INVERSE TRIG FNS - Derivatives & Integrals

$$\frac{d}{dx}\left(\sin^{-1} x\right) = \frac{1}{\sqrt{1-x^2}} \qquad \int \frac{1}{\sqrt{1-x^2}}\,dx = \sin^{-1}(x) + C$$

$$\frac{d}{dx}\left(\cos^{-1} x\right) = \frac{-1}{\sqrt{1-x^2}} \qquad \int \frac{-1}{\sqrt{1-x^2}}\,dx = \cos^{-1}(x) + C$$

$$\frac{d}{dx}\left(\tan^{-1} x\right) = \frac{1}{1+x^2} \qquad \int \frac{1}{1+x^2}\,dx = \tan^{-1} x + C$$

More <u>generally</u>, we have the following:

$$\frac{d}{dx}\left(\sin^{-1} \frac{x}{a}\right) = \frac{1}{\sqrt{a^2-x^2}} \qquad \boxed{\int \frac{1}{\sqrt{a^2-x^2}}\,dx = \sin^{-1}\left(\frac{x}{a}\right) + C}$$

$$\frac{d}{dx}\left(\cos^{-1} \frac{x}{a}\right) = \frac{-1}{\sqrt{a^2-x^2}} \qquad \int \frac{-1}{\sqrt{a^2-x^2}}\,dx = \cos^{-1}\left(\frac{x}{a}\right) + C$$

$$\frac{d}{dx}\left(\tan^{-1} \frac{x}{a}\right) = \frac{a}{a^2+x^2} \qquad \boxed{\int \frac{1}{a^2+x^2}\,dx = \frac{1}{a}\tan^{-1}\left(\frac{x}{a}\right) + C}$$