

Calculus 2, Chapter 10 Study Guide

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The following is a *brief* list of topics covered in Chapter 10 of *Thomas' Calculus*. Test questions will be chosen directly from the text. This list is not meant to be comprehensive, but only gives a list of several important topics. I reserve the right to ask you definitions and theorems on the tests. If I do so, then I will choose from the **bold-faced** items below.

10.1. Sequences. Sequence, **convergent and divergent series**, **limit of a sequence**, **diverges to positive/negative infinity**, rules for limits of sequences, **Sandwich Theorem for Sequences**, interaction of limits of sequences and continuous functions, use of limits of functions to explore limits of sequences (Theorem 4), limits of various sequences (Theorem 5), recursion formulas, Fibonacci sequence, bounded sequences, Monotonic Sequence Theorem, Completeness Property.

10.2. Infinite Series. Infinite series, partial sums, convergent/divergent series, geometric series, telescoping series, **Test for Divergence**, Properties of series (Theorem 8).

10.3. The Integral Test. Integral Test, p -series, harmonic series and rate of divergence, Bounds for the Remainder in the Integral Test.

10.4. Comparison Tests. **Direct Comparison Test**, **Limit Comparison Test**.

10.5. The Ratio and Root Tests. **Ratio Test**, **n th Root Test**.

10.6. Alternating Series, Absolute and Conditional Convergence. **Alternating series**, **alternating series test** (Theorem 14), **Alternating Series Estimation Theorem**, **Absolute**

and Conditional Convergence, Absolute Convergence Test, Rearrangement Theorem for Absolutely Convergent Series, Absolute Convergence Test, rearrangement of conditionally convergent series.

10.7. Power Series. Power series about $x = a$, n th term and center, types of sets on which a series might converge or diverge (**Corollary to Theorem 18**), radius of convergence, interval of convergence, The Series Multiplication Theorem for Power Series, **Term-by-Term Differentiation, Term-by-Term Integration.**

10.8. Taylor and Maclaurin Series. Taylor Series about $x = a$, Maclaurin series, Taylor polynomial,

10.9. Convergence of Taylor Series; Error Estimates. Taylor's Theorem, Taylor's Formula, Taylor polynomial.

10.9. Convergence of Taylor Series. Taylor's Theorem, Taylor's Formula, The Remainder Estimation Theorem.

10.10. The Binomial Series and Applications of Taylor Series. Binomial series, evaluating limits using series, other MacLaurin series.