Chapter 11 Exam Topics

11.1 Sequences

- Boundedness
- Monotonicity
- Convergence
- Monotone Convergence Theorem

11.2 - 11.6 Series

Convergence Tests

- Term Test for Divergence: $\lim_{n \to \infty} a_n \neq 0 \Rightarrow \sum_{n=1}^{\infty} a_n$ diverges.
- Geometric Series Theorem: $\sum_{n=1}^{\infty} ar^{n-1} = \frac{a}{1-r}$ for $|r| < 1$
- Integral Test: In case of convergence, then: $|\sum_{n=1}^{N} f(n) - s_n| \leq \int_{N}^{\infty} f(x) \, dx$
- $p$ - Series Theorem: $\sum_{n=1}^{\infty} \frac{1}{n^p}$ converges $\iff p > 1$
- Comparison Tests
- Direct
- Limit
- Alternating Series Test ($\ast$)

(\ast) These tests apply to series with both infinitely many positive and negative terms

Additional Final Exam Topics

- Be able to plot Polar Curves and find Areas & Slopes of bounded polar regions (see Chpt 10.3 & 10.4)

Key Concepts

- Absolute vs. Conditional Convergence (11.6)
- Radius and Interval of Convergence of a Power Series (11.8)
- Power Series representation of a Function (11.9 - 11.10)
- Term-by-term Differentiation and Integration of a Power Series (11.9)
- Taylor Series expansion for $f$ at $a$: $f(x) = \sum_{n=0}^{\infty} \frac{f^{(n)}(a)}{n!} (x-a)^n$ (11.10)