Math 121, Section 01, Spring 2022

Homework #6

Goal: Exploring Limits using L'Hôpital's Rule, and Integrals using Integration By Parts

Compute each of the following Limits. Simplify.

1. $\displaystyle \lim_{x \to \infty} \frac{\ln\left(5 + e^{3x}\right)}{x}$

2. $\displaystyle \lim_{x \to \infty} \left(\frac{x}{x+1}\right)^x$

3. $\displaystyle \lim_{x \to \infty} \left(e^{\frac{1}{x^6}} - \frac{6}{x^6}\right)^{x^6}$

Compute each of the following Integrals. Simplify.

4. $\displaystyle \int x \cos(5x) \ dx$

5. $\displaystyle \int_0^1 \arctan x \ dx$

6. $\displaystyle \int_0^5 \frac{x^2}{e^x} \ dx$

7. $\displaystyle \int (\ln x)^2 \ dx$

8. $\displaystyle \int_1^{\sqrt{3}} \arctan\left(\frac{1}{x}\right) \ dx$

9. $\displaystyle \int x \arctan x \ dx$

10. $\displaystyle \int \ln\left(x^2 + 7\right) \ dx$

<u>REGULAR OFFICE HOURS</u>

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

Do something different or new this week, for studying purposes.
Go to office hours and also go to Math Fellow TA hours
with Nico, Ian, Karime, or Daksha