

Math 102 — More series practice

Problem 1. For each of the following alternating series $\sum_{n=1}^{\infty} a_n$, (1) determine whether the series converges and state which test can be used to prove this, (2) determine whether $\sum_{n=1}^{\infty} |a_n|$ converges and state which test can be used to prove this, and (3) state whether the series is absolutely convergent or conditionally convergent.

- a. $\sum_{n=1}^{\infty} (-1)^{n+1} \frac{1}{n^2}$
- b. $\sum_{n=1}^{\infty} (-1)^{n-1} \frac{n+5}{3n-5}$
- c. $\sum_{n=1}^{\infty} (-1)^n \frac{1}{\sqrt{n}}$
- d. $\sum_{n=1}^{\infty} \frac{(-1)^n n^2}{n!}$

Problem 2. Let s_n be the n th partial sum of an alternating series $\sum_{n=1}^{\infty} (-1)^{n+1} b_n$ that converges to L . As you think about the following question, I want you to go back to the real number line diagram we drew when we proved the alternating series test and notice that L must be between s_n and s_{n+1} for any $n \geq 1$. Give an upper bound on the distance between s_n and L .