

MTH 1125 - Test 2 (12pm Class)

FALL 2021

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Name _____

Instructions. Show CLEARLY how you arrive at your answers.

1. Compute: $\frac{d}{dx} [4x^5 + 4x^4 + 6x^3 + 6x^2 + 8x + 8\sqrt{x} + 10] =$

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

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

4. Compute: $\frac{d}{dx} [(8x^3 + 12x^2 + 6x)^5] =$

5. Given that $f(x) = 4x^3 + 4x - 5$, give the *equation* of the line tangent to the graph of $f(x)$ at the point $(1, 3)$.

6. Given that $w = 3u^4 + 4u$ and that $u = \cos(v)$; compute $\frac{dw}{dv}$ **using the Leibniz form of the Chain Rule.** (In particular, when doing this exercise, *write explicitly the Leibniz form of the chain rule that you are going to use.*)

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

8. Compute: $\frac{d}{dx} \left[\left(\frac{5x^2 + 12x}{8x^2 + 10x + 1} \right)^6 \right] =$

9. Compute: $\frac{d}{dx} [\csc^{10}(4x^4 + 16x)] =$

10. Given that $x^6 - x^6y^4 = \sin(y)$, compute $\frac{dy}{dx}$

11. Given that $f(x) = 3x^2 - 9x + 2$, compute $f'(x)$ **using the definition of derivative.**
(i.e., using the “limit process.”)

Extra (Wow! 10 Points)

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