(1) The Alternating Series Test

(2) Determine whether the alternating series below converge or diverge. Justify your conclusion.

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

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

(c) $\displaystyle\sum_{n=1}^{\infty} \frac{(-1)^{n-1}n}{2^n}$

(3) Remainders in Alternating Series and How to Estimate Them

(4) Recall that we concluded the series $\sum_{n=1}^{\infty} \frac{(-1)^{n+1}}{n^2}$ converges. Find S_4 and determine how well it estimates the sum of the series. How large does k need to be so that S_k is within $0.0001 = 10^{-4}$ of the sum of the series?

(5) **Definitions:** Absolute and Conditional Convergence

(6) For each series below, determine if the series is absolutely convergent, conditionally convergent, or divergent.

(a) $\sum_{n=1}^{\infty} \frac{(-1)^{n-1}}{3n^2}$

(b) $\sum_{n=1}^{\infty} \frac{(-1)^{n-1}}{3n+1}$