

## Advice for the final exam

This is a *cumulative* exam, including *all* chapters covered this semester. Here, I only discuss sections covered after the second midterm, but please take a look at the advice given regarding earlier sections! It is also extremely essential to know the basics of differentiation and integration from Calculus I, especially the product rule, quotient rule and chain rule for derivatives, the substitution method for integrals, and the Fundamental Theorem of Calculus. You should know how to differentiate and integrate elementary functions (polynomials, trig functions, exponentials and logarithms).

**10.5:** The ratio test is one of the most useful tests we have for determining whether a series converges or diverges. Know how to use both the ratio test and the root test, and practice lots of problems from this section.

**10.6:** Given a power series, you should know how to find its center, its radius of convergence, and its interval of convergence. You should also be able to find the values of  $x$  for which it converges absolutely and for which it converges conditionally. Learn how to find the power series of functions of the form  $\frac{a}{b+cx^n}$  by comparing them to the sum of a geometric series, and how to find other power series by integrating or differentiating a series you already have (term by term). You do not need to know the subsection on solving differential equations using power series.

**10.7:** You should know how to find the Taylor series for a function. Methods for doing this include using the formula for the co-efficients in the series, substituting terms in a series you already have, multiplying series by powers of  $x$  or by other series, comparing with the sum of a geometric series, integrating or differentiating a series you already have term by term, or by using the binomial theorem.

**9.1:** You should know what it means for a differential equation to be separable, and how to solve it in this case. You should also understand what initial conditions are and how to use them.

**9.2:** The differential equation for Newton's Law of Cooling and the balance in an annuity are given in the formula sheet. You should be able to apply the methods of Section 9.1 to solve these differential equations and use the result to solve problems similar to the homework problems for this section.

**9.3:** You do not need to know how to draw slope fields, but you should know how slope fields correspond to differential equations, and how to find solution curves given a slope field and initial conditions. You do *not* need to know Euler's Method.

For each of these chapters, make sure you know how to do all of the homework and quiz problems!