

Please provide complete and well-written solutions to the following exercises.

(No due date, though the quiz on May 19 or May 21 will be based on this homework.)

Assignment 8

Exercise 1. Using appropriate convergence tests as necessary, determine whether the following series converge or diverge.

- $\sum_{n=2}^{\infty} \frac{1}{n(\ln n)^2}$.
- $\sum_{n=1}^{\infty} \frac{2n+1}{n^2+2n+1}$.
- $\sum_{n=1}^{\infty} \frac{1}{(n+1)!}$.
- $\sum_{n=1}^{\infty} \frac{n^{1/n}}{n^2}$.
- $\sum_{n=2}^{\infty} \frac{\ln n}{n^{5/4}}$.

Exercise 2. Using appropriate convergence tests as necessary, determine whether the following series converge absolutely, converge conditionally, or diverge.

- $\frac{1}{2} - \frac{1}{3} + \frac{1}{2^2} - \frac{1}{3^2} + \frac{1}{2^3} - \frac{1}{3^3} + \dots$.
- $\sum_{n=1}^{\infty} \frac{(-1)^n}{n^{3/2}}$.
- $\sum_{n=1}^{\infty} \frac{\sin n}{n^2}$.

Exercise 3. Approximate $\sum_{n=1}^{\infty} \frac{(-1)^{n+1}}{n^5}$ to three decimal places.