

07/08/16

Math E-10

Precalculus

Fall 2016

**Instructor:** David Arias, Ed.D.

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**Course Website:** <https://canvas.harvard.edu/courses/18233>

During the semester, linear, quadratic, exponential, logarithmic, trigonometric, polynomial and rational functions will be discussed. Lectures will be videotaped and posted on our website within 24 hours. Solution to homework, solution to questions from recommended textbook and sample tests will also be posted on our website. You will be able to access them by using your Harvard PIN. Make sure that you have your **Harvard** PIN and password by the first class meeting. You may request one at [www.pin.harvard.edu](http://www.pin.harvard.edu).

If you have technical questions about viewing the videotaped lectures, the following link could help.

<http://www.extension.harvard.edu/academics/courses/types-courses/videocourse-guidelines>

**Schedule** (No school on November 24)

**Lectures:** Thursdays 5:30 – 7:30 p.m., (Sep 01 – Dec 15.) Room TBA.

Only registered students will be allowed to attend lectures.

**Optional Review Sections:** They will be conducted every Wednesday, 6:30-7:30 p.m. from September 07 to Dec 14, via web conference. Sessions will be recorded and links to access them will be posted on our website. Instructions will be provided at the beginning of the semester.

For the web conference, you will need a computer (system requirements: at <http://support.blackboardcollaborate.com/ics/support/default.asp?deptID=8336&task=knowledge&questionID=2890>) and an headset with a microphone attached to it.

**Required Graduate Seminar** – The graduate credit option for Math E10 is intended for students participating in the Math for Teaching masters program. Students signing up for graduate credit are required to participate in an hour-long weekly graduate seminar to discuss pedagogical issues relating to the precalculus class. Potential students' misconceptions as well as alternative teaching approaches will be examined. The seminar will be conducted using an online learning platform on a day and time to be determined after consulting with everyone who is signed up for graduate credit during the first week of classes.

**Textbook:** Functions Modeling Change: A Preparation For Calculus, **4th Edition**, Connally, Hughes Hallett, Gleason, et al., ISBN 978-0470484753. It is available at the Harvard Coop, BarnesAndNoble.com, Amazon.com, etc. They have used copies too. You could also rent a digital copy of the book.

The book is recommended but not required. We will discuss the concepts in an order similar to the order in which they are presented in the recommended textbook. But, if you do not have access to the book, you may use any other one that contains the concepts we will discuss in class.

Questions from the recommended book will not be assigned as part of homework. The instructor will create the questions for homework. However, the recommended book contains many good examples and practice problems. Weekly, the instructor will suggest a list of questions from the recommended book to practice before working on homework. If you do not have access to the recommended book, make sure you practice enough from other books until you are prepared to start working on homework. A copy of the fourth edition is on reserve at Grossman Library in Sever Hall.

**Prerequisites:** According to its course description, in our web catalogue, Math E-10 is an **intensive course** for students with **superior algebra skills**. Thus, although algebra concepts will be used extensively in our course, time in class or review sections will not be used to teach concepts from Math E-8, College Algebra. You must master the following skills before taking Precalculus:

- How to solve linear equations and systems of linear equations. If you need to review, work on pages 61 to 65 from the recommended textbook.
- How to solve inequalities. You may go to <http://mhhe.com/math/devmath/dugopolski/acs/etext/ch02.pdf>
- How to factor quadratic algebraic expressions and how to solve quadratic equations by factoring and by using the quadratic formula. If you need to review, work on pages 120 to 125 from the recommended textbook.
- How to solve a quadratic equation by completing the square. If you need to review, work on pages 125 to 128 from the recommended textbook.
- How to use properties of exponents. If you need to review, work on pages 175 to 178 from the recommended textbook.
- How to simplify algebraic fractions. If you need to review, work on pages 489 to 493 from the recommended textbook.

**Calculators:** Some of the questions from homework will require the use of a graphing calculator. The instructor will use a TI-83Plus graphing calculator when needed. You may use a graphing calculator of any brand during class meetings and while doing homework.

The instructor is familiar with the following models from Texas Instruments: TI-82, TI-83, and TI-84 plus. If your calculator is not mentioned in the list above, he will be able to help you if you bring your calculator's guidebook.

Owning a graphing calculator is not mandatory. You may access any of the free graphing calculators available online or you may install an application on your cellular phone. Although questions from tests and final exam will be designed to be answered only by using a scientific calculator, graphing calculators will be allowed during tests and final

exams. Calculators from Ipads, laptops, cellular phones or any other communication device **will not** be allowed during tests and final exams.

**Homework:** It will consist of a problem set assigned each week. It will be posted on our website about one hour after the end of our class meetings.

Homework is an opportunity for the instructor to give you feedback. Homework should not be considered as the only practice you should have during the semester.

Keep in mind that the more you practice, the better you get at it. Thus, consider homework as a test you have to prepare for. The instructor will post a weekly “Suggested practice” on our website. Use it to practice the concepts and skills discussed in class until you are ready to start working on homework.

Should you need more practice before working on homework, you could work on more problems from the recommended book, included at the end of each lesson. The book also includes a “Check your understanding” section at the end of each chapter and a “Skills refresher” at the end of chapters 1, 3, 4, 5, 7 and 11. Those sections include many questions that would help you master the concepts and skills discussed in class. The more you practice before working on homework, the better.

While working on problems from the recommended book, you could compare your solutions to the solutions posted on our website. Not all solutions are posted. If the solution you need is not posted, email the instructor as soon as possible. The instructor will answer your questions within 24 hours. Avoid asking questions too close to the homework deadline.

Homework is due at the beginning of each class meeting by 5:30 pm, according to the Course Outline, at the end of this syllabus. Homework submitted after the deadline will have no credit, no exceptions.

**All students must submit their homework electronically**, by using our course website. No other way of submitting homework will be accepted. At the first day of class, the instructor will show you how to submit homework at our website.

Only pdf files will be accepted and graded. Messages sent to canvas to modify part of your homework will not be considered as part of homework. If you want to modify your homework, scan your modified homework and submit it. Only the latest pdf file, submitted by the deadline, will be graded. If your homework consists of several pages, they must be assembled into only one pdf document.

Homework will be graded electronically and students will be able to access their graded work at the course website, within a week.

**The three lowest homework scores will be dropped** to consider situations that students could not control, such as: student was sick, student had an accident or was in an emergency situation, student had to travel out of town, student could not attend review

section or class, student has a heavy course load, student did not scan homework properly, student had an appointment, student emailed homework but file was corrupted or illegible, student did not have access to a scanner, student tried to access our website close to the deadline and could not connect to it because power was out or internet was not available, etc. In general, **there is not** extension of homework deadline. Thus, plan accordingly.

**Homework format:** The problem sets should be neatly and logically presented. At least one blank line should be left between solutions. Final answer should be clearly circled or underlined.

The instructor will solve many problems during class meetings. The clarity of his solutions will be a sample of the clarity you need to show in your homework. In general, solution process must be shown, step by step. Answers read from graphs (from graphing calculator or graphs drawn by hand) will have no credit. If a number is found in the solution of a problem and that number is not supported by computations, points will be taken off.

Erase any work that should not be graded. In case two different approaches are used to solve a problem or part of it, only the first approach will be graded. If statements not related to the solution are included, points will be taken off if those statements are incorrect.

If your solution process is not clear to the instructor, you will not get credit for it. Make sure you work on all questions from homework. Remember that writing well and clearly (in any discipline) is a way of showing respect for your own work.

### **Academic Integrity:**

You are responsible for understanding Harvard Extension School policies on academic integrity ([www.extension.harvard.edu/resources-policies/student-conduct/academic-integrity](http://www.extension.harvard.edu/resources-policies/student-conduct/academic-integrity)) and how to use sources responsibly. Not knowing the rules, misunderstanding the rules, running out of time, submitting the wrong draft, or being overwhelmed with multiple demands are not acceptable excuses. There are no excuses for failure to uphold academic integrity. To support your learning about academic citation rules, please visit the Harvard Extension School Tips to Avoid Plagiarism ([www.extension.harvard.edu/resources-policies/resources/tips-avoid-plagiarism](http://www.extension.harvard.edu/resources-policies/resources/tips-avoid-plagiarism)), where you'll find links to the Harvard Guide to Using Sources and two free online 15-minute tutorials to test your knowledge of academic citation policy. The tutorials are anonymous open-learning tools.

**Tests and the Final Exam:** There will be three 60-minute tests and a two-hour final exam. Test and final exam are closed-book exams. Tests will be given in **September 22, October 20 and November 17. No make-up tests will be given for any reason.**

If you miss one, two, or three tests, you will earn a grade of zero in each of the missing tests. The lowest test grade will be dropped and your course grade will be calculated according to the grading policy below.

At each test day, the instructor will lecture during the first half of the class meeting. Tests will be given during the second half of the class meeting. Tests will not be given before the second half of the class meeting. No exceptions. Thus, students are advised to plan accordingly.

Within one week, copies of graded tests will be emailed to students.

The **final exam will be given in December 15.** If you cannot take the final exam in **December 15**, you have to file an appeal to the makeup Examinations Committee, at the Extension School. After evaluation of your case, the committee will decide whether to allow you to make-up the final exam at a later date.

Any change of tests and final exam dates will be communicated to you well in advance. If a no-school day is officially declared by Harvard Extension School on any of our test dates, mentioned above, the corresponding test will be given during the next class meeting.

Within one week, copies of the graded final exam will be emailed to students. If you live in the United States and you took the final exam on campus, your final exam will be mailed to you if you bring a self addressed and stamped manila envelope (minimum postage must be equivalent to three “forever” stamps) by **December 15.** If you bring a cardboard envelope, use four “forever” stamps. If you bring a padded envelope, use five “forever” stamps. If you bring a Priority Mail envelope, stamp \$6 worth of postage.

**If you live within the six-state New England** area (Connecticut, Maine, Massachusetts, New Hampshire, Rhode Island, and Vermont) you must come to campus to take Test 01, Test 02, Test 03 and the Final Exam.

**If your primary address throughout the term is not in New England** you may come to campus or you must find a qualified proctor near your home to administer the exam in absentia in a proctored setting in your home area according to the procedures detailed at <http://www.extension.harvard.edu/resources-policies/exams-grades-transcripts/exams-online-courses>, regarding “Proctored exams.”

If after reading the details on the webpage above you still have questions about the exam procedure, please email [distance\\_exams@dcemail.harvard.edu](mailto:distance_exams@dcemail.harvard.edu) for more information.

**Grading Policy:** If you are an undergraduate-credit student, your course grade will be calculated according to the following scheme:

- Homework           15%
- Test A               25%
- Test B               25%
- Final Exam         35%

**No extra-credit** work will be assigned. Thus, plan accordingly.

Test A and Test B are the two test grades that would remain after dropping the lowest test grade. Homework grade will not replace either a test grade or the final exam grade. The final exam grade will not be substituted by any of the test grades.

If you are a graduate-credit student, your grade will be computed as follows:

Undergraduate-credit grade (computed as shown above)	90%
Grade from graduate seminars	10%

Final course grade will be translated into letter grades as follows:

**A**(94-100), **A-**(90-93), **B+**(87-89), **B**(83-86), **B-**(80-82), **C+**(77-79), **C**(73-76), **C-**(70-72), **D+**(67-69), **D**(63-66), **D-**(60-62), **E**(less than 60).

**Extra Help:** It is important to keep up with the material presented in class. Thus, if you are having difficulties, seek for extra help as soon as possible. During the semester, you will have access to the following resources.

**Review Sections:** They will be conducted every Wednesday, 6:30-7:30 pm from September 07 to December 14, via web conference. Sessions will be recorded and links to access them will be posted on our website. Instructions will be provided at the beginning of the semester.

For the web conference, you will need a computer (system requirements: at <http://support.blackboardcollaborate.com/ics/support/default.asp?deptID=8336&task=knowledge&questionID=2890>) and a headset with a microphone attached to it.

Review sections will be dedicated to answer students' questions. Students may ask any question about precalculus problems they worked on except questions from homework. They may also ask specific questions about concepts that need to be clarified.

If you cannot attend review sections, email your questions to the instructor. Your questions will be answered during next review section.

**The Math Question Center (MQC):** Mondays, 5:30 pm. to 7:30 pm., and Tuesdays, 7:40 pm. to 9:40 pm., Sever Hall 215. Several tutors are available to help students in a variety of Extension School math courses. Note that the MQC is open to many students so try to arrive early.

If you are a distance student or a local student who cannot come to campus, you may ask for extra help via online. If you want to access the MQC online, please follow instructions at <https://canvas.harvard.edu/courses/2878>

**Disability Services:**

The Extension School is committed to providing an accessible academic community. The Accessibility Office offers a variety of accommodations and services to students with documented disabilities. Please visit [www.extension.harvard.edu/resources-policies/resources/disability-services-accessibility](http://www.extension.harvard.edu/resources-policies/resources/disability-services-accessibility) for more information.

**Other Suggestions:**

It is a good idea to read the sections from the recommended textbook before we go over them during lecture. It is extremely helpful to be familiar with the concepts before they are presented to you. Ideally, the lecture should be a clarification and an extension of the material that you have already read about.

Start working on the weekly suggested practice as early as possible. The material will still be fresh and you'll have sufficient time to work on it thoroughly. Solutions to problems from textbook will be posted on our website.

Once you practice enough from the suggested practice, start working on the homework and identify the areas where you need help. Prepare the questions you will ask during review section or during your meeting with personnel at the Math Question Center.

Scan your homework and submit it (by using our website or by emailing it to the instructor) as soon as possible to avoid late homework.

### Tentative Course Outline (Subject to change)

**Text:** Functions Modeling Change: A Preparation For Calculus, **4th Edition**, Connally, Hughes Hallett, Gleason, et al.

<b>Class</b>	<b>Date</b>	<b>List of topics</b>	<b>Sections in Textbook</b>
1	09/01	Chapter 1: Functions, lines, and change <b>HW 01 is assigned</b>	1.1 – 1.5
2	09/08	Chapter 2 + 3 : Functions – Quadratic functions <b>HW 02 is assigned HW 01 is due</b>	2.1 – 3.2
3	09/15	Chapter 4: Exponential functions <b>HW 03 is assigned HW 02 is due</b>	4.1 – 4.3
4	09/22	Chapter 5: Logarithmic functions <b>HW 04 is assigned      TEST 01 IS DUE</b>	5.1
5	09/29	Chapter 5 + 6: Logarithmic functions – Transformations <b>HW 05 is assigned. HW 03 and HW 04 are due</b>	5.2 – 6.3
6	10/06	Chapter 6 + 7: Transformations - Trigonometry <b>HW 06 is assigned. HW 05 is due</b>	6.4 – 7.3
7	10/13	Chapter 7: Trigonometry in circles and triangles <b>HW 07 is assigned. HW 06 is due</b>	7.4 – 7.5
8	10/20	Chapter 7: Trigonometry in circles and triangles <b>HW 08 is assigned      TEST 02 IS DUE</b>	7.6
9	10/27	Chapter 8: Trigonometric functions <b>HW 09 is assigned. HW 07 and HW 08 are due</b>	8.1 – 8.3
10	11/03	Chapter 8: Trigonometric functions <b>HW 10 is assigned. HW 09 is due</b>	8.4
11	11/10	Chapter 9: Trigonometric identities and their applications <b>HW 11 is assigned. HW 10 is due</b>	9.1 – 9.2
12	11/17	Chapter 10: Composition of functions + inverse functions <b>HW 12 is assigned      TEST 03 IS DUE</b>	10.1 – 10.2
13	12/01	Chapter 11: Polynomial and rational functions <b>HW 13 is assigned. HW 11 and HW 12 are due</b>	11.1 – 11.3
14	12/08	Chapter 11: Polynomial and rational functions <b>No HW is assigned. HW 13 is due</b>	11.4 – 11.5
15	12/15	<b>FINAL EXAM IS DUE</b>	