

Name: KEY

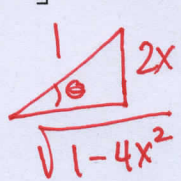
Read all directions and problems carefully! Show all appropriate work for credit.

1. Find the exact value of the following inverse trig functions.

~~$\cos(\cos^{-1} \frac{1}{3})$~~

$\frac{1}{3}$ SINCE $\frac{1}{3} \in \text{DOMAIN OF } \cos^{-1} : [-1, 1]$

$\cos[\sin^{-1} 2x] = \cos \theta = \frac{\sqrt{1-4x^2}}{1}$



(+1)

$\sec(\tan^{-1}(-1)) \rightarrow \text{EVEN POWER.}$
 $\sec(-\frac{\pi}{4}) = \frac{1}{\cos \frac{\pi}{4}} = \frac{1}{\frac{\sqrt{2}}{2}} = \frac{2}{\sqrt{2}} = \sqrt{2}$

(+1)

2. Find the derivative of the following functions.

$y = \sec^{-1}(\sqrt[3]{x})$

$y = \cos^{-1}(1-x) + \cot^{-1} 3x$

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

$= \frac{1}{3|x| \sqrt{x^{\frac{2}{3}} - 1}}$

(+2)

$\frac{dy}{dx} = \frac{-1}{\sqrt{1-(1-x)^2}}(-1) + \frac{-1}{1+(3x)^2}(3)$

$= \frac{+1}{\sqrt{2x-x^2}} - \frac{3}{1+9x^2}$

(+4)

3. Evaluate the following integrals involving inverse trigonometric functions.

$\int \frac{1}{25+4x^2} dx = \int \frac{1}{5^2+(2x)^2} dx$ $u=2x$
 $\frac{du}{2} = \frac{2dx}{2}$

$\int \frac{6}{\sqrt{4-(x+1)^2}} dx = 6 \int \frac{1}{\sqrt{2^2-(x+1)^2}} dx$

$= \frac{1}{2} \int \frac{1}{5^2+u^2} du$

$= 6 \cdot \sin^{-1} \frac{x+1}{2} + C$

(+3)

$= \frac{1}{2} \cdot \frac{1}{5} \tan^{-1} \frac{u}{5} + C$

$= \frac{1}{10} \tan^{-1} \frac{2x}{5} + C$

(+3)