

MA 1003: CALCULUS I, Fall 2005

Instructor: Prof. Suh-Yuh Yang (楊肅煜)

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Prerequisites: High school mathematics

Textbook: R. Larson and B. H. Edwards, *Calculus: An Applied Approach, Seventh Edition*, by Houghton Mifflin Company, 2005 (臺灣代理商: 歐亞書局有限公司, 請洽 02-89121188).

Course Objective: Its primary goal is to teach you the techniques of differential and integral calculus that you are likely to encounter in undergraduate courses in your major and in your subsequent professional activities. The emphasis is on four basic ideas: limit, derivative, integral, and series.

General Information: The course will mainly cover the following topics

Chapter 0 - A Precalculus Review: the real line, absolute value, exponents and radicals, factoring polynomials, fractions and rationalization

Chapter 1 - Functions, Graphs, and Limits: the Cartesian plane, graphs of equations, lines in the plane and slope, functions, limits, continuity

Chapter 2 - Differentiation: the derivative and the slope of a graph, some rules for differentiation, rates of change, the product and quotient rules, the chain rule, higher-order derivatives, implicit differentiation, related rates

Chapter 3 - Applications of the Derivative: increasing and decreasing functions, extrema and the first-derivative test, concavity and the second-derivative test, optimization problems, business and economics applications, asymptotes, curve sketching, differentials and marginal analysis

Chapter 4 - Exponential and Logarithmic Functions: exponential and logarithmic functions, derivatives of exponential and logarithmic functions, exponential growth and decay

Chapter 5 - Integration and Its Applications: antiderivatives and indefinite integrals, power rule, exponential and logarithmic integrals, the Fundamental Theorem of Calculus, area, definite integrals, volume

Grading Policy: mid-terms 1, 2, 3 and final exam: each 20%; others (quizzes, attendance, etc.) 20%

Examinations:

Mid-term 1: 03:00 ~ 04:50 p.m., October 18, 2005 (Tuesday)

Mid-term 2: 03:00 ~ 04:50 p.m., November 15, 2005 (Tuesday)

Mid-term 3: 03:00 ~ 04:50 p.m., December 13, 2005 (Tuesday)

Final Exam: 03:00 ~ 04:50 p.m., January 10, 2006 (Tuesday)

Exercises:

Chapter 0 - Section 0.1: 23, 25, 27, 31, 35; Section 0.2: 9, 13, 27, 29, 33; Section 0.3: (Example 5), (Example 6); Section 0.4: 51, 55, 65, 67, 72; Section 0.5: (Example 5), (Example 6)

Chapter 1 - Section 1.1: 11, 13, 23, 35, 36; Section 1.2: 19, 33, 43, 45, 51, 53, 63, 69; Section 1.3: 21, 27, 33, 45, 86, 90; Section 1.4: 41, 49, 55, 57, 59, 63; Section 1.5: 41, 43, 45, 47, 49, 51; Section 1.6: (Example 5), 35, 37, 39, 41, 43, 45, 46, 55

Chapter 2 - Section 2.1: 21, 25, 41, 43, 47, 49, 51; Section 2.2: 15, 17, 19, 27, 29, 35, 41, 49, 57, 65, 66; Section 2.3: none; Section 2.4: 5, 9, 27, 31, 33, 35, 37, 43, 53, 58, 59, 63; Section 2.5: 27, 31, 49, 59, 63, 67, 69, 71; Section 2.6: 9, 11, 13, 19, 23, 29, 35, 39, 51–56; Section 2.7: 5, 9, 11, 19, 23, 35, 39; Section 2.8: none

Chapter 3 - Section 3.1: 15, 17, 21, 23, 27, 29, 33, 40; Section 3.2: (Example 3), 9, 13, 17, 23, 25, 27, 29, 37; Section 3.3: 5, 7, 15, 17, 29, 31, 51; Section 3.4: (Example 4), 18, 26, 31; Section 3.5: 15, 21, 25; Section 3.6: 19, 21, 25, 29, 31, 57, 64; Section 3.7: (Example 2); Section 3.8: (Example 3)

Chapter 4 - Section 4.1: 25, 27, 29, 31; Section 4.2: (Example 3), (Example 4), (Example 5), 27, 28, 29; Section 4.3: (Example 5), 11, 13, 15, 21, 23, 29, 31, 33, 41; Section 4.4: 37, 39, 47, 49, 59, 67, 69, 81, 85–90; Section 4.5: (Example 8), (Example 9), 15, 17, 19, 21, 25, 47, 51, 53, 57, 69, 71; Section 4.6: 48

Chapter 5 - Section 5.1: 33, 35, 37, 39, 41, 53, 55, 65, 69, 79; Section 5.2: 11, 17, 21, 25, 27, 37, 39, 41, 47, 53; Section 5.3: 5, 9, 21, 23, 25, 41, 49, 51, 53, 55