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.

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

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