MATH 5a: Precalculus  
Spring 2017  

Instructor: Becci Torrey  
Office: Goldsmith 222  
e-mail address: rtorrey@brandeis.edu  
Office hours: see LATTE  

Text:  

The course will cover the following sections of the text: Sections 1.1–1.5, 1.7, 1.8, 1.10, 1.11, 2.1–2.7, 4.1–4.5 and selected sections from Chapters 5 and 6.  

Prerequisite:  
There are no prerequisites for Math 5a. Students who are unsure of their placement and are considering Math 10a should take the calculus placement exam:  
http://www.brandeis.edu/registrar/newstudent/testing.html#mathtest.  

Learning Goals for Math 5a:  

- Become proficient in the skills necessary for succeeding in Calculus (Math 10a), including:  
  - Solidify knowledge of algebra: working with exponents and radicals, simplifying polynomials and rational expressions, and solving polynomial and rational equations and inequalities.  
  - Understand the definition of a function, and learn to identify the domain and range of a function and graph a number of basic functions.  
  - Learn to find and work with combinations and transformations of functions.  
  - Learn to solve applied problems involving functions.  
  - Learn to find and graph the inverse of a function.  
  - Learn to work with exponential, logarithmic and trigonometric functions and their graphs.  
  - Learn to solve exponential, logarithmic and trigonometric equations and inequalities.  

- 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.  

- 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.  

- Acquire (or improve) ability to accurately represent mathematical expressions on a computer by practicing online homework with instant feedback.  

- Develop a sense for how the specific skills learned in Math 5a will transfer to other disciplines by solving applied problems from other fields, such as biology, chemistry, physics and economics.  

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Experiential Learning:
This is an Experiential Learning course. The ABC’s of Experiential Learning are Agency, Belonging and Competency. Here’s how the ABC’s will factor into our class.

- **Agency:** One of our learning goals of Math 5a is to improve our ability to learn math so that you can carry these skills with you into your future study. You will set your own sub-goals for this, depending on your current background and level. You will have the opportunity during the semester to reflect on your progress and modify your goals as appropriate. This will encourage you to take control of your own learning.

- **Belonging:** There is compelling research showing that students who succeed in introductory college math courses have one big factor in common: they form social groups around academics. This means they make friends in their classes and talk to each other about math outside of class. We will promote this type of social interaction in our course through “coffee groups”, in-class group work and some out-of-class partner or group assignments.

- **Competency:** Gaining competency in math is just like learning a language, an instrument or a sport: you will make progress with extensive practice. This course is structured to provide you with ample hands-on practice before, during and after class. By actively practicing techniques and skills and intentionally reflecting on your progress, you will build your understanding of the important ideas in this class.

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

- **Homework (10% of your grade).**
  - Homework assignments will be collected about twice a week.
  - No late homeworks will be accepted, but your five lowest homework grades will be dropped.
  - You are encouraged 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.
  - One of your quiz grades will be a grade for Reading Quizzes. You must read each section of the text before it is covered in class. On the days when a reading assignment is due, there will be a reading quiz online, which will be due before class. These are graded on completion only, so it is an easy way to boost your overall quiz grade. They are graded this way because it is important that you try these problems before class but if you don’t get them right, it’s ok.

- **Two midterm exams (each 25% of your grade).**

- **Final exam (30% of your grade).**

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Exams:
There will be two midterm exams and a final exam. Tentative exam dates:

- **Exam 1:** Monday, February 13, 7–9 p.m. (evening)
- **Exam 2:** Friday, March 24, 2–4 p.m.
- **Final Exam:** Tuesday, May 9, 9:15 a.m.–12:15 p.m.

If you have an academic conflict (such as a class, lab, or another exam) with a midterm exam, please let me know at least one week before the exam. If the conflict can’t be resolved, I will offer you a make-up exam.

Calculators:
You should have access to a scientific calculator (an online one is fine). You do not need a graphing calculator in Math 5a. Calculators are not allowed during exams or quizzes.

LATTE:
All course materials for Math 5a will be available online on LATTE. Log in at [http://latte.brandeis.edu](http://latte.brandeis.edu) using your Unet username and password.

Self-quizzes:
There is a link called “Self-quizzes” on your Math 5a LATTE course page. The Math 5a self-quizzes cover all the material being studied in Math 5a. 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 attend my 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.

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.).

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 (see http://www.brandeis.edu/studentaffairs/srcs/rr/index.html). 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 to let me know.

Topics covered in Math 5a (Prealculus):

- Section 1.1 Real Numbers
- Section 1.2 Exponents and Radicals
- Section 1.3 Algebraic Expressions
- Section 1.4 Rational Expressions
- Section 1.5 Equations
- Section 1.7 Inequalities
- Section 1.8 Coordinate Geometry
- Section 1.10 Lines
- Section 1.11 Making Models Using Variation
- Section 2.1 What Is a Function?
- Section 2.2 Graphs of Functions
- Section 2.3 Getting Information from the Graph of a Function
- Section 2.4 Average rate of Change of a Function
- Section 2.5 Transformations of Functions
- Section 2.6 Combining Functions
- Section 2.7 One-to-One Functions and Their Inverses
- Appendix Modeling with Functions
- Section 4.1 Exponential Functions
- Section 4.2 The Natural Exponential Function
- Section 4.3 Logarithmic Functions
- Section 4.4 Laws of Logarithms
- Section 4.5 Exponential and Logarithmic Equations
- Section 6.1 Angle Measure
- Section 6.2 Trigonometry of Right Triangles
- Section 5.1 The Unit Circle
- Section 5.2 Trigonometric Functions of Real Numbers
- Section 5.3 Trigonometric Graphs
- Section 5.4 More Trigonometric Graphs

Note: Some topics may be added or omitted as time permits.