

Math 121 Take-Home Quiz #5

Due Sunday, October 27, 2024 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 1-2, determine whether the Series Converges or Diverges. Name any Convergence Test(s) you use, and justify all of your work. [10 points each]

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

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

3. Determine if the following series is Absolutely Convergent or Divergent [10 points]

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

4. Consider $\sum_{n=1}^{\infty} \frac{1}{n^2 + 2n + 5}$ [15 points total]

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!