

HW #13

4.5 / (2)

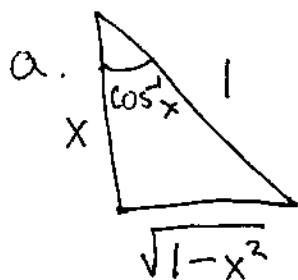
a. $\sin^{-1}(\frac{1}{2}\sqrt{3}) = x$
 $\sin x = \frac{1}{2}\sqrt{3}$
 $x = \pi/3$

b. $\cos^{-1}(\frac{1}{2}) = x$
 $\cos x = \frac{1}{2}$
 $x = \pi/3$

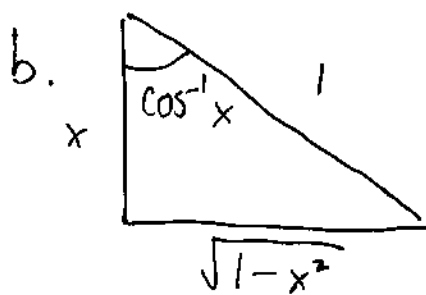
c. ~~any~~
 $\tan^{-1}(1) = x$
 $\tan x = 1$
 $x = \pi/4$

d. $\sec^{-1}(-2) = x$
 $\sec x = -2 \rightarrow \cos x = -\frac{1}{2}$
 $x = 2\pi/3$

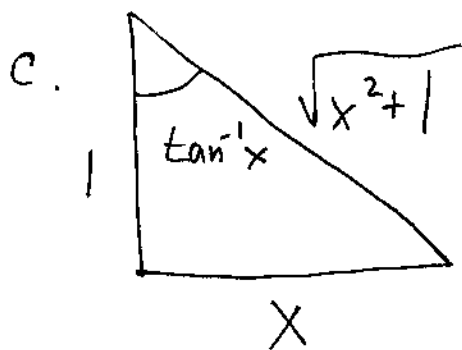
(12)



$$\sin(\cos^{-1}x) = \sqrt{1-x^2}$$



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



$$\begin{aligned} \csc(\tan^{-1}x) &= \frac{1}{\sin(\tan^{-1}x)} \\ &= \frac{\sqrt{x^2+1}}{x} \end{aligned}$$

d. same picture as c. $\sin(\tan^{-1}x) = \frac{x}{\sqrt{x^2+1}}$

$$(21) \quad a. \quad y = \sin^{-1}\left(\frac{1}{3}x\right)$$

$$\frac{dy}{dx} = \frac{1}{\sqrt{1 - \left(\frac{1}{3}x\right)^2}} \cdot \frac{1}{3} = \frac{1}{3\sqrt{1 - \frac{x^2}{9}}}$$

$$= \frac{1}{\sqrt{9\left(1 - \frac{x^2}{9}\right)}} = \frac{1}{\sqrt{9 - x^2}}$$

$$b. \quad y = \cos^{-1}(2x+1)$$

$$\frac{dy}{dx} = \frac{-1}{\sqrt{1 - (2x+1)^2}} \cdot 2 = \frac{-2}{\sqrt{1 - (4x^2 + 4x + 1)}}$$

$$= \frac{-2}{\sqrt{1 - 4x^2 - 4x - 1}} = \frac{-2}{\sqrt{-4x^2 - 4x}}$$

$$= \frac{-1}{\sqrt{-x^2 - x}}$$

$$(22) a. y = \tan^{-1}(x^2)$$

$$\frac{dy}{dx} = \frac{1}{1+(x^2)^2} \cdot 2x = \frac{2x}{1+x^4}$$

$$b. y = \cot^{-1} \sqrt{x}$$

$$\frac{dy}{dx} = \frac{-1}{1+(\sqrt{x})^2} \cdot \frac{1}{2} x^{-1/2} = \frac{-1}{2\sqrt{x}(1+x)}$$