HW 19: Section 8.4 and 8.5

Due: Thursday, November 21st in SQRC by 9pm

Learning Goals:

- Use the alternating series test
- Understand the difference between conditional convergence and absolute convergence
- Use the ratio test to determine convergence
- Estimate the value that a convergent series converges to

Questions:

1. If $a_k \geq 0$ and $\lim_{k\to\infty} a_k = 0$, explain in terms of partial sums why $\sum_{k=1}^{\infty}(-1)^{k+1}a_k$ is more likely to converge than $\sum_{k=1}^{\infty} a_k$.
2. Problem 8.4.4 Determine whether the series $\sum_{k=1}^{\infty}(-1)^{k+1}\frac{k^2}{k+1}$ converges or diverges.
3. Problem 8.4.16 Determine whether the series $\sum_{k=1}^{\infty}(-1)^{k+1}\frac{k!}{3^k}$ converges or diverges.
4. Problem 8.4.22 Determine whether the series $\sum_{k=1}^{\infty}(-1)^{k}\frac{1}{\ln(k)}$ converges or diverges.
5. Problem 8.5.8 Determine whether the series $\sum_{k=4}^{\infty}(-1)^{k}\frac{10^k}{k!}$ is absolutely convergent, conditionally convergent, or divergent.
6. Problem 8.5.10 Determine whether the series $\sum_{k=3}^{i} nfty(-1)^{k+1}\frac{4}{2k+1}$ is absolutely convergent, conditionally convergent, or divergent.
7. Problem 8.5.16 Determine whether the series $\sum_{k=1}^{\infty}\frac{4}{k}$ is absolutely convergent, conditionally convergent, or divergent.
8. How many terms must you sum in order for the error between the partial sums and $\sum_{k=1}^{\infty}(-1)^{k+1}\frac{1}{k}$ to be less than $\frac{1}{1000}$?
9. How many terms must you sum in order for the error between the partial sums and $\sum_{k=1}^{\infty}\frac{1}{k^2}$ to be less than $\frac{1}{1000}$?