

$$\begin{aligned} \csc \theta &= \frac{1}{\sin \theta} & \sec \theta &= \frac{1}{\cos \theta} & \cot \theta &= \frac{1}{\tan \theta} \\ \tan \theta &= \frac{\sin \theta}{\cos \theta} & \cot \theta &= \frac{\cos \theta}{\sin \theta} \end{aligned}$$

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

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

Half-Angle Formulas

$$\sin^2 x = \frac{1 - \cos 2x}{2} \quad \cos^2 x = \frac{1 + \cos 2x}{2}$$

Double-Angle Formulas

$$\sin 2x = 2 \sin x \cos x$$

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

Exponential and Logarithmic Functions

$$9. \frac{d}{dx} (e^x) = e^x$$

$$10. \frac{d}{dx} (a^x) = a^x \ln a$$

$$11. \frac{d}{dx} \ln |x| = \frac{1}{x}$$

$$12. \frac{d}{dx} (\log_a x) = \frac{1}{x \ln a}$$

Trigonometric Functions

$$13. \frac{d}{dx} (\sin x) = \cos x$$

$$14. \frac{d}{dx} (\cos x) = -\sin x$$

$$15. \frac{d}{dx} (\tan x) = \sec^2 x$$

$$16. \frac{d}{dx} (\csc x) = -\csc x \cot x$$

$$17. \frac{d}{dx} (\sec x) = \sec x \tan x$$

$$18. \frac{d}{dx} (\cot x) = -\csc^2 x$$

$$\int x^n dx = \frac{x^{n+1}}{n+1} + C \quad (n \neq -1)$$

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

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

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

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

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

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

$$\int \csc^2 x dx = -\cot x + C$$

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

$$\int \csc x \cot x dx = -\csc x + C$$

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

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

$$\int \sinh x dx = \cosh x + C$$

$$\int \cosh x dx = \sinh x + C$$

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

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

$$\int \ln u du = u \ln u - u + C$$