MTH 1125 - Test 2

FALL 2015

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Instructions. Show CLEARLY how you arrive at your answers.

1. Compute: $\frac{d}{dx}\left[8x^6+12x^4+16x^3+24x^2+48x+2\sqrt{x}+48\right]=$

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

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

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

5. Given that $f\left(x\right)=3x^2-6x+4$, give the *equation* of the line tangent to the graph of $f\left(x\right)$ at the point $\left(2,4\right)$.

6. Given that $x = \tan(y)$ and that $y = 8t^2 + 8t$; compute $\frac{dx}{dt}$ **using the Liebniz form of the Chain Rule.** (In particular, when doing this exercise, *write the Liebniz form of the chain rule, that you are going to use, explicitly.)*

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

8. Compute: $\frac{d}{dx}\left[\left(\frac{6x^6+6}{3x^3+9x}\right)^{10}\right] =$

9. Compute: $\frac{d}{dx}\left[\sin^5\left(8x^2 + 16x\right)\right] =$

10. Given that $S'(x) = \frac{1}{2S(x)}$; compute $\frac{d}{dx}\left[S\left(5x^2\right)\right]$

11. $f(x) = \begin{cases} \frac{3x-6}{x-2} & \text{for } x < 2 \\ 3 & \text{for } x = 2 \\ \frac{12x-24}{x^2-4} & \text{for } x > 2 \end{cases}$ Determine whether or not $f(x)$ is continuous at the point $x = 2$. (Justify your answer.)

12. $x^2 + 3y^4 = \sin(y)$; compute y'

13. Given that $f(x) = 3x^2 - 3x + 5$,compute $f'(x)$ **using the definition of derivative.** (i.e., using the "limit process.")