

Differentiation Formula

$$1. \frac{d}{dx} (\sin x) = \cos x$$

$$2. \frac{d}{dx} (\cos x) = -\sin x$$

$$3. \frac{d}{dx} (\sec x) = \sec x \tan x$$

$$4. \frac{d}{dx} (\csc x) = -\csc x \cot x$$

$$5. \frac{d}{dx} (\tan x) = \sec^2 x = 1 + \tan^2 x$$

$$6. \frac{d}{dx} (\cot x) = -\csc^2 x = -1 - \cot^2 x$$

$$7. \frac{d}{dx} (\sin^{-1} x) = \frac{1}{\sqrt{1-x^2}}$$

$$8. \frac{d}{dx} (\cos^{-1} x) = -\frac{1}{\sqrt{1-x^2}}$$

$$9. \frac{d}{dx} (\tan^{-1} x) = \frac{1}{x^2 + 1}$$

$$10. \frac{d}{dx} (\cot^{-1} x) = -\frac{1}{x^2 + 1}$$

$$11. \frac{d}{dx} (\sec^{-1} x) = \frac{1}{|x| \sqrt{x^2 - 1}}$$

$$12. \frac{d}{dx} (\csc^{-1} x) = -\frac{1}{|x| \sqrt{x^2 - 1}}$$

Integration Formula

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

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

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

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

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

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

$$\int \sin^{-1} x \, dx = x \sin^{-1} x + \sqrt{1-x^2} + C$$

$$\int \cos^{-1} x \, dx = x \cos^{-1} x - \sqrt{1-x^2} + C$$

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

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

$$\int \sec^{-1} x \, dx = \text{TBD}$$

$$\int \csc^{-1} x \, dx = \text{TBD}$$