Review sheet for exam 3

The best way to study for the exam is to learn how to do all of the assigned practice problems. If you run out of problems, learn to do all of the problems in the book! Here are some suggested problems from the review sections:

Chapter 11 review: 40-43, 45, 46, 47-54, 55, 57(a), 58(a)

Chapter 9 Review: 1-15, 18, 22, 23

The following is a list of the topics that I think are important:

- 11.8: Power series
  - Know the definition of a power series centered at $x = a$.
  - Be able to compute the radius of convergence and interval of convergence for a power series. Don't forget about the endpoints!
- 11.9: Representing functions as power series
  - Know the power series expansion for $1/(1-x)$ on $(-1, 1)$.
  - Be able to manipulate this series to find power series representations of related functions and their radii and intervals of convergence.
  - Know the theorem about integrating and differentiating power series representations of functions.
- 11.10: Taylor and Maclaurin Series
  - Know how to find a Maclaurin or Taylor series for a given function.
  - Know how to use a given series to find related series via substitution, integration, and differentiation.
- 11.11: Applications of Taylor Polynomials
  - Know what a Taylor polynomial is and how to compute it.
  - Be able to compute the remainder for using a Taylor polynomial to approximate a function. **I will only ask about alternating Taylor series. You do not need to memorize Taylor's Theorem for remainders**.
- 9.1: Differential equations
  - Know what a differential equation is and what it means for a function to be a solution.

  - Understand what an initial value problem is.

- 9.2: Direction fields and Euler's Method
  - Know what a direction field is and about the connection between functions defining a differential equation and the associated direction field.
  - Understand the connection between solution curves in the direction field and solutions to initial value problems.
  - Know Euler's method.

- 9.3: Separable equations
  - Know how to identify and solve separable differential equations.

- 9.5: Linear differential equations
  - Know how to solve first–order linear differential equations and initial value problems.
  - Be able to solve mixing problems.

- 9.4 + 9.6: Population dynamics
  - Be familiar with the "Law of natural growth" (see bottom of page 591).
  - Be familiar with the logistic model (see pages 592-595.
  - Be able to read and understand the Lotka-Volterra equations (see page 608).
  - Understand how to interpret phase trajectories in the phase plane.