MTH 1125 - Test 2

SUMMER 2023

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Instructions. Show CLEARLY how you arrive at your answers.

1. Compute: $\frac{d}{dx}\left[6x^6 + 9x^4 - 12x^3 + 18x^2 + 8x + 4\sqrt{x} + 2\right] =$

2. Compute: $\frac{d}{dx}\left[\left(6x^4 + 8x^3 + 5\right)\left(3x^2 + 6x + 2\right)\right] =$

3. Compute: $\frac{d}{dx}\left[\frac{10x^3+15x^2+10x+2}{2x^2+8x}\right] =$

4. Compute: $\frac{d}{dx}\left[\left(6x^4 + 12x^2 + 7\right)^5\right] =$

5. Given that $f(x) = 4x^2 - 7x + 4$, write the *equation* of the line tangent to the graph of $f(x)$ at the point $(2, 6)$.

6. Given that $v = \sin(w)$ and that $w = x^3 + 3x$; compute $\frac{dv}{dx}$ **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: $\frac{d}{dx}[\sec(\sin(x))] =$

8. Compute: $\frac{d}{dx}\left[\left(\frac{3x^4+6x^2+3}{\cos(x)+4x^2}\right)^{20}\right] =$

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

10. Given that $3y^2+6x^3y^5+2x^5=\tan\left(y\right),\quad$ compute $\frac{dy}{dx}$

11. Given that $f\left(x\right)=2x^2+6x+7$, compute $f'\left(x\right)$ **using the definition of derivative.** (i.e., using the "limit process.")

Extra (Wow! 10 Points)

Given that $L'(x) = \frac{2x+6}{x^2+6x+5}$ (i.e., $\frac{d}{dx}[L(x)] = \frac{2x+6}{x^2+6x+5}$); compute $\frac{d}{dx}[L(\tan(x))] =$