MTH 1125 - Test 2 (12pm Class)

Fall 2022

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Instructions. Show CLEARLY how you arrive at your answers.

1. Compute: $\frac{d}{dx}\left[3x^5+4x^4+6x^3+9x^2+16x+30\sqrt{x}+10\right]=$

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

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

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

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

6. Given that $w = \tan(u)$ and that $u = 3v^2 + 2v + 5$; compute $\frac{dw}{dv}$ **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: $\frac{d}{dx}\left[\sec\left(2x^3 + 3x^2\right)\right] =$

8. Compute: $\frac{d}{dx}\left[\left(\frac{2x^2+6x}{5x^2+10x+15}\right)^5\right] =$

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

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

11. Given that $f\left(x\right) = 4x^2 - 5x + 5$, compute $f'\left(x\right)$ **using the definition of derivative.** (i.e., using the "limit process.")

Extra (Wow! 10 Points)

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