Math 105, 2017W Term 2

Integral Calculus with Applications to Commerce and Social Sciences

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Course Outline

- The course is divided into three parts. Roughly speaking, we will cover multivariable calculus (Chapter 12) and start on integration (Chapter 5) before the first midterm. We will complete the theory of integration (Chapter 5) and integration techniques (Chapter 7), followed by a week's worth of probability before the second midterm. The rest of the time will be devoted to discussing sequences and series (Chapters 8 and 9).
- Here is a week-by-week schedule of course material based on the appropriate sections of the text. The chapter and section numbers are from the second custom edition of the textbook. Follow the links for each week to get a more detailed description of the concepts covered that week, and for the learning objectives that you should use as self-checks.
    - Week 1 Functions of several variables (Chapter 12) Learning goals
        - Planes and surfaces (12.1)
        - Graphs and level curves (12.2)
    - Week 2 Functions of several variables (Chapter 12) Learning goals
        - Partial derivatives (12.4)
        - Maximum/minimum problems (12.8)
    - Week 3 Functions of several variables (Chapter 12) Learning goals
        - Maximum/minimum problems (12.8)
        - Lagrange multipliers (12.9)
    - Week 4 Integration (Chapter 5) Learning goals
        - Approximating areas under curves (5.1)
        - Definite integrals (5.2)
    - Week 5 Integration (I)(Chapter 5) Learning goals
        - Fundamental theorem of calculus (5.3)
        - Substitution rule (5.5)
    - Week 6 Integration (II) (Chapter 5) Learning goals
        - Integration by parts (7.2)
    - Week 7 Integration techniques (Chapter 7) Learning goals
        - Trigonometric Integrals (7.3)
        - Trigonometric substitutions (7.4)
        - Partial fractions (7.5)
    - Week 8 Integration techniques (Chapter 7) Learning goals
        - Numerical integration (7.7)
        - Improper integrals (7.8)
        - Introduction to differential equations (7.9)
    - Week 9 Probability (Probability Appendix) Learning goals
        - Continuous random variable (2.1 and 2.2 in Probability Appendix)
        - Expected Value, Variance, and Standard Derivation (2.5 and 2.6 in Probability Appendix)
    - Week 10 Sequences and infinite series (Chapter 8) Learning goals
        - Sequences (8.1-8.2)
        - Infinite series (8.3)

    - The divergence and integral tests (8.4)
  - Week 11 Series (Chapter 8) and Power series (Chapter 9) Learning goals
    - The ratio and comparison tests (8.5).
    - Approximating functions with polynomials (9.1)
    - Properties of power series (9.2)
  - Week 12 Power series (Chapter 9) and review Learning goals
    - Taylor series (9.3)
    - Working with Taylor series (9.4)

Practice problems

This section contains a list of problems from the textbook. These are not to be turned in, but working through them will help crystallize the concepts covered in class. Not all parts of a textbook section will be emphasized equally in lectures, and these problems serve as guidelines for identifying the important and relevant parts that constitute the course syllabus. 60% of the final exam will consist of the questions which are similar to the questions in the following list.

- Section 11.1: 9, 11, 15, 31, 33, 37, 41, 45
- Section 11.2: 7, 9, 43, 67, 69
- Section 11.3: 3, 49
- Section 12.1: 1, 3, 11, 13, 29, 31, 33.
- Section 12.2: 1, 3, 7, 11, 15, 17, 19, 31, 33, 35, 37, 53, 65
- Section 12.4: 1, 3, 5, 17, 21, 23, 25, 29, 33, 37, 41, 43, 61, 63
- Section 12.8: 13, 19, 21, 23, 25, 27, 35, 37, 39, 43, 45, 47, 51, 61
- Section 12.9: 5, 11, 13, 27, 29, 35, 37, 47, 49, 53, 55
- Section 5.1: 5, 7, 21, 23, 27, 31, 33, 35, 39, 41, 55, 57, 59, 61, 63
- Section 5.2: 3, 5, 9, 21, 23, 27, 31, 33, 35, 37, 39, 41, 43, 45, 47, 51, 69, 71
- Section 4.8: 11, 13, 15, 17, 19, 21, 25, 27, 29, 39, 41. Section 4.8 and the solutions to the Practice problems in section 4.8
- Section 5.3: 5, 9, 11, 17, 19, 21, 23, 25, 37, 39, 45, 61, 63, 65, 67, 69, 75, 85, 99, 101
- Section 5.5: 3, 5, 11, 13, 15, 19, 23, 29, 33, 35, 39, 41, 43, 53, 57, 61, 63, 67, 73
- Section 7.2: 7, 9, 11, 15, 17, 19, 25, 27, 31, 35, 37
- Section 7.3: 13, 15, 21, 25, 35, 37, 41, 53, 59, 61
- Section 7.4: 7, 9, 17, 25, 27, 35, 37, 47, 59, 63, 65.
- Section 7.5: 1, 3 a, 3 b, 15, 19, 21, 27, 29, 63, 65, 67, 71, 77, 79
- Section 7.7: 7, 9, 11, 13, 15, 17, 39, 41, 49, 51, 59
- Section 7.8: 9, 11, 15, 17, 27, 43, 45, 71, 73
- Section 7.9: 17, 19, 25, 27, 29, 31, 33, 39, 63, 65, 67
- Probability Appendix 9, 10, 11, 12, 13, 14, 15, 16, 17, 18. The solutions are HERE . .
- Section 8.1: 3, 7, 9, 15, 19, 21, 23, 29, 31, 35, 57, 69, 71, 73, 75, 77
- Section 8.2: 3, 5, 9, 11, 17, 29, 45, 47, 49, 75, 79, 81
- Section 8.3: 7, 9, 11, 13, 17, 19, 21, 23, 25, 29, 31, 33, 35, 37, 39, 49, 61, 63, 69
- Section 8.4: 3, 5, 9, 13, 21, 23, 25, 29, 31, 45, 47, 49, 53, 55, 57
- Section 8.5: 9, 11, 13, 15, 17, 27, 29, 31, 33, 35, 37.
- Section 9.1: 15, 17, 33, 39, 41, 45, 49, 51, 53, 61, 63, 65, 67, 69
- Section 9.2: 17, 19, 21, 23, 25, 27, 29, 31, 33, 41, 45, 47, 49, 63, 65, 67. Note that you just need to find the radius of convergence for questions 63, 65 and 67.
- Section 9.3: 9, 11, 15, 23, 25, 29, 33, 35
- Section 9.4: 25, 27, 29, 31, 55, 61