Math 242

Formula sheet

- Derivatives of inverse trigonometric functions.

$$\frac{d}{dx}\sin^{-1}(x) = \frac{1}{\sqrt{1-x^2}} \qquad\qquad \frac{d}{dx}\cos^{-1}(x) = -\frac{1}{\sqrt{1-x^2}}$$

$$\frac{d}{dx}\tan^{-1}(x) = \frac{1}{1+x^2} \qquad\qquad \frac{d}{dx}\cot^{-1}(x) = -\frac{1}{1+x^2}$$

$$\frac{d}{dx}\sec^{-1}(x) = \frac{1}{x\sqrt{x^2-1}} \qquad\qquad \frac{d}{dx}\csc^{-1}(x) = -\frac{1}{x\sqrt{x^2-1}}$$

- Trigonometric identities.

$$\sin^2 x + \cos^2 x = 1 \qquad\qquad \sin(x+y) = \sin x \cos y + \cos x \sin y$$

$$1 + \tan^2 x = \sec^2 x \qquad\qquad \cos(x+y) = \cos x \cos y - \sin x \sin y$$

$$1 + \cot^2 x = \csc^2 x \qquad\qquad \tan(x+y) = \frac{\tan x + \tan y}{1 - \tan x \tan y}$$

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

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

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

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

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

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

- Integrals of trigonometric functions.

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

$$\int \cot x \; dx = \ln|\sin x| + C$$

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

$$\int \csc x \; dx = -\ln|\csc x + \cot x| + C$$