

MATH 200X Syllabus

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Text: Stewart, *Calculus early transcendentals*, sixth edition

Topics covered are listed below. Some are optional, some require more than one class period:

* optional, time permitting.

** may require more than one class period.

the instructor may consider introducing this material after Chapter 5

Chapter 1

Topics from Chapter 1 are covered depending on the preparation of the students. To gauge their preparation, on the first day of class students are asked to give information about previous math courses and to take a ten-minute quiz on algebra and trigonometry. (Some students may then be advised to take Math 107 or Math 108.)

Chapter 2

- 2.1** The Tangent and Velocity Problems
- 2.2 The Limit of a Function
- 2.3 Calculating Limits Using the Limit Laws
- 2.4* The Precise Definition of a Limit
- 2.5 Continuity (lightly)
- 2.6 Limits at Infinity; Horizontal Asymptotes
- 2.7 Derivatives as Rates of Change
- 2.8 The Derivative as a Function

Chapter 3

- 3.1 Derivatives of Polynomials and Exponential Functions
- 3.2 The Product and Quotient Rules
- 3.3 Derivatives of Trigonometric Functions
- 3.4 The Chain Rule
- 3.5** Implicit Differentiation
- 3.6 Derivatives of Logarithmic Functions
- 3.7* Rates of Change in the Natural and Social Sciences
- 3.8*# Exponential Growth and Decay
- 3.9** Related Rates
- 3.10** Linear Approximations and Differentials
- 3.11* Hyperbolic Functions

Chapter 4

- 4.1 Maximum and Minimum Values
- 4.2 The Mean Value Theorem
- 4.3 How Derivatives Affect the Shape of a Graph
- 4.4 Indeterminate Forms and L'Hospital's Rule
- 4.5** Summary of Curve Sketching
- 4.6* Graphing with Calculus and Calculators

- 4.7** Optimization Problems
- 4.8 Newton's Method
- 4.9 Antiderivatives

Chapter 5

- 5.1 Areas and Distances
- 5.2 The Definite Integral
- 5.3** The Fundamental Theorem of Calculus
- 5.4 Indefinite Integrals and the Total Change Theorem
- 5.5 The Substitution Rule

Chapter 6

- 6.1 Areas Between Curves
- 6.2** Volumes
- 6.3** Volumes by Cylindrical Shells
- 6.4* Work
- 6.5* Average Value of a Function

The final exam may cover any of the non-optional sections above. Optional sections may of course be included at the discretion of the instructor. The criteria upon which the Math 200 finals are evaluated by the Core Assessment Committee are listed below.

1. Students master problem-solving skills.
2. Students learn to manipulate abstract symbols.
3. Students learn and appreciate the rigorous use of deductive arguments in mathematics.
4. Students learn a broad spectrum of mathematical applications:
 - a. limits and continuity
 - b. differentiation and integration
 - c. maximization/minimization problems
 - d. analysis of functions of one variable and their graphs
 - e. applications of integrals and derivatives
5. Students have mastered the prerequisite material for the course.

To that end, a question is chosen from the final exam representing each of these nine criteria and sub-criteria. It has often been the case in the past that one exam question served to cover more than one criterion. It is not our intention to create conditions leading to inordinately long or redundant final exams for the purpose of meeting Core Assessment Committee demands. However, Math 200 instructors should be aware of the criteria while preparing their final exams.