

Test 2 Study Guide

Sections 10.1-10.2

- *Fibonacci sequence* $f_{n+1} = f_n + f_{n-1}$, $f_1 = f_2 = 1$
- Practice finding limits of sequences!
- *Bounded monotonic* sequences converge.
- $n! = 1 \cdot 2 \cdot 3 \cdots (n-1) \cdot n$
- Geometric series: The sum of a geometric series $\frac{a}{1-r} = \sum_{n=0}^{\infty} ar^n$ if and only if $|r| < 1$.
Problems like the “bouncing ball” (section 10.2 #39)
- The *sum* of a series is the limit of the *sequence of partial sums*, $s_n = \sum_{i=1}^n a_i$.
- Test for divergence: $\lim_{n \rightarrow \infty} a_n = 0$ does NOT imply $\sum_{n=0}^{\infty} a_n$ converges! (see *harmonic series*)
- *Telescoping sums* (eg. #11 in section 10.2). Note that these problems use **PFD** (Yay!).

Sections 10.3-10.5

- *Integral test*
- A “*p-series*” converges for $p > 1$ and diverges otherwise.
- *Comparison* and *limit comparison* tests
- *Alternating series test*. Note that this doesn’t tell you if an alternating series diverges!
- *Absolute convergence* implies regular convergence but not the other way around.
- *Ratio test*, *root test*.
- You may want to try ALL the problems that ask you to test for convergence “using any method” that are in each of these sections as this is a review of all the concepts/convergence tests.

Section 10.6

- Be able to find the *radius of convergence* of a power series and *interval of convergence*.
- The “*geometric power series*” is $\sum_{n=0}^{\infty} x^n = \frac{1}{1-x}$ for $|x| < 1$.
- Know how to “substitute” to find power series representations for functions like $\frac{5x}{9+x^3}$.

Section 8.4, 10.7

- The *Taylor series* for $f(x)$ centered at $x = c$ is $\sum_{n=0}^{\infty} \frac{f^{(n)}(c)}{n!} (x-c)^n$.
- Know how to find the coefficients $c_n = \frac{f^{(n)}(c)}{n!}$, and the interval of converge.

NOTE: It goes without saying that you must be familiar with all the types of textbook and webwork homework problems. This guide is only a rough overview of the material covered on the test.