Math 152-AN Quiz #3 Satake

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.

$\cancel{\cos}\left(\cancel{\cos^{-1}}\frac{1}{3}\right)$

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

+1

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

θ

1, $2x$, θ, $\sqrt{1-4x^2}$

+1

$\sec\left(\tan^{-1}(-1)\right) \rightarrow$ EVEN FUNCT.

$\sec\left(-\frac{\pi}{4}\right)$

$\frac{1}{\cos\frac{\pi}{4}} = \frac{1}{\frac{\sqrt{2}}{2}} = \frac{2}{\sqrt{2}} = \boxed{\sqrt{2}}$

+1

2. Find the derivative of the following functions.

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

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

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

+2

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

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

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

+4

3. Evaluate the following integrals involving inverse trigonometric functions.

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

$u = 2x$

$\frac{du}{2} = \frac{\cancel{2}dx}{\cancel{2}}$

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

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

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

+3

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

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

+3

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