Math 132: Discussion Session: Week 14

Directions: In groups of 3-4 students, work the problems on the following page. Below, list the members of your group and your answers to the specified questions. Turn **this paper** in at the end of class. You do not need to turn in the question page or your work.

Additional Instructions: It is okay if you do not completely finish all of the problems. Also, each group member should work through each problem, as similar problems may appear on the exam.

Scoring:

Correct answers	Grade
0–3	0%
4–6	80%
7–13	100%

Group Members:

11.7 Series Strategy.

(1) $\sum_{n=1}^{\infty} \frac{2+n}{1-2n}$ converges absolutely/converges conditionally/diverges. How do you know?

(2) $\sum_{n=2}^{\infty} \frac{(-1)^n}{\ln n}$ converges absolutely/converges conditionally/diverges. How do you know?

(3) $\sum_{n=1}^{\infty} (\ln(n+1) - \ln n)$ converges absolutely/converges conditionally/diverges. How do you know?

(4) $\sum_{n=1}^{\infty} \sin^2\left(\frac{\pi}{n}\right)$ converges absolutely/converges conditionally/diverges. How do you know?

(5) $\sum_{n=1}^{\infty} \frac{n}{3^n - 2^n}$ converges absolutely/converges conditionally/diverges. How do you know?

(6) $\sum_{n=1}^{\infty} \frac{\cos n}{n^{\frac{3}{2}}}$ converges absolutely/converges conditionally/diverges. How do you know?

(7) $\sum_{n=1}^{\infty} (-1)^n (\ln(n+1) - \ln n)$ converges absolutely/converges conditionally/diverges. How do you know?

(8) $\sum_{n=1}^{\infty} \frac{(-1)^n}{n^{1.01}\ln(n+1)}$ converges absolutely/converges conditionally/diverges. How do you know?

(9) $\sum_{n=1}^{\infty} \frac{(-1)^n (2n)!}{(n!)^2}$ converges absolutely/converges conditionally/diverges. How do you know?

(10) $\sum_{n=1}^{\infty} (-1)^n \sin\left(\frac{1}{n}\right)$ converges absolutely/converges conditionally/diverges. How do you know?

11.8: Power Series.

(1) $\sum_{n=1}^{\infty} nx^n$ converges when _____ $< x <$ _____.

(2) $\sum_{n=1}^{\infty} \frac{(2n)!}{(n!)^3} x^n$ converges when _____ $< x <$ _____.

(3) $\sum_{n=2}^{\infty} \frac{x^n}{\ln n}$ converges when _____ $< x <$ _____.

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11.7 Series Strategy. Determine whether the following series converge absolutely, converge conditionally, or diverge, using any of the methods discussed so far in class. State the method you used, and how you used it. For example

- "$\sum_{n=1}^{\infty} \frac{1}{n^2}$ converges by the p-series test. The terms are already positive, so the series converges absolutely."
- "$\sum_{n=1}^{\infty} \frac{(-1)^n}{n^2+2}$ converges absolutely by the comparison test because $\left|\frac{(-1)^n}{n^2+2}\right| = \frac{1}{n^2+2} \leq \frac{1}{n^2}$ and $\sum_{n=1}^{\infty} \frac{1}{n^2}$ converges."

(1) $\displaystyle\sum_{n=1}^{\infty} \frac{2+n}{1-2n}$

(2) $\displaystyle\sum_{n=2}^{\infty} \frac{(-1)^n}{\ln n}$

(3) $\displaystyle\sum_{n=1}^{\infty} (\ln(n+1) - \ln n)$

(4) $\displaystyle\sum_{n=1}^{\infty} \sin^2\left(\frac{\pi}{n}\right)$

(5) $\displaystyle\sum_{n=1}^{\infty} \frac{n}{3^n - 2^n}$

(6) $\displaystyle\sum_{n=1}^{\infty} \frac{\cos n}{n^{\frac{3}{2}}}$

(7) $\displaystyle\sum_{n=1}^{\infty} (-1)^n (\ln(n+1) - \ln n)$

(8) $\displaystyle\sum_{n=1}^{\infty} \frac{(-1)^n}{n^{1.01}\ln(n+1)}$

(9) $\displaystyle\sum_{n=1}^{\infty} \frac{(-1)^n (2n)!}{(n!)^2}$

(10) $\displaystyle\sum_{n=1}^{\infty} (-1)^n \sin\left(\frac{1}{n}\right)$

11.8: Power Series. Find the range of values of x for which the following series converge. The ratio or root tests will be helpful, but after that you might need to check the endpoints of the range separately. In your answer, change the $<$ symbol to a $\leq$ symbol when needed. If the range of values doesn't have a lower or upper bound, fill in the blanks with $-\infty$ and ∞.

(1) $\displaystyle\sum_{n=1}^{\infty} n x^n$

(2) $\displaystyle\sum_{n=1}^{\infty} \frac{(2n)!}{(n!)^3} x^n$

(3) $\displaystyle\sum_{n=2}^{\infty} \frac{x^n}{\ln n}$