

**Homework #14****Due Friday, April 8th** in Gradescope by 11:59 pm ET

**Goal:** Exploring Convergence of Infinite Series. Focus on Absolute and Conditional Convergence...also using the Absolute Convergence Test. Finally... some review problems.

Determine whether the given series is Absolutely Convergent, Conditionally Convergent or Divergent.

$$1. \sum_{n=1}^{\infty} (-1)^n \frac{n^3 + 8}{n^8 + 3} \quad 2. \sum_{n=1}^{\infty} \frac{(-1)^n}{5n + 1} \quad 3. \sum_{n=1}^{\infty} \frac{(-1)^n (\ln n) (2n)!}{n^n 2^{3n} (n!)}$$

$$4. \sum_{n=1}^{\infty} (-1)^n \frac{n + 1}{n^2} \quad 5. \sum_{n=1}^{\infty} (-1)^{n+1} \frac{n^3}{n^7 + 2}$$

6. Write the statement of the Absolute Convergence Test.

7. Use the Absolute Convergence Test to show that  $\sum_{n=1}^{\infty} \frac{(-1)^n}{n^3 + 1}$  Converges.

8. Use the Absolute Convergence Test to show that  $\sum_{n=1}^{\infty} \frac{(-1)^n \sin^2 n}{n^8 + 2}$  Converges.

Review

9. Show that the Sequence  $\left\{ \left( \frac{n}{n+1} \right)^n \right\}_{n=1}^{\infty}$  Converges to  $\frac{1}{e}$ .

10. Determine if the Series  $\sum_{n=1}^{\infty} \left( \frac{n}{n+1} \right)^n$  Converges or Diverges.

11. Find the Sum of the series  $\sum_{n=1}^{\infty} \frac{(-1)^n 5^{2n+1}}{2^{5n-1}}$ .

# 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**

This is the end of the material for the Exam 2. Material stops after  
Section 11.6 Absolute Convergence Test and Ratio Test  
and Absolute/Conditional Convergence.