

Homework #6**Due Friday, September 17th** in Gradescope by 11:59 pm ET**Goal:** Exploring Limits using L'Hôpital's Rule, and Integrals using Integration By Parts

Compute each of the following Limits. Simplify.

1. $\lim_{x \rightarrow \infty} \frac{\ln(5 + e^{3x})}{x}$

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

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

Compute each of the following Integrals. Simplify.

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

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

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

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

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

9. $\int x \arctan x dx$

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

REGULAR OFFICE HOURS

Monday: 1:00–3:00 pm

9–10:30 pm TA Mia, SMUDD 207

Tuesday: 12:00–4:00 pm

6–7:30 pm TA Ian, SMUDD 207

7:30–9:00 pm TA Karime, SMUDD 207

Wednesday: 1:00–3:00 pm

6–7:30 pm TA Ian, SMUDD 207

7:30–9:00 pm TA Daksha, SMUDD 207

Thursday: none for Professor

1–2:30 pm TA Mia, SMUDD 207

7:30–9:00 pm TA Daksha, SMUDD 207

Friday: 12:00–2:00 pm

2:30–4:00 pm TA Karime, SMUDD 014**

Do something different or new this week, for studying purposes.

Go to office hours and also go to Math Fellow TA hours
with Mia, Ian, Karime, or Daksha