MTH 1125 - Test 2 (2pm Class)

Fall 2023

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Instructions. Show CLEARLY how you arrive at your answers.

1. Compute: $\frac{d}{dx}\left[2x^6+3x^4+8x^3+12x^2+20x+40\sqrt{x}+10\right]=$

2. Compute: $\frac{d}{dx}\left[\left(\sin\left(x\right)+8x^5\right)\left(\cos\left(x\right)+4x+2\right)\right]=$

3. Compute: $\frac{d}{dx}\left[\frac{3x^6+6x^3+18x}{3x^3+9x+9}\right]=$

4. Compute: $\frac{d}{dx}\left[\left(5x^3+6x^2+9x\right)^{15}\right]=$

5. Given that $f(x) = -2x^2 + 3x + 3$, give the *equation* of the line tangent to the graph of $f(x)$ at the point $(2, 1)$.

6. Given that $w = \tan(u)$ and that $u = 3t^2 + 3t + 3$; compute $\frac{dw}{dt}$ **using the Liebniz form of the Chain Rule.** (In particular, when doing this exercise, *write explicitly the Liebniz form of the chain rule that you are going to use.)*

7. Compute: $\frac{d}{dx}\left[\sec\left(3x^4 + 6x^3\right)\right] =$

8. Compute: $\frac{d}{dx}\left[\left(\frac{4x^3+6x}{4x^4+8x^2+16}\right)^{10}\right] =$

9. Compute: $\frac{d}{dx}\left[\sin^{12}\left(x^3+3x^2\right)\right] =$

10. Given that $5x^4 - x^4y^4 = \tan\left(y\right),$ compute $\frac{dy}{dx}$

11. Given that $f\left(x\right) = 6x^2 - 8x + 4$, compute $f'\left(x\right)$ **using the definition of derivative.** (i.e., using the "limit process.")

Extra (Wow! 10 Points)

Given that $L'(x) = \frac{1}{\sqrt{x^2+1}}$ (i.e., $\frac{d}{dx}[L(x)] = \frac{1}{\sqrt{x^2+1}}$); compute $\frac{d}{dx}[L(\tan(x))]$