Math 1172 - Sequences and Series - Student Handout Modifications to Chapters 9 and 10

Note: Due to the fact that Math 1172 does not cover certain topics in chapters 9 and 10, some of the exercise problems in the book will not be relevant. Some of the problems that you may skip are given below. If you are not sure about the relevance of a certain exercise, check with your instructor.

Chapter 9 - Sequences and Infinite Series

9.1   The entire section is covered.

9.2   The entire section is covered except for the following:

Not covered: **Formal Definition of a Limit of a Sequence** (bottom of page 635 and page 636, and problems 69-74 in the exercises.)

9.3   The entire section is covered.

9.4   Only some of this section is covered (see below.)

Covered: **The Divergence Test** (pg. 648-649.) Includes THEOREM 9.8.

Covered: **The Harmonic Series** (pg. 649-651.) Includes THEOREM 9.9. However the proof for the divergence of the Harmonic series will not involve using an integral as in the textbook on pages 650 and 651.

Covered: **Properties of Convergent Series** (pg. 657-659.) Includes THEOREM 9.13.

Not covered: **The Integral Test** (middle of page 651 to page 653, and problems 19-28 in the exercises.)

Not covered: **Convergence of p-Series** (pg. 653-654, and problems 29-34 in the exercises.)

Not covered: **Estimating Series with Positive Terms** (bottom of page 654 to top of page 657, and problems 35-42 in the exercises.)

9.5   Only one topic is covered.

Covered: **The Ratio Test** (page 661 to top of page 663.) Includes THEOREM 9.14.

Not covered: **The Root Test** (pg. 663-664, and problems 19-26 in the exercises - though the Ratio Test will work on some of these problems.)

Not covered: **Comparison Test** (pg. 664-665, and problems 27-39 in the exercises.)

Not covered: **The Limit Comparison Test** (pg. 666-667, and problems 27-39 in the exercises.)

Note: The **Guidelines** on page 668 can be used, though any features not covered in math 1172 may be ignored.

(9.6)   Math 1172 does not cover any of this section. However, a couple of vocabulary terms must be mentioned: Absolute Convergence and Conditional Convergence. These expressions may be used later in chapter 10, but they can be ignored. [For example, you might see "... the series converges *absolutely...*"]

Chapter 10 - Power Series

10.1   The entire section is covered.

10.2   The entire section is covered, except for some restrictions and modifications outlined below.

Be aware that, due to the omission of many topics in chapter 9, you will have a very limited set of tools for handling power series. For this reason, when you are finding the interval of convergence for a power series, you do not need to test for convergence at each of the **endpoints** of the interval. Moreover, you do not need to apply the Root Test, even though the textbook may do so. Instead, you will be using a more general version of the Ratio Test that is given below (not in the textbook.)

THEOREM - The General Ratio Test
Let $\sum a_k$ be an infinite series with nonzero terms and let $r = \lim\limits_{k \to \infty} \dfrac{|a_{k+1}|}{|a_k|}$.

1. If $0 \leq r < 1$, the series converges.
2. If $r > 1$ (including $r = \infty$), the series diverges.
3. If $r = 1$, the test is inconclusive.

10.3   The entire section is covered except for the following:

Not covered: **The Binomial Series** (middle of page 708 to middle of page 711.) However, you should be able to find the first few nonzero terms of a binomial series using facts learned about Taylor series and power series in general.

10.4   Only some of this section is covered (see below.)

Covered: **Differentiating Power Series** (Example 3, pg. 718), **Integrating Power Series** (Example 5, pg. 719-720), **Representing Real Numbers** (Example 6, pg. 720-721), and **Representing Functions as Power Series** (Examples 7 and 8, pg. 721-722.)

Not covered: **Limits by Taylor Series** (Examples 1 and 2, pg. 717-718) and **solving differential equations using Taylor series** (Example 4, pg. 718-719.)