

Homework #10: Section 12.3

Complete each question below. Answers should be carefully written up, showing all necessary work for each step to complete each problem. Your turned-in work should be neat and legible. If I cannot understand or follow your work you will not get credit for it. You may discuss these problems with myself, the TAs and Math Center tutors, and your classmates, but once you start writing up the problem to turn in, you must complete the write-up on your own. This assignment is out of **24 points**. It is due at the **start of class on Monday, November 9**.

- (a) (5 points) Determine whether the series $\sum_{n=2}^{\infty} \frac{1}{n(\ln(n))^2}$ converges or diverges.

(b) (5 points) How many terms would you need to use to estimate the value of the sum with an error of at most $\frac{1}{100}$?
- (7 points) Explain why the integral test works. That is, explain why the convergence of a given infinite series can be related to the convergence of a Type 1 improper integral. Use the relationship between the series and the integral to explain the remainder estimate.
- (7 points) Find all values of p for which the series $\sum_{n=1}^{\infty} \frac{\ln n}{n^p}$ converges.