Worksheet 16 - Alternating Series

Due at the beginning of class on the day of Test 3

Direction: Solve the problems in this worksheet on separate sheets of paper. Write your solution neatly. Use standard size paper. Clearly label each problem, and include each problem in the correct order. No ragged edges. Staple multiple pages. At the top of the first page put your name, Math 2414, and the title of the worksheet.Show all work to justify your answer. Answer with insufficient work will receive no credit.

Problem 1: Using the alternating series test

Explain why the conditions of the alternating series are met and apply the test to conclude that the series converges

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

Problem 2: The alternating series test does not apply

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

Problem 3: Alternating series estimation theorem

Determine the number of terms required to approximat the sum of the series with an error of less than 0.001

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

Problem 4: Absolute convergent series

Explain why the series converges absolutely

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

Problem 5: Conditionally convergent series

Explain why the series converges conditionally

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