

MATH 10b: Techniques of Calculus (b) – Summer 2017

Section 1

Instructor: Zach Larsen

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Office hours: see LATTE

Text:

Single Variable Calculus: Concepts and Contexts, James Stewart, 4th edition.

Prerequisites:

Math 10a or a satisfactory score on the math department's calculus placement exam.

Learning Goals for Math 10b:

By the end of the semester, you will:

- Understand and be able to apply key ideas of calculus, including:
 - the interpretation of the definite integral in terms of area and net change;
 - the relationship between differential and integral calculus (The Fundamental Theorem of Calculus)
 - using estimation and limits to derive precise calculations;
 - using integration to compute volume and arc length;
 - using integration and Taylor series techniques to solve (or estimate solutions for) differential equations.
- Develop proficiency in core techniques for:
 - integration, including substitution, integration by parts and partial fractions;
 - computing improper integrals and testing for convergence of improper integrals; and
 - analyzing infinite series, including tests for convergence.
- Hone quantitative reasoning skills by solving problems that challenge you to understand the material on a deeper level by presenting the material in ways not demonstrated explicitly in class.
- Develop a sense for how the specific skills learned in math 10b will transfer to other disciplines by solving applied problems from other fields, such as biology, chemistry, physics and economics.
- Improve communication skills, particularly for communicating technical information, by practicing writing (on homework, quizzes and exams) and speaking (to classmates, evening help tutors and your instructor) with precision about these mathematical concepts.

Syllabus:

We will cover the following topics this semester:

Section	Topic
3.6	Inverse Trig Functions and their Derivatives
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5.1	Areas and Distances
5.2	The Definite Integral
5.4	The Fundamental Theorem of Calculus (FTC I)
5.3	The Fundamental Theorem of Calculus (FTC II)
5.5	Integration by Substitution
5.6	Integration by Parts
5.7	Additional Techniques of Integration (Partial Fractions)
5.9	Approximate Integration (Midpoint and Trapezoidal Rules)
5.10	Improper Integrals
6.1	More about Areas
6.2	Volumes (Disks and Washers)
6.4	Arc Length
6.7	Applications to Economics and Biology
7.1	Differential Equations
7.3	Separable Equations
8.2	Introduction to Series
8.4	Other Convergence Tests (Alternating Series Test and Ratio Test)
8.5	Power Series
8.7	Taylor Series

Note: You must know the material on Antiderivatives from §4.8 (covered in Math 10a).

Note: Some topics may be added, omitted, or presented in a different order, as time permits.

LATTE:

All course materials for Math 10b will be available online on LATTE. Log in using your Unet username and password.

Calculators:

Calculators are **not** allowed during exams or quizzes. You should have access to a scientific calculator for homework, but you do not need a graphing calculator.

Four-Credit Course (with three hours of class-time per week):

Success in this 4 credit hour course is based on the expectation that students will spend a **minimum of 9 hours of study time per week** in preparation for class (readings, papers, discussion sections, preparation for exams, etc.).

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Exams:

There will be two midterm exams and a final exam.

Grades:

Your grade in the course will be based on the following:

- **Homework (10% of your grade).**
 - Homework assignments will be collected once or twice a week.
 - **No late homeworks will be accepted**, but your three lowest homework grades will be dropped.
 - We encourage you to discuss homework problems with your classmates, but you must write up your own solutions. You may not use any solution manuals.
- **Quizzes (10% of your grade).**
 - Short quizzes will be given regularly.
 - **No make-up quizzes will be given.** Missed quizzes count as zeroes. However, the lowest 25% of your quiz grades will be dropped.
- **Two midterm exams (each 25% of your grade).**
- **Final exam (30% of your grade).**

Self-quizzes:

There is a link called “Self-quizzes” on your Math 10b LATTE course page. The Math 10b self-quizzes cover all the material being studied in Math 10b. Complete solutions to each self-quiz are given. These self-quizzes are optional and for your use only, and have no effect on your grade.

Office hours:

You are encouraged to use your instructor’s office hours whenever you have questions about the course material. If you can’t attend office hours, don’t hesitate to ask for an appointment for another time.

Evening help sessions:

You are welcome to attend the Math Department’s evening help sessions whenever you like. These are drop-in sessions that are available to students in Math 5a, 10a and 10b every Monday, Tuesday, Wednesday, and Thursday evening anytime between 7:00 pm and 9:00 pm. Help sessions are held in Goldsmith 101 and will begin on Tuesday, January 24th.

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Students with disabilities:

If you are a student who needs academic accommodations because of a documented disability you should present your letter of accommodation to your instructor as soon as possible. If you have questions about documenting a disability or requesting academic accommodations you should contact Beth Rodgers-Kay in the Office of Academic Services at x63470 or at brodgers@brandeis.edu. Letters of accommodations should be presented at the start of the semester to ensure provision of accommodations. Accommodations cannot be granted retroactively.

Academic Integrity:

You are expected to follow the University's policy on academic integrity, which is distributed annually as section 4 of the Rights and Responsibilities Handbook. Instances of alleged dishonesty will be forwarded to the Department of Student Development and Conduct for possible referral to the Student Judicial System. Potential sanctions include failure in the course and suspension from the University. If you have any questions about how these policies apply to your conduct in this course, please ask.

Name/Pronouns:

If you have a preferred name and/or preferred pronouns you would like me to use, please send me an email.

Course coordinator:

Becci Torrey, Goldsmith 222, rtorrey@brandeis.edu