = \boxed{-\cot u + C}$$

$$\int \sec u \tan u \, du = \boxed{\sec u + C}$$

$$\int \csc u \cot u \, du = \boxed{-\csc u + C}$$

$$\int \tan u \, du = \boxed{\ln|\sec u| + C}$$

$$\int \cot u \, du = \boxed{-\ln|\csc u| + C}$$

$$\int \sec u \, du = \boxed{\ln|\sec u + \tan u| + C}$$

$$\int \csc u \, du = \boxed{-\ln|\csc u + \cot u| + C}$$

Integrals with Inverse Trigonometric Antiderivatives:

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

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

$$\int \frac{1}{u\sqrt{u^2 - a^2}} \, du = \boxed{\frac{1}{a} \sec^{-1}\left|\frac{u}{a}\right| + C}$$

Pythagorean Identities:

$$\sin^2 u + \cos^2 u = 1$$

$$\tan^2 u + 1 = \sec^2 u$$

$$1 + \cot^2 u = \csc^2 u$$

Half Angle Formulae:

$$\sin^2 u = \frac{1}{2}(1 - \cos 2u)$$

$$\cos^2 u = \frac{1}{2}(1 + \cos 2u)$$

Double Angle Formulae:

$$\sin 2u = 2 \sin u \cos u$$

$$\begin{aligned} \cos 2u &= 1 - 2\sin^2 u \\ &= \cos^2 u - \sin^2 u \\ &= 2\cos^2 u - 1 \end{aligned}$$