Math 1232: Single-Variable Calculus 2
George Washington University Fall 2025
Recitation 2

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Problem 1. (a) Compute $\log_3(6) + \log_3(9/2)$.

(b) Compute $\log_4(8) - \log_4(2)$.

(c) Rewrite the expression $\log_5(15) + \log_5(75) - \log_5(12)$ as an integer plus a logarithm.

(d) Solve $e^{5-3s} = 10$.

Problem 2. Let $h(x) = \ln|x|$. We're going to compute the derivative of this two ways.

(a) If we assume $x > 0$, we can simplify $\ln|x|$. What does it simplify to? What is the derivative?

(b) If $x < 0$, we can also simplify $\ln|x|$. What does it simplify to? This is a little less obvious. What is the derivative?

(c) What about when $x = 0$?

(d) What pattern do we get here?

(e) Now let's approach this a totally different way. Verify that we can define $|x| = \sqrt{x^2}$. How does that work?

(f) Use the chain rule to compute $\ln(\sqrt{x^2})$. Does this match your previous answer?

Problem 3. Compute the derivative of $(x+1)^{\sqrt{x}}$.

Problem 4. Use logarithmic differentiation to compute $\dfrac{d}{dx}\dfrac{x^3\sqrt{x^2-5}}{(x+4)^3}$.

Problem 5. Try to compute the following integrals.

(a) $\int_0^3 e^x \, dx$

(b) $\int_0^{\ln(3)} e^x \, dx$

(c) $\int e^{3x} \, dx$. (Hint: remember u-substitution!)

(d) $\int 3^x \, dx$. Hint: there are a couple ways you can approach this.