Name: Richard

QUIZ 10

MATH 200
September 23, 2025

Directions: Differentiate the following functions.

1. $y = \left(x^3 + \cos(x)\right)^8$

$$\frac{dy}{dx} = \boxed{8\left(x^3+\cos(x)\right)^7\left(3x^2-\sin(x)\right)}$$

2. $y = \sqrt{x^2+9} = (x^2+9)^{\frac{1}{2}}$

$$\frac{dy}{dx} = \frac{1}{2}(x^2+9)^{\frac{1}{2}-1}(2x+0) = \frac{2x}{2(x^2+9)^{1/2}} = \boxed{\frac{x}{\sqrt{x^2+9}}}$$

3. $y = \left(\tan(x)+x\right)\left(1+e^x\right)^{100}$

$$y' = (\sec^2(x)+1)(1+e^x)^{100} + (\tan(x)+x)\,100\,(1+e^x)^{99}(0+e^x)$$

$$= \boxed{(\sec^2(x)+1)(1+e^x)^{100} + 100\,e^x(\tan(x)+x)(1+e^x)^{99}}$$

4. $y = \sin\left(e^{5x^2}\right)$

$$D_x\left[\sin\left(e^{5x^2}\right)\right] = \cos\left(e^{5x^2}\right) D_x\left[e^{5x^2}\right]$$

$$= \cos\left(e^{5x^2}\right) e^{5x^2}\, 5\cdot 2x$$

$$= \boxed{10x\,e^{5x^2}\cos\left(e^{5x^2}\right)}$$

Name: _____

QUIZ 10

MATH 200
September 23, 2025

Directions: Differentiate the following functions.

1. $y = \sqrt[3]{\cos(x) + \sin(x)}$ $= (\cos(x)+\sin(x))^{\frac{1}{3}}$

$y' = \frac{1}{3}(\cos(x)+\sin(x))^{\frac{1}{3}-1}(-\sin(x)+\cos(x))$

$= \frac{\cos(x)-\sin(x)}{3(\cos(x)+\sin(x))^{2/3}} = \boxed{\frac{\cos(x)-\sin(x)}{3\sqrt[3]{(\cos(x)+\sin(x))^2}}}$

2. $y = (x^3 + 2e^x)^7$

$y' = \boxed{7(x^3+2e^x)^6(3x^2+2e^x)}$

3. $y = (x + e^x)(1 + \tan(x))^{100}$

$y' = (1+e^x)(1+\tan(x))^{100} + (x+e^x)100(1+\tan(x))^{99}(0+\sec^2(x))$

$= \boxed{(1+e^x)(1+\tan(x))^{100} + 100\sec^2(x)(x+e^x)(1+\tan(x))^{99}}$

4. $y = e^{\sin(5x^2)}$

$\frac{dy}{dx} = e^{\sin(5x^2)} D_x[\sin(5x^2)]$

$= e^{\sin(5x^2)}\cos(5x^2)\,10x$

$= \boxed{10x\,e^{\sin(5x^2)}\cos(5x^2)}$