Math 130 Day 21

Office Hours (LN 301/301.5): M 3:30-4:30, Tu 11:00-1:00, W 12:15-1:15, F 1:30-2:30. Other times by appointment. **Math Intern:** Sun through Thurs: 3:00–6:00, 7:00–10:00pm. **Website:** Use the links at the course homepage on **Canvas** or go to my course Webpage: `http://math.hws.edu/~mitchell/Math130F16/index.html`.

Practice

1. Read/Re-read **Chapter 3.9** on Derivatives of Logs and Exponentials. Review the **online notes**. We will finish this next time. Also review Implicit Differentiation in Chapter 3.8.

2. Page 211 #3, 9, 11, 15 (simplify first with a log rule), 17, 19(a classic).

a) Page 211 #23, 25, 27

3. If we get this far: Find the derivatives of these three exponentials (answers below)

a) $x^3 5^x$ **b)** $4^{6\cos x}$ **c)** $9^{e^{2x}\tan x}$

d) Find the tangent line to the curve in (a) at the point $(2, 1)$ Answers: Use $D_x(b^u) = b^u \frac{du}{dx}$.

a) $D_x(x^3 5^x) = 3x^2 5^x + x^3 5^x \ln 5 = x^2 5^x (3 + x \ln 5)$ **b)** $D_x(4^{6\cos x}) = -4^{6\cos x} 6 \sin x \ln 4$

c) $D_x(9^{e^{2x}\tan x}) = 9^{e^{2x}\tan x}(2e^{2x}\tan x + e^{2x}\sec^2 x)$

Hand In Next Time

Do WeBWorK Set Day 21. Due Thursday night. Remember Set Day 20 (Chain Rule Review) due Wednesday.

1. Use implicit differentiation to find $\frac{dy}{dx}$ and then etermine the tangent line to $y^3 + \ln(y^2) = x^3 + x + 1$ at $(-1, 1)$.

2. Compute and compare the derivatives of

a) $\dfrac{d}{dx}\left[\ln(x^6)\right]$ **b)** $\dfrac{d}{dx}\left[(\ln x)^6\right]$

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3. Determine and simplify the derivative of $f(t) = \dfrac{3 + \ln t}{e^{4t}}$.

4. Find and simplify the derivative of $g(t) = 8 - 7\ln(\cos t)$ (where $t \in (-\pi/2, \pi/2)$ so that g is defined).

5. Find the derivative of $g(x) = \ln(x^2 + 9)^{1/2}$. Hint: Simplify using a log law before differentiating.

6. If $p(x) = 7x^5 \ln(6x)$, then $p'(x) =$

7. Find the derivative of $g(x) = \ln\left(\dfrac{2x^3 + 1}{x^2 + 3x + 1}\right)$. Hint: Simplify using a log law before differentiating.

8. Complete the definition: The function g is the **inverse** of the function f if

1)

2)