Exam 4 Study Hints

Exam 4 covers sections 11.1, 11.2, 11.3, 11.5, 11.6, 11.8, 11.9, 11.10, 11.11

1. Chapter 11 Review, p. 758, TF 1-8, 12-18; Problems 1-odd, 11, 13, 16, 18, 19, 21, 23, 25, 27, 28, 32, 41, 43, 45, 47, 49, 51, 55, 57ac.

2. There will be up to 12 True-False and Multiple Choice questions on the exam. Some True-False questions may come directly from the End of Chapter review. You may see some of the iClicker questions from lecture modified as True-False questions or exactly as presented. Other Multiple Choice questions will either be conceptual or simple calculations.

3. There will be 6 twenty point problems on the exam. At least 15 points for each problem will be partial credit. Three or four of the problems will have a couple of multiple choice/true-false questions included as a small part (5 points) of the problem. The top 5 scores out of 6 will constitute your grade on the exam with the addition of any iClicker bonus points you have accumulated. A maximum of 100 points can be scored on the exam.

4. For 11.1: Be able to list out several terms of a sequence if the nth term definition is given. Be able to determine the nth term definition if a list of terms is given. Be able to determine if a sequence is convergent or divergent - if it is convergent find its limit.

5. For 11.2: Be comfortable applying partial sums, geometric series test and divergence test to determine the convergence or divergence of a series. If you are asked to find the sum of a series - be prepared to use either partial sums or geometric series test to do so. Also, be able to express a repeating decimal as a ratio of integers by writing it as a geometric series and determining the sum.

6. For 11.3: Be comfortable applying the p-test (p. 700) to determine if a series is convergent or divergent.

7. For 11.5: Be able to apply the alternating series test to determine the convergence of a series that can be written in the form \( \sum_{n=1}^{\infty} (-1)^n b_n \).

8. For 11.6: Be able to determine if a given series is absolutely convergent, conditionally convergent or divergent. Also be comfortable applying the ratio test and the root test, both of which test for absolute convergence of a series.

9. For 11.8: Be able to determine the radius and interval of convergence for a given series. For the interval of convergence - be sure to read the wording carefully on the problem to see if you need to check the endpoints of the interval for convergence.

10. For 11.9: Be able to express functions that are of the form \( \frac{a}{1-r} \) as power series by using properties of geometric series. Also, be comfortable integrating or differentiation power series (see examples 5, 6, 7 and 8a in text). Be able to state the radius of convergence for these types of problems.

11. For 11.10: Understand how to write out the Taylor(Maclaurin) expansion of a function about \( x = a \). You should be able to determine the nth term definition of the coefficient for the resulting series expansion and write your answer in summation notation. Given a Maclaurin series expansion or binomial series definition for \( f(x) \), determine a Maclaurin series for a given function that is related to \( f(x) \). Use a power series to evaluate an indefinite integral.
12. 11.11: Be able to find the nth degree Taylor(Maclaurin) polynomial to approximate \( f(x) \) given the center \( a \) and the degree \( n \). You may also be asked to use Taylor’s Inequality (formula given) to estimate the accuracy of the Taylor polynomial on an interval.


**Formulas given on your test**

Binomial Series
\[
(1 + x)^k = 1 + kx + \frac{k(k-1)}{2!}x^2 + \frac{k(k-1)(k-2)}{3!}x^3 + \cdots = \sum_{n=0}^{\infty} \binom{k}{n} x^n
\]
\[
\binom{k}{n} = \frac{k(k-1)(k-2)\cdots(k-n+1)}{n!}
\]

Taylor Remainder and Inequality on an interval
Given \( f(x) = T_n(x) + R_n(x) \), then \( |R_n(x)| \leq \frac{M}{(n+1)!} |x-a|^{n+1} \)
where \( M \) is the maximum value of \( |f^{(n+1)}(x)| \) on the interval and \( |x-a| \leq d \).

**Directions found on the front cover of your text**

Use of books, notes or calculators is **NOT** permitted.

**Please show all your work!** Answers without appropriate supporting work may not receive full credit.

Clearly indicate your answers to each problem by underlining them or placing a box around your answers!

Trigonometric functions at the values 0, \( \pi/6 \), \( \pi/4 \), \( \pi/3 \), \( \pi/2 \), etc must be evaluated!

True/False and Multiple Choice Questions are graded with NO PARTIAL CREDIT.

There are 5 questions on this exam. The sum of the 4 highest scores will determine your examination score.