Name: Richard

QUIZ 10 ♡

MATH 200
October 4, 2021

Directions: Differentiate the following functions.

1. $y = e^{x^3-2x}$

$$y' = \boxed{e^{x^3-2x}(3x^2-2)}$$

2. $y = \sqrt{\cos(x)} = (\cos(x))^{1/2}$

$$y' = \frac{1}{2}\cos(x)^{\frac{1}{2}-1}(-\sin(x)) = \frac{-\sin(x)}{2(\cos(x))^{1/2}} = \boxed{\frac{-\sin(x)}{2\sqrt{\cos(x)}}}$$

3. $y = \sin\left((x^4 - x^3)^8\right)$

$$y' = \cos((x^4-x^3)^8)\, D_x\left[(x^4-x^3)^8\right]$$

$$= \boxed{\cos((x^4-x^3)^8)\, 8(x^4-x^3)^7(4x^3-3x^2)}$$

4. $y = \left(\frac{x-1}{x+1}\right)^9$

$$y' = 9\left(\frac{x-1}{x+1}\right)^8 \frac{1\cdot(x+1) - (x-1)\cdot 1}{(x+1)^2} = \boxed{9\left(\frac{x-1}{x+1}\right)^8 \frac{2}{(x+1)^2}}$$

$$= \boxed{\frac{18(x-1)^8}{(x+1)^{10}}}$$

5. $y = 4w^8 - w + 1 + w^3\sin(\pi w)$

$$y' = 32w^7 - 1 + 0 + 3w^2\sin(\pi w) + w^3\cos(\pi w)\pi$$

$$= \boxed{32w^7 - 1 + 3w^2\sin(\pi w) + \pi w^3\cos(\pi w)}$$

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QUIZ 10 ♣

MATH 200
October 4, 2021

Directions: Differentiate the following functions.

1. $y = \sin^5(x)$ $= (\sin(x))^5$

$$D_x\left[(\sin(x))^5\right] = \boxed{5(\sin(x))^4 \cos(x)}$$

2. $y = e^{x-x^2}$

$$\boxed{y' = e^{x-x^2}(1-2x)}$$

3. $y = \sqrt{xe^{-x}}$ $= (xe^{-x})^{1/2}$

$$y' = \frac{1}{2}(xe^{-x})^{\frac{1}{2}-1}\left(1\cdot e^{-x} + xe^{-x}(-1)\right)$$

$$= \frac{1}{2(xe^{-x})^{1/2}}\left(e^{-x} - xe^{-x}\right) = \boxed{\frac{e^{-x}(1-x)}{2\sqrt{xe^{-x}}}}$$

4. $y = \left(x + \tan\left(x^5\right)\right)^9$

$$y' = 9(x+\tan(x^5))^8 D_x\left[x + \tan(x^5)\right]$$

$$= \boxed{9(x+\tan(x^5))^8(1+\sec^2(x^5)5x^4)}$$

5. $y = 4w^8 - w + 1 + w^3\sin(\pi w)$

$$\frac{dy}{dx} = 32w^7 - 1 + 0 + 3w^2\sin(\pi w) + w^3\cos(\pi w)\pi$$

$$= \boxed{32w^7 - 1 + 3w^2\sin(\pi w) + \pi w^3\cos(\pi w)}$$

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QUIZ 10 ◊

MATH 200
October 4, 2021

Directions: Differentiate the following functions.

1. $y = \sec(-3x)$

$$y' = \sec(-3x)\tan(-3x)(-3)$$
$$= \boxed{-3\sec(-3x)\tan(-3x)}$$

2. $y = 7e^{x^2-2x+4}$

$$\frac{dy}{dx} = \boxed{7e^{x^2-2x+4}(2x-2)}$$

3. $y = \sqrt{x\sin(x)}$ $= (x\sin(x))^{1/2}$

$$y' = \frac{1}{2}(x\sin(x))^{1/2-1}(1\cdot\sin(x) + x\cos(x))$$
$$= \frac{\sin(x) + x\cos(x)}{2(x\sin(x))^{1/2}} = \boxed{\frac{\sin(x) + x\cos(x)}{2\sqrt{x\sin(x)}}}$$

4. $y = \tan\left((x^6+4x^2)^7\right)$

$$\frac{dy}{dx} = \sec^2\left((x^6+4x^2)^7\right) D_x\left[(x^6+4x^2)^7\right]$$
$$= \boxed{\sec^2\left((x^6+4x^2)^7\right) 7(x^6+4x^2)^6(6x^5+8x)}$$

5. $y = 4w^8 - w + 1 + w^3\sin(\pi w)$

$$\frac{dy}{dw} = 32w^7 - 1 + 0 + 3w^2\sin(\pi w) + w^3\cos(\pi w)\pi$$
$$= \boxed{32w^7 - 1 + 3w^2\sin(\pi w) + \pi w^3\cos(\pi w)}$$

Name: Richard

Quiz 10 ♠

MATH 200
October 4, 2021

Directions: Differentiate the following functions.

1. $y = e^{\sin(x)}$

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

2. $y = \sec\left(x^3 - 2x\right)$

$y' = \boxed{\sec(x^3-2x)\tan(x^3-2x)(3x^2-2)}$

3. $y = \sin\left(\tan\left(x^3 - 2x\right)\right)$

$D_x\left[\sin(\tan(x^3-2x))\right]$

$= \cos(\tan(x^3-2x))\, D_x\left[\tan(x^3-2x)\right]$

$= \boxed{\cos(\tan(x^3-2x))\sec^2(x^3-2x)(3x^2-2)}$

4. $y = \sqrt[3]{\dfrac{x-1}{x+1}} = \left(\dfrac{x-1}{x+1}\right)^{1/3}$

$y' = \dfrac{1}{3}\left(\dfrac{x-1}{x+1}\right)^{1/3-1}\dfrac{(1)(x+1)-(x-1)\cdot 1}{(x+1)^2} = \dfrac{1}{3}\left(\dfrac{x-1}{x+1}\right)^{-2/3}\dfrac{2}{(x+1)^2}$

$= \dfrac{2}{3}\dfrac{1}{\sqrt[3]{\dfrac{x-1}{x+1}}^{\,2}}\dfrac{1}{(x+1)^2} = \boxed{\dfrac{2\sqrt[3]{x+1}^{\,2}}{3\sqrt[3]{x-1}\,(x+1)^2}}$

5. $y = 4w^8 - w + 1 + w^3\sin(\pi w)$

$\dfrac{dy}{dw} = 32w^7 - 1 + 0 + 3w^2\sin(\pi w) + w^3\cos(\pi w)\pi$

$= \boxed{32w^7 - 1 + 3w^2\sin(\pi w) + \pi w^3\cos(\pi w)}$