∫ Math 123
CALCULUS II

Basic Integrals
and Trig Identities
In Preparation for Exam 1

Basic Integrals

$$\int x^n\,dx = \frac{1}{n+1}x^{n+1} + C$$

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

$$\int \frac{1}{x^2+1}\,dx = \arctan(x) + C$$

$$\int \frac{1}{\sqrt{1-x^2}}\,dx = \arcsin(x) + C$$

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

$$\int a^x\,dx = \frac{1}{\ln a}a^x + C$$

$$\int \cos x\,dx = \sin x + C$$

$$\int \sin x\,dx = -\cos x + C$$

$$\int \sec^2 x\,dx = \tan x + C$$

$$\int \sec x\tan x\,dx = \sec x + C$$

$$\int \sec x\,dx = \ln|\sec x + \tan x| + C$$

$$\int \tan x\,dx = \ln|\sec x| + C$$

General Forms of some Basic Integrals

$$\int e^{ax}\,dx = \frac{1}{a}e^{ax} + C$$

$$\int \frac{1}{ax+b}\,dx = \frac{1}{a}\ln|ax+b| + C$$

$$\int \frac{1}{x^2+a^2}\,dx = \frac{1}{a}\arctan\left(\frac{x}{a}\right) + C$$

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

$$\int \cos ax\,dx = \frac{1}{a}\sin ax$$

$$\int \sin ax\,dx = -\frac{1}{a}\cos ax + C$$

Conversion Identities

$$\cos^2 x = 1 - \sin^2 x$$

$$\sin^2 x = 1 - \cos^2 x$$

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

$$\tan^2 x = \sec^2 x - 1$$

Reduction Identities

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

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

$$\sin x\cos x = \frac{1}{2}\sin 2x$$