

Due Sunday, October 20, 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 4 entry.

For problems 1 – 3, determine whether the given **Sequence** Converges or Diverges. If it converges, find the Limit. [5 points each]

$$1. \left\{ \frac{3n^5 - 6n^2 + 7}{8n^5 + 2n^4 - 1} \right\}_{n=1}^{\infty} \quad 2. \left\{ \frac{n^7}{4 \ln n} \right\}_{n=2}^{\infty} \quad 3. \left\{ \frac{(2n-1)!}{(2n+1)!} \right\}_{n=1}^{\infty}$$

4. [10 Points] Consider  $\sum_{n=1}^{\infty} \frac{(-1)^n 3^{n+1}}{2^{3n-1}}$ . First, explain why this **Series** Converges, and then second show that the series Sum equals  $\boxed{-\frac{18}{11}}$ .

For 5 and 6, determine whether the **Series** Converges or Diverges. Name any Convergence Test(s) you use, and justify all of your work. [10 points each]

$$5. \sum_{n=2}^{\infty} \frac{n^7}{4 \ln n} \quad (\text{hint: your work from 2. above will help here...})$$

$$6. \sum_{n=1}^{\infty} \frac{4}{n^7} + \frac{4^n}{7^n}$$

7. Use **TWO different** Methods/Tests to show that  $\sum_{n=1}^{\infty} 2024$  Diverges.