# Review sheet for Exam 2

The best way to study for the exam is to learn how to do all of the assigned practice problems. Here are some suggested problems from the chapter reviews:

Chapter 8 Review: 1-4, 7, 8, 11, 12, 13, 19

Chapter 11 review: 1, 5, 7, 11-26 (skip around), 27, 28, 29, 32, 35, 36, 38

The following is a list of the topics that you should have mastered to be prepared for the exam:

- 8.1: Arc length
  - Know the arc length formula and be able to use it in examples.
- 8.2: Surface areas
  - Know how to find the surface area of a surface generated by rotating a curve about the $x$ or $y$ axis.
- 8.3: Physics applications
  - Know how to compute the centroid of thin plates.
- 8.5: Probability
  - Understand what a continuous random variable is.
  - Know the basic properties of probability density functions.
  - Be able to use a probability density function to compute probabilities.
  - Know how to compute the mean value of a random variable.
- 11.1: Sequences
  - Know how to decide if a sequence converges or not.
  - Know the limit laws, the squeeze theorem, and the theorem that says that if the limit of the absolute value is zero, then the limit of the original sequence is zero.
  - Know the monotonic sequence theorem.
- 11.2: Series
  - Know the definition of a series and how to decide if it converges or not by looking at the sequence of partial sums.

- Be able to identify geometric series.
- Know how to either compute the value of a geometric series or show that it diverges.
- Know the test for divergence. Know not to apply it backwards (limit of terms equals zero **does not imply** that the sequence converges).
- Be able to identify and test telescopic series for convergence.

- 11.3: Integral test
  - Know how to use the integral test to decide convergence.
  - Be sure to know how to check that the hypotheses are satisfied.
  - Know how to tell if a $p$–series is convergent.
  - Know how to use integration to estimate the value of a series from its partial sums.
  - Know how to use the remainder estimate for the integral test to approximate sums.

- 11.4: Comparison tests
  - Be an expert at using the comparison and limit comparison tests.

- 11.5: Alternating series
  - Be able to identify alternating series.
  - Know how to use the alternating series test.
  - Know how to estimate the value of an alternating series from its partial sums.
- 11.6: Ratio and Root Tests
  - Know the definitions of absolutely and conditionally convergent and how to test series for these types of convergence.
  - Be able to use the ratio test.
  - Be able to use the root test.
- 11.7: Strategy for testing series
  - Practice!