Math 121, Section 01, Spring 2022

Homework #9

Due **Wednesday, March 23rd after vacation** in Gradescope by 11:59 pm ET

Goal: Exploring Improper Integrals, for both Type I (unbounded domain) and Type II (unbounded range). We will need IBP, Complete the Square, Partial Fractions, and some u-sub here. We may also need L'Hôpital's Rule to finish a few of the limits at hand.

Compute each of the following Integrals. Simplify when possible.

1. $\displaystyle\int_{-\infty}^{0} \frac{1}{3-4x}\,dx$

2. $\displaystyle\int_{1}^{\infty} \frac{1}{(2x+1)^3}\,dx$

3. $\displaystyle\int_{2}^{\infty} \frac{x}{e^{3x}}\,dx$

4. $\displaystyle\int_{e}^{\infty} \frac{\ln x}{x^3}\,dx$

5. $\displaystyle\int_{e}^{\infty} \frac{1}{x(\ln x)^2}\,dx$

6. $\displaystyle\int_{e}^{\infty} \frac{1}{x\ln x}\,dx$

7. $\displaystyle\int_{-\infty}^{7} \frac{1}{x^2-4x+29}\,dx$

8. $\displaystyle\int_{6}^{\infty} \frac{6}{x^2-4x-5}\,dx$

9. $\displaystyle\int_{0}^{5} \frac{6}{x^2-4x-5}\,dx$ Can reuse PFD work in 8

10. $\displaystyle\int_{1}^{2} \frac{1}{x\ln x}\,dx$

11. $\displaystyle\int_{0}^{1} x\ln x\,dx$

12. $\displaystyle\int_{-2}^{3} \frac{1}{x^4}\,dx$

13. $\displaystyle\int_{-\infty}^{\infty} \frac{1}{x^2+2x+5}\,dx$

REGULAR OFFICE HOURS

Sunday: 6–7:30 pm TA Nico, SMUDD 207

Monday: 1:00–3:00 pm

6–7:30 pm TA Daksha, SMUDD 207

7:30–9:00 pm TA Karime, SMUDD 207

Tuesday: 12:00–4:00 pm

6–7:30 pm TA Ian, SMUDD 207

7:30–9:00 pm TA Nico, SMUDD 207

Wednesday: 1:00-3:00 pm

9–10:30 pm TA Daksha, SMUDD 207

Thursday: none for Professor

6–7:30 pm TA Ian, SMUDD 207

7:30–9:00 pm TA Karime, SMUDD 207

Friday: 12:00–2:00 pm

You are welcome at Office Hours all the time. *Please come!*