RUTGERS
UNIVERSITY | NEWARK

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**Calculus III**

Spring 2018

# List of topics for the Final Exam

**Topics:** The list of topics for the Final Exam includes all the material that was covered throughout the semester. However, the focus of the exam will be on Chapters 13 and 14.

## Chapter 11: Vectors and Vector-Valued Functions

You should review Chapter 11, at the very least go through your notes carefully. Refer to the list of topics for Exam #1 for details on what to review for this chapter.

## Chapter 12: Functions of several variables

You should review Chapter 12, at the very least go through your notes carefully. Refer to the list of topics for Exam #2 for details on what to review for this chapter.

## Chapter 13: Multiple Integration

Review all covered sections of Chapter 13 in depth:

- **13.1** Double Integrals over Rectangular Regions. Definition of (double) integrals for functions of two variables. Average value. Computing double integrals over rectangular regions: Fubini's theorem.
- **13.7** This section is off-topic. It will not be on the Final Exam.

## Chapter 14: Vector Calculus

Review all covered sections of Chapter 14 in depth:

> **14.1** Vector Fields. Definition, geometric description. Gradient fields, conservative vector fields, potential functions, flow lines, equipotential curves.

> **14.2** Line Integrals. Line integral and average value of a function along a smooth curve, line integral of a vector field along a smooth curve, circulation of a vector field along a smooth curve. Notations and formulas.

> **14.3** Conservative Vector Fields. Finding potential functions. Fundamental theorem for line integrals, and corollaries: path independence and circulation for conservative vector fields. 2-dimensional curl of a vector field and irrotational vector fields. Curl test theorem.

> **14.4** Green's theorem. Notions of topology in the plane: Closed curves, simple closed curves, contractible curves, open domains, connected and simply connected domains. Circulation form of Green's theorem. Consequences of Green's theorem. Application to computing areas of planar domains via line integrals.

**Review material:**

> **Lecture notes** and supporting **textbook**.

> **Homework problems:** Refer to the online course schedule for the homework assignments corresponding to the topics in the list of topics.

> **Quizzes:** Quizzes 7, 8.

**Advice**

- Your lecture notes from class should be your primary (if not only) source of information. You are expected to know all the material in your lecture notes, and no other (unless you are told otherwise occasionally). Review your lecture notes regularly and thoroughly.
- Remember that all past quizzes, tests and homework exercises sheets are available on the course web page. Make sure you go over all of them (or as many as you can).
- I am happy to answer your questions, as long as: 1. They are math questions, and 2. You have made a genuine effort to think about your

question before contacting me.

- The best way to prepare for the exams is to work regularly, make sure you understand all the material as it is being taught, do all the homework exercises, etc. Don't wait until the last moment to prepare. Don't try to guess what will be on the test, your time is best spent preparing for every possibility.
- Do not expect the test to be solely a direct application of the material you reviewed. It will require you to be capable of original thinking.
- Calculators will not be allowed.