

Name Answer Key
Date 2012-2013 Period

Sec 3.6

Derivatives of Inverse Trigonometric functions:

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

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

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

Example 5: Differentiate $f(x) = x \arctan \sqrt{x}$

$$f = x \\ f' = 1$$

$$g = \arctan \sqrt{x} \\ g' = \frac{1}{2\sqrt{x}(1+x)}$$

$$\rightarrow \arctan u \\ \frac{d}{du} \arctan u \\ \frac{1}{1+u^2} \\ \frac{1}{1+x}$$

$$u = \sqrt{x} \\ u' = \frac{1}{2\sqrt{x}}$$

$$f'(x) = \arctan \sqrt{x} + \frac{x}{2\sqrt{x}(1+x)}$$

$$\text{or } \arctan \sqrt{x} + \frac{x}{2\sqrt{x} + 2x\sqrt{x}}$$