

Homework #2

Due Friday, September 9th 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.

$$1. f(x) = e^5 \quad 2. f(x) = e^x + x^e \quad 3. y = \frac{1 - e^{2x}}{1 + e^{2x}} \quad 4. f(x) = e^{\sin(2x)} + \sin(e^{2x})$$

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

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:

$$12. \lim_{x \rightarrow 2^-} \ln|x - 2|$$

$$13. \lim_{x \rightarrow 3^+} \ln(x^2 - 9)$$

Evaluate each of the following Integrals. Simplify. Justify.

$$14. \int e^x + x^e dx \quad 15. \int_0^{\ln 4} \frac{1}{e^{2x}} dx \quad 16. \int \frac{(1 + e^x)^2}{e^x} dx$$

$$17. \int (e^x + e^{-x})^2 dx \quad 18. \int \frac{e^x}{1 + e^x} dx \quad 19. \int_2^3 \frac{1}{5 - 4x} dx$$

$$20. \int_e^{e^3} \frac{4}{x(\ln x)^2} dx$$

REGULAR OFFICE HOURS

Monday: 12:00–3:00 pm

Tuesday: 1:00–4:00 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.