Math 121 Take-Home Quiz #6

Due Sunday, April 6, 2025 in Gradescope by 11:59 pm

Instructions:

- This is an Open Notes Quiz. You can use materials, homeworks problems, lecture notes, etc. that you manually worked on.
- This is **NOT** an Open Internet Quiz. You can only access our Main Course Webpage.
- You are not allowed to work on or discuss these problems with other students or people.
- You can ask a few small, clarifying, questions in Office Hours, but the problems will not be solved for you.
- The main goal is to make a thoughtful and detailed presentation for the solutions. Submit a clear final draft. No mess please.
- Please submit your final work in Gradescope in the Quiz 6 entry.

Find the **Interval and Radius of Convergence** for each of the following power series. Analyze carefully and with full justification. Pay careful attention to the language used to justify the Ratio Test conclusion(s). There is a Handout posted on the webpage that can help you, where the correct language justification is highlighted in yellow. There are three more helpful examples on the front page of Homework 15. [10 Points each]

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

2. $\displaystyle\sum_{n=2}^{\infty} n^n\ (\ln n)\ (x-6)^n$

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

Optional Bonus: Create a Power Series with Interval of Convergence $I = \left[-\frac{3}{2}, \frac{4}{5}\right]$. Continue on to justify that your series satisifies this challenge.