

Monday, March 16

Clicker Questions

Clicker Question 1

Practicing the Comparison Test

Determine the convergence or divergence of these two series:

$$\text{I. } \sum_{n=1}^{\infty} \frac{6^n}{5^n - 4^n}$$

$$\text{II. } \sum_{n=1}^{\infty} \frac{n}{n^2 - n + 4}$$

- A. I. diverges but II. converges
- B. both I. and II. diverge
- C. both I. and II. converge
- D. I. converges but II. diverges

Series to compare to

I. $\frac{6^n}{5^n - 4^n} > \frac{6^n}{5^n} = \left(\frac{6}{5}\right)^n$, and the geometric series $\sum_{n=1}^{\infty} \left(\frac{6}{5}\right)^n$ diverges.

II. $\frac{n}{n^2 - n + 4} > \frac{n}{n^2} = \frac{1}{n}$ when $n \geq 5$, and the harmonic series $\sum_{n=5}^{\infty} \frac{1}{n}$ diverges.

Clicker Question 2

Practicing the Limit Comparison Test

Determine the convergence or divergence of these two series:

$$\text{I. } \sum_{n=7}^{\infty} \frac{1}{2^n - 100}$$

$$\text{II. } \sum_{n=1}^{\infty} \frac{1}{\sqrt[3]{4n^5 + 6}}$$

- A. I. diverges but II. converges
- B. I. converges but II. diverges
- C. both I. and II. diverge
- D. both I. and II. converge

Series to compare to

I. $\lim_{n \rightarrow \infty} \frac{2^{-n}}{1/(2^n - 100)} = \lim_{n \rightarrow \infty} (1 - 100 \cdot 2^{-n}) = 1$, and the geometric series $\sum_{n=7}^{\infty} 2^{-n}$ converges.

II. $\lim_{n \rightarrow \infty} \frac{n^{-5/3}}{1/\sqrt[3]{4n^5 + 6}} = \lim_{n \rightarrow \infty} \sqrt[3]{4 + 6n^{-5}} = \sqrt[3]{4}$, and the p -series $\sum_{n=1}^{\infty} n^{-5/3}$ converges.

Midterm #2 Information

Same procedures as last time

- Solutions and the grading scheme have been posted on our section web page.
- Requests for regrades must be **in writing**, and you must say **specifically** what part of the grading scheme wasn't applied correctly to your paper.
- If we made a mistake copying your score from the problem to the front of the exam, or in adding up your score, we will quickly fix it—but still put it in writing for me, so I will remember what to fix.
- Please, no midterm questions today. Think about it on your own first, and check the solutions and grading scheme.
- Remember: the primary function of the midterms is to practice for the final exam. Thoughtfully view whatever mistakes you made, and **learn from those mistakes** so that you'll conquer a similar problem on the final.

Midterm #2 Information

The course web page is your friend

- Our section's median was **24 out of 45**, or 53%. (As usual, other section's midterm medians aren't relevant to us.)
- This is noticeably lower than on Midterm #1. Partially, Midterm #2 was a little longer, and covered more material.
- Partially, we didn't do as well on some of the more straightforward problems. In particular, I thought we would do better than we did on #1, #2, and #5.
- **Term marks will be scaled** to match our section's median on the final exam. Most probably, our section's median on the final will be more like Midterm #1 than Midterm #2.
- My best guess: **think of your Midterm #2 score as 4 points higher** to get a sense of how prepared you are for the final exam. (And, we have a whole month to improve!)
- Nine piles, alphabetized by last name:
AB C DEF GHIJ KL MNO PQR ST U-Z