Name Key

Quiz Review 3.7-3.9

1. Find $\frac{dy}{dx}$ if $x = \tan x + y^2 - 2xy$. ($2xy$: u v)

$$1 = \sec^2 x + 2y\frac{dy}{dx} - \left(2y + 2x\frac{dy}{dx}\right)$$

$$1 = \sec^2 x + 2y\frac{dy}{dx} - 2y - 2x\frac{dy}{dx}$$

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

$$\boxed{\frac{dy}{dx} = \frac{1 - \sec^2 x + 2y}{2y - 2x}}$$

2. Find an equation of the line that is tangent to the graph of $5x + 6 = 4x^3y + y^3$ at $(1,2)$. ($4x^3y$: u v)

$$5 = 12x^2y + 4x^3\frac{dy}{dx} + 3y^2\frac{dy}{dx}$$

$$5 - 12x^2y = \frac{dy}{dx}(4x^3 + 3y^2)$$

$$\boxed{\frac{dy}{dx} = \frac{5 - 12x^2y}{4x^3 + 3y^2}}$$

3. Find $\frac{dy}{dx}$ if $y = \sin^{-1} x^3$.

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

$$\boxed{\frac{dy}{dx} = \frac{3x^2}{\sqrt{1 - x^6}}}$$

4. Which of the following cannot be true if $f'(x) = 16x^7$?

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a) $f(x) = 2x^8$ True

b) $f''(x) = 112x^6$ True

c) $f'''(x) = 672x^5$

(d) $f''(x) = 23x^6$ False

$f''(x) = 112x^6$

$f'''(x) = 672x^5$

5. Which expression is equivalent to $\tan^{-1} x$?

a) $\frac{\sin^{-1} x}{\cos^{-1} x}$

(b) $\cot^{-1}\left(\frac{1}{x}\right)$

c) $\frac{1}{\tan x}$

$y = \tan^{-1} x \rightarrow \tan y = x \rightarrow \frac{1}{\tan y} = \frac{1}{x}$ $\quad \cot y = \frac{1}{x}$

$\cot^{-1}\left(\frac{1}{x}\right) = y$

6. Find $\frac{dy}{dx}$ if $y = (4x^2 - 8)\tan x$. (u, v)

$$\frac{dy}{dx} = (4x^2 - 8)\sec^2 x + 8x \tan x$$

7. Find $\frac{dy}{dx}$ if $y = \ln(4x^2 + 3x)$.

$$y' = \frac{1}{4x^2 + 3x} \cdot 8x + 3 = \frac{8x+3}{4x^2+3x}$$