Math 121, Section 01, Spring 2022

Homework #15

Due **Friday, April 15** in Gradescope by 11:59 pm ET

Goal: Exploring Power Series, mainly the Interval and Radius of Convergence. Also beginning to explore the relationship between Power Series and Functions.

Determine the Interval and Radius of Convergence for each of the following Power Series.

1. $\displaystyle\sum_{n=0}^{\infty} \frac{x^n}{n!}$

2. $\displaystyle\sum_{n=1}^{\infty} \frac{x^n}{n^4 \cdot 4^n}$

3. $\displaystyle\sum_{n=1}^{\infty} n!\ \ln n\ (x-6)^n$

4. $\displaystyle\sum_{n=1}^{\infty} \frac{(-1)^n\ (9x-4)^n}{n^8 \cdot 5^n}$

5. $\displaystyle\sum_{n=0}^{\infty} (3n)!\ (2x-1)^n$

6. $\displaystyle\sum_{n=1}^{\infty} \frac{(-1)^n\ (6x+1)^n}{(6n+1) \cdot 7^n}$

7. $\displaystyle\sum_{n=0}^{\infty} \frac{(-1)^n\ x^{2n}}{(2n)!}$

8. $\displaystyle\sum_{n=1}^{\infty} \frac{(-1)^{n+1}\ (3x-5)^n}{(n+6)^2 \cdot 7^{n+1}}$

9. $\displaystyle\sum_{n=1}^{\infty} \frac{(-1)^n\ (n+1)\ (5x+1)^n}{n^2 \cdot 9^n}$

Find the Power Series Representation for the following functions and determine the Interval of Convergence.

10. $f(x) = \dfrac{1}{1+x}$

11. $f(x) = \dfrac{5}{1-4x}$

12. $f(x) = \dfrac{1}{3-x}$

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

Time for a refreshed commitment to the course for a strong finish.