Math 121 Take-Home Quiz #5

Due Sunday, October 29, 2023 in Gradescope by 11:59 pm ET

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 5 entry.

For each of the following Series in 1-4, determine whether the Series Converges or Diverges. Name any Convergence Test(s) you use, and justify all of your work. [10 points each]

1. $\sum_{n=1}^{\infty} n^7 + 4$

2. $\sum_{n=1}^{\infty} \frac{n^3}{n^4 + 7}$

3. $\sum_{n=1}^{\infty} \frac{n^4 + 7}{4n^7 + 1}$

4. $\sum_{n=1}^{\infty} \frac{(-1)^n \, 4^n \, (n!)}{n^n \cdot n^6}$

5. Consider $\sum_{n=1}^{\infty} \frac{1}{n^2 + 2n + 5}$.

Use **TWO Different** methods, namely the Integral Test and the Comparison Test, to prove that this series Converges.

You can skip checking the Integral Test preconditions here this time. yay!