Integrals to know

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

$$\int a^x dx = \frac{a^x}{\ln(a)} + C \qquad \int x^n dx = \frac{x^{n+1}}{n+1} + C$$

$$\int e^{ax} dx = \frac{1}{a} e^{ax} + C \qquad \int \frac{1}{x} dx = \ln|x| + C$$

$$\int \ln(x) dx = x\ln(x) - x + C$$

$$\int \sin(x) dx = -\cos(x) + C \qquad \int \sin(ax) dx = -\frac{1}{a}\cos(ax) + C$$

$$\int \cos(x) dx = \sin(x) + C \qquad \int \cos(ax) dx = \frac{1}{a}\sin(ax) + C$$

$$\int \tan(x) dx = -\ln|\cos(x)| + C \qquad \int \tan(ax) dx = \frac{1}{a}\ln|\cos(ax)| + C$$

$$\int \cot(x) dx = \ln|\sin(x)| + C \qquad \int \cot(ax) dx = \frac{1}{a}\ln|\sin(ax)| + C$$

$$\int \sec^2(x) dx = \tan(x) + C \qquad \int \sec^2(ax) dx = \frac{1}{a}\tan(ax) + C$$

$$\int \csc^2(x) dx = -\cot(x) + C \qquad \int \csc^2(ax) dx = \frac{-1}{a}\cot(ax) + C$$

$$\int \sec(x)\tan(x) dx = \sec(x) + C \qquad \int \csc(x)\cot(x) dx = -\csc(x) + C$$

$$\int \frac{1}{a^2 + x^2} dx = \frac{1}{a}\tan^{-1}\left(\frac{x}{a}\right) + C \qquad \int \frac{1}{\sqrt{a^2 - x^2}} dx = \sin^{-1}\left(\frac{x}{a}\right) + C$$

Trig Identities to know

$$\tan\theta = \frac{\sin\theta}{\cos\theta} \qquad \cot\theta = \frac{\cos\theta}{\sin\theta} = \frac{1}{\tan\theta}$$

$$\sec\theta = \frac{1}{\cos\theta} \qquad \csc\theta = \frac{1}{\sin\theta}$$

Note that $\sec\theta$ is not the same as $\cos^{-1}\theta$ (AKA, arccos). Same for the others too.

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

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

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

$$\sin(2\theta) = 2\sin\theta\cos\theta$$

$$\cos(2\theta) = 2\cos^2(\theta) - 1 = \cos^2\theta - \sin^2\theta = 1 - 2\sin^2\theta = \frac{1-\tan^2\theta}{1+\tan^2\theta}$$

$$\tan(2\theta) = \frac{2\tan\theta}{1-\tan^2\theta}$$