While it is nice to have these memorized, here they are for convenience.

$$\tan u = \frac{\sin u}{\cos u}$$

$$\cot u = \frac{\cos u}{\sin u} = \frac{1}{\tan u}$$

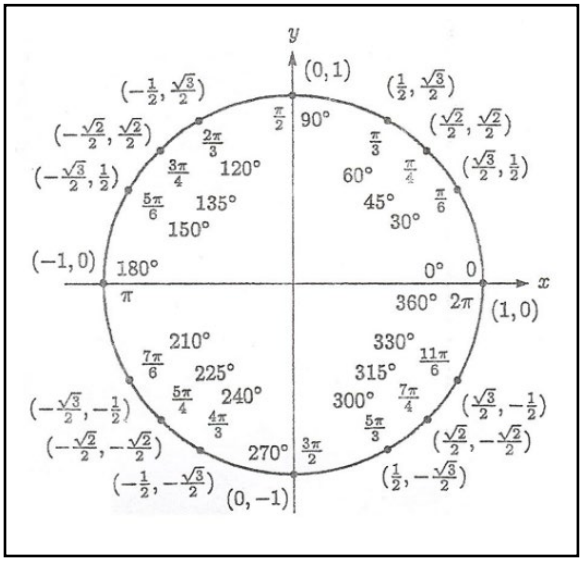
$$\csc u = \frac{1}{\sin u}$$

$$\sec u = \frac{1}{\cos u}$$

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

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

$$\cot^2 u + 1 = \csc^2 u$$




**Derivative Product Rule:** $\frac{d}{dx}(u \cdot v) = u \cdot v' + v \cdot u'$

**Derivative Quotient Rule:** $\frac{d}{dx}\left(\frac{\text{HI}}{\text{LO}}\right) = \frac{(\text{LO}) \cdot \frac{d}{dx}(\text{HI}) - (\text{HI}) \cdot \frac{d}{dx}(\text{LO})}{(\text{LO})^2}$

$$\frac{d}{dx}u^n = nu^{n-1} \cdot \frac{du}{dx}$$

$$\frac{d}{dx}e^u = e^u \cdot \frac{du}{dx}$$

$$\frac{d}{dx}\ln u = \frac{1}{u} \cdot \frac{du}{dx}$$

$$\frac{d}{dx}\sin u = \cos u \cdot \frac{du}{dx} \qquad \frac{d}{dx}\cos u = -\sin u \cdot \frac{du}{dx} \qquad \frac{d}{dx}\sin^{-1} u = \frac{1}{\sqrt{1-u^2}} \cdot \frac{du}{dx} \qquad \frac{d}{dx}\cos^{-1} u = -\frac{1}{\sqrt{1-u^2}} \cdot \frac{du}{dx}$$

$$\frac{d}{dx}\tan u = \sec^2 u \cdot \frac{du}{dx} \qquad \frac{d}{dx}\cot u = -\csc^2 u \cdot \frac{du}{dx} \qquad \frac{d}{dx}\tan^{-1} u = \frac{1}{1+u^2} \cdot \frac{du}{dx} \qquad \frac{d}{dx}\cot^{-1} u = -\frac{1}{1+u^2} \cdot \frac{du}{dx}$$

$$\frac{d}{dx}\sec u = \sec u \tan u \cdot \frac{du}{dx} \qquad \frac{d}{dx}\csc u = -\csc u \cot u \cdot \frac{du}{dx} \qquad \frac{d}{dx}\sec^{-1} u = \frac{1}{|u|\sqrt{u^2-1}} \cdot \frac{du}{dx} \qquad \frac{d}{dx}\csc^{-1} u = -\frac{1}{|u|\sqrt{u^2-1}} \cdot \frac{du}{dx}$$