Math 121, Sections 01, 02, 03, Fall 2021

Homework #2

Due **Friday, September 3rd** in Gradescope by 11:59 pm ET

Goal: Review of Limits, Derivatives and Integrals for Exponentials and Logarithms. Plenty of help in Office Hours!

Differentiate the following functions. Simplify.

1. $f(x) = e^5$
2. $f(x) = e^x + x^e$
3. $y = \dfrac{1 - e^{2x}}{1 + e^{2x}}$
4. $f(x) = e^{\sin(2x)} + \sin\left(e^{2x}\right)$
5. $y = e^{\sqrt{x}}$
6. $y = x^2 e^{-\frac{1}{x}}$
7. $y = \ln\left(1 + e^{3x}\right)$
8. $f(x) = \ln\left(\dfrac{1}{x}\right) + \dfrac{1}{\ln x}$

9. Express the quantity as a single logarithm. Simplify.

$$\frac{1}{3}\ln[(x+2)^3] + \frac{1}{2}[\ln x - \ln[(x^2+3x+2)^2]]$$

Solve each of the following equations for x:

10. $e^{7-4x} = 6$

11. $\ln(3x - 10) = 2$

Evaluate each of the following Limits:

12. $\lim\limits_{x \to 2-} \ln|x - 2|$

13. $\lim\limits_{x \to 3^+} \ln(x^2 - 9)$

Evaluate each of the following Integrals. Simplify.

14. $\displaystyle\int e^x + x^e \, dx$
15. $\displaystyle\int_0^{\ln 4} \frac{1}{e^{2x}} \, dx$
16. $\displaystyle\int \frac{(1 + e^x)^2}{e^x} \, dx$
17. $\displaystyle\int \left(e^x + e^{-x}\right)^2 \, dx$
18. $\displaystyle\int \frac{e^x}{1 + e^x} \, dx$
19. $\displaystyle\int_2^3 \frac{1}{5 - 4x} \, dx$
20. $\displaystyle\int_e^{e^3} \frac{4}{x(\ln x)^2} \, dx$

REGULAR OFFICE HOURS

Monday: 1:00–3:00 pm

Tuesday: 12:00–4:00 pm

Wednesday: 1:00-3:00 pm

Friday: 12:00–2:00 pm

Math Fellow evening TA Help Hours TBD soon

• Office Hours are open to everyone. Please feel welcome whether you have lots of questions or just one question. Just stop by. :-) Working on your calculus assignment can be fun! You are encouraged to make fully engaged visits to office hours **each** week. I hope that you come hang out at many help sessions.

• **NO LATE HOMEWORK!** unless illness or emergency occurs.