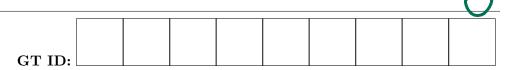
Time limit: 20 Minutes

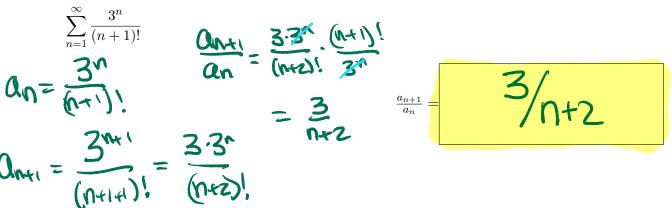


By signing here, you agree to abide by the **Georgia Tech Honor Code**: I commit to uphold the ideals of honor and integrity by refusing to betray the trust bestowed upon me as a member of the Georgia Tech Community.

Sign Your Name:

Please clearly organize your work, show all steps, simplify all answers, and BOX your answers.

1. (3 points) For the given series $\sum a_n$, write the ratio $\frac{a_{n+1}}{a_n}$ from the ratio test. Simplify your answer but do not take a limit.



2. (3 points) Briefly explain the flaw in the following argument. Use complete sentences, justify your reasoning, and use correct terminology from the class.

The series $\sum_{n=1}^{\infty} \frac{n^2+1}{n^4+1}$ converges by the direct comparison test, since you can compare the terms $a_n = \frac{n^2+1}{n^4+1}$ to the terms $b_n = \frac{n^2}{n^4} = \frac{1}{n^2}$.

Note: $Q_n = \frac{n^2+1}{n^4+1} \notin \frac{n^2}{n^4} = b_n$ For example, when n=2 $Q_z = \frac{5}{17}$ and $b_z = \frac{4}{16} = \frac{1}{4}$ but $\frac{5}{17} \notin \frac{4}{4}$

Since an 4 by over Though Ebn converges you can not conclude that Ean converges.

3. (A points) Determine if each series converges or diverges. Fully justify your answer for credit, e.g., state the convergence test you used and clearly state the necessary conditions for the test you are using. Points will be deducted for arguments that are not clearly organized.

(a)
$$\sum_{n=1}^{\infty} \frac{n^2+1}{n^4+1}$$
 limit comparison by $n = \sqrt[4]{n^2}$

$$\frac{Q_n}{b_n} = \frac{N^2+1}{n^4+1} \cdot \frac{N^2}{1} = \frac{N^4+n^2}{n^4+1} \xrightarrow{k\to\infty} 1 = C$$

$$\Rightarrow$$
 Zan & Zbn both druge.

$$(b) \sum_{n=1}^{\infty} \frac{4^n}{(3n)^n}$$

$$Q_n = \frac{4^n}{(3n)^n}$$

$$(an)^{1/n} = (4n)^{1/n} = \frac{4}{3n} \rightarrow 0 = L$$

Zan Converge