

Math 1232: Single-Variable Calculus 2
George Washington University Spring 2023
Recitation 2

Jay Daigle

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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. A very important derivative is the derivative of $f(x) = \ln|x|$. There are two different approaches we can take here.

(a) If $x > 0$, can we write a formula for $f(x)$ without using a $|\cdot|$ sign? What is $f'(x)$ when $x > 0$?

(b) If $x < 0$, can we write a formula for $f(x)$ without using a $|\cdot|$ sign? What is $f'(x)$ when $x < 0$?

(c) What do those two answers tell you about $f'(x)$?

(d) There's another approach we can take. Think about the graph of $|x|$. What is $\frac{d}{dx}|x|$?

(e) Using the chain rule, what does this tell you about $f'(x)$?

(f) Does your answer from (e) match your answer from (c)?

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

Problem 4 (Bonus). Use logarithms to compute $\frac{d}{dx} \frac{x^3 \sqrt{x^2 - 5}}{(x+4)^3}$.

Problem 5. Compute the following integrals.

(a) $\int_e^{e^4} \frac{1}{x\sqrt{\ln x}} dx.$

(b) $\int e^x \cos(1 + e^x) dx.$

(c) $\int \frac{\ln(x)}{x} dx.$

Problem 6 (Challenge). Compute $\int \frac{dx}{1 + e^x}.$