Review sheet for Exam 3

Be sure to practice the practice problems listed on the course web page. You should skip around and work on things that you find difficult or confusing first. While studying, try your best not to refer to your notes or the book so that you can better internalize the formulas and techniques.

Here are some problems from the chapter review section:

- Chapter 14 review: 59-64
- Chapter 15 review: Think through the "concept check" and "true–false quiz". Also try 1-34, 39-40, 45, 46, 47-49

14.8: Lagrange multipliers

- Know how to use the technique of Lagrange multipliers with one or more constraints.

15.1: Double integrals over rectangles

- Understand the concepts behind setting up double integrals over rectangles.
- Be able to estimate double integrals given limited data.

15.2: Iterated integrals

- Know how to compute iterated integrals.
- Know Fubini's theorem and how to use it.

15.3: Double integrals over more general regions

- Know how to compute an integral over a non–rectangle. How is this derived from integrating over a rectangle?
- Be able to set up double integrals over type I and II regions.
- Be able to change order of integration.
- Know the basic properties of double integrals and how to use them to split up integrals over more complicated regions.

15.4: Double integrals in polar coordinates

- Know how to convert to and from polar coordinates.
- Be able to compute double integrals by changing to polar coordinates.

15.6: Triple integrals

- Understand the concepts behind setting up triple integrals.
- Know Fubini's theorem for triple integrals and how to use it to integrate over various types of regions.
- Be able to change order of integration.

15.7: Triple integrals in cylindrical coordinates

- Understand how cylindrical coordinates work and how to convert between Cartesian and cylindrical coordinates.
- Know how to convert integrals to cylindrical coordinates.

15.8: Triple integrals in spherical coordinates

- Understand how spherical coordinates work and how to convert between Cartesian and spherical coordinates.
- Know how to convert integrals to spherical coordinates.

15.9: Change of variables

- Understand how transformations of the plane work.
- Know the definition of the Jacobian in 2 and 3 dimensions.
- Know the change of variables formula for double and triple integrals and how to use it.
- In general, be able to evaluate an integral by making an appropriate change of variables (polar, cylindrical, spherical, other).