SM 121 LESSON 30 45/47 10/16/2008

SECTION 3.5 IMPLICIT DIFFERENTIATION CONTINUED

(45) $\frac{d}{dx}\left(y = \tan^{-1}\sqrt{x}\right)$

$\frac{d}{dx}\left(y = \tan^{-1} u\right)$ $\quad u = \sqrt{x} \quad u' = \frac{1}{2\sqrt{x}}$

$$y' = \frac{1}{1+u^2} \cdot u'$$

$$y' = \frac{\frac{1}{2\sqrt{x}}}{1+(\sqrt{x})^2}$$

$$\boxed{y' = \frac{1}{2\sqrt{x}(1+x)}}$$

(47) $\frac{d}{dx}\left(y = \sin^{-1}(2x+1)\right)$

$\frac{d}{dx}\left(y = \sin^{-1} u\right)$ $\quad u = 2x+1 \quad u' = 2$

$$y' = \frac{1}{\sqrt{1-u^2}} \cdot u'$$

$$y' = \frac{1}{\sqrt{1-(2x+1)^2}} \cdot 2$$

$$y' = \frac{2}{\sqrt{1-(4x^2+4x+1)}}$$

$$y' = \frac{2}{\sqrt{-4x^2-4x}} = \frac{2}{\sqrt{4(-x^2-x)}} = \frac{2}{2\sqrt{-x^2-x}} = \boxed{\frac{1}{\sqrt{-x^2-x}}}$$