108. Table of Derivatives. In this table, u and v represent functions of x; a, n, e represent constants ($e = 2.7183 \cdots$), and all angles are measured in radians.

$$\frac{d}{dx}(x) = 1. \qquad \frac{d}{dx}(a) = 0.$$

$$\frac{d}{dx}(u \pm v \pm \cdots) = \frac{du}{dx} \pm \frac{dv}{dx} \pm \cdots.$$

$$\frac{d}{dx}(au) = a\frac{du}{dx}. \qquad \frac{d}{dx}(uv) = u\frac{dv}{dx} + v\frac{du}{dx}.$$

$$\frac{d}{dx}\left(\frac{u}{v}\right) = \frac{v\frac{du}{dx} - u\frac{dv}{dx}}{v^2}. \qquad \frac{d}{dx}\sin u = \cos u\frac{du}{dx}.$$

$$\frac{d}{dx}(u^n) = nu^{n-1}\frac{du}{dx}. \qquad \frac{d}{dx}\cos u = -\sin u\frac{du}{dx}.$$

$$\frac{d}{dx}\log_a u = \frac{\log_a e}{u}\frac{du}{dx}. \qquad \frac{d}{dx}\tan u = \sec^2 u\frac{du}{dx}.$$

$$\frac{d}{dx}\log_e u = \frac{1}{u}\frac{du}{dx}. \qquad \frac{d}{dx}\text{ctn}\, u = -\csc^2 u\frac{du}{dx}.$$

$$\frac{d}{dx}a^u = a^u \cdot \log_e a \cdot \frac{du}{dx}. \qquad \frac{d}{dx}\sec u = \sec u \tan u\frac{du}{dx}.$$

$$\frac{d}{dx}e^u = e^u\frac{du}{dx}. \qquad \frac{d}{dx}\csc u = -\csc u\, \text{ctn}\, u\frac{du}{dx}.$$

$$\frac{d}{dx}u^v = vu^{v-1}\frac{du}{dx} + u^v \log_e u\frac{dv}{dx}. \qquad \frac{d}{dx}\text{vers}\, u = \sin u\frac{du}{dx}.$$

$$\lim_{x\to 0}\frac{\sin x}{x} = 1,\ \lim_{x\to 0}(1+x)^{1/x} = e = 2.71828\cdots = 1 + 1 + \frac{1}{2!} + \frac{1}{3!} + \cdots.$$

$$\frac{d}{dx}\sin^{-1} u = \frac{1}{\sqrt{1-u^2}}\frac{du}{dx}, \qquad \frac{-\pi}{2} \leqq \sin^{-1} u \leqq \frac{\pi}{2}.$$

$$\frac{d}{dx}\cos^{-1} u = -\frac{1}{\sqrt{1-u^2}}\frac{du}{dx}, \qquad 0 \leqq \cos^{-1} u \leqq \pi.$$

$$\frac{d}{dx}\tan^{-1} u = \frac{1}{1+u^2}\frac{du}{dx}. \qquad \frac{d}{dx}\text{ctn}^{-1} u = -\frac{1}{1+u^2}\frac{du}{dx}.$$

$$\frac{d}{dx}\sec^{-1} u = \frac{1}{u\sqrt{u^2-1}}\frac{du}{dx}, \quad -\pi \leqq \sec^{-1} u < -\frac{\pi}{2},\ 0 \leqq \sec^{-1} u < \frac{\pi}{2}.$$