

MA 190, Precalculus, Section 5  
Worcester State University, Spring 2018

**Instructor:** Hy Ginsberg

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office hours:

Mondays 10:25 – 11:25, Tuesdays 1:00 – 2:00, Wednesdays 1:00 – 2:00,  
and by appointment or luck (you are welcome to stop in anytime).

website: <http://www.hyginsberg.com>

**Meetings:** MWF 8:00 – 9:10, S-123.

**Prerequisites:** MA 180 with a grade of at least C-, or a placement code of 6 or above.

**Content:** The course covers exponential and logarithmic functions and equations; trigonometric functions, equations, and identities; the use of linear algebra in the solution of systems of linear equations and inequalities; and conic sections. Applications to real world problems will be considered throughout. See the “Approximate Schedule” and “Student Learning Outcomes” sections for details.

**Text:** I strongly suggest you acquire a copy of *Precalculus, Mathematics for Calculus*, by Stewart, Redlin, and Watson (not the “Study Guide” or “Student Solution Manual”) – *Do not buy the current edition*, which sells for over \$200! You can easily obtain an older edition for less than \$20 including shipping – maybe even less than \$10. Other precalculus textbooks are also acceptable; the text is only for reference and easy access to additional exercises. You are not *required* to have a textbook (but again, I do strongly recommend that you get one anyway).

There are also online sites that can be helpful; see the class website for suggestions.

**Calculators:** In general we will not be using calculators (and they will never be permitted on quizzes and exams). We may indulge now and then for the sake of an interesting application, but do not go out and buy one.

**Homework:** We will be using the *free* “WeBWork” online homework system (compliments of the Mathematical Association of America). Homework assignments will be posted at:

<https://webwork.worcester.edu/webwork2/MA190S18Ginsberg/>

Use your usual Worcester State username and password to login.

You are free to discuss homework problems and seek assistance as needed, but *all submitted work must be your own*.

Please see *How to Do Your Homework*, later in this document, for further details and the best advice I could muster.

**Quizzes:** Quizzes will usually be held weekly on Wednesdays; exceptions will be announced in class. No makeup quizzes will be given, but your two lowest quiz grades will be dropped. If you miss a quiz, ask me for a copy (so you have it for studying), and let me know if you have legitimate reasons for missing more than two quizzes.

**Midterms:** There will be two midterm exams. They are tentatively scheduled for Wednesday, February 28th, and Wednesday, April 18th, but may be rescheduled to better fit the timing of the course, if necessary. You might be able to talk me into a make-up exam if you have a good enough reason; if you care to try, let me know as soon as possible.

**Final:** The final exam is cumulative, and will be held in our usual classroom on Friday, May 11th, 8:30 AM – 12:30 PM (according to the schedule set by the registrar).

**Grading:** Your grade will be the higher of:

- (1) 20% for each of the two midterm exams, 15% for your quiz average, 15% for your homework average, and 30% for your final exam;
- (2) Your final exam grade (100%);

subject to the following conditions:

- (i) It is the math department's policy that ***you must get at least a 50% on the final exam in order to pass the class.***
- (ii) If you miss more than five classes, two quizzes, two homework assignments, or either midterm exam, then you will not be eligible to receive your final exam grade as your grade in the class.
- (iii) If your homework average is 20 percentage points or more higher than both your final exam grade and the average of your midterm exam grades, then your homework will not be counted towards your final grade. In this case the weight of your other grades will be increased proportionately to account for the 15% allocated for homework in the formula above.

Grades will not be curved or rounded, and final letter grades will be assigned as follows:

	$B^+ \geq 87$	$C^+ \geq 77$	$D^+ \geq 67$
$A \geq 93$	$B \geq 83$	$C \geq 73$	$D \geq 63$
$A^- \geq 90$	$B^- \geq 80$	$C^- \geq 70$	$D^- \geq 60$

**Attendance:** You are expected to attend *every* class. If you must miss a class, *you are still responsible for the material we cover*. In particular, you are expected to read a textbook, get the class notes, and do the homework so that you are caught up with the rest of the class when you return. Falling behind can be *disastrous*.

Class will start on time. If you come 5 or 10 minutes late it is quite likely that you will be lost from the moment you sit down, and you might find it very difficult to catch up.

Missing 6 or more classes without legitimate *documented* reasons for almost all of them will result in an automatic failing grade in the class.

**Academic Honesty:** You are expected to uphold the university's high standards of academic honesty at all times. Please see the *Student Handbook* on the [Student Services](#) page for details. All incidents of academic dishonesty will be reported to the Academic Judicial Board.

**Tutoring:** Free drop in tutoring is available at the Math Tutoring Center; hours and location to be announced.

**Peer-Assisted Learning** This course is being supported this semester by Peer-Assisted Learning (PAL) sessions, funded by a Massachusetts Department of Higher Education grant for the retention of STEM students. Peer-Assisted Learning is being provided for selected courses in Biology, Chemistry, Computer Science, Earth Science, and Mathematics.

PAL sessions are student-led, instructor-supported, group study and review sessions run by trained student facilitators who were highly successful precalculus students themselves. These student leaders have been trained to develop group learning activities using a variety of strategies. They will be attending the regular classroom sessions and meeting with the course instructors regularly to prepare their PAL sessions, which will be designed to foster a deeper understanding of the course material.

There will be four MA-190 PAL sessions offered per week, by two different PAL leaders. You may attend any (or all!) of the sessions that fit your schedule.

Attendance at these sessions is voluntary (and will not be reported to the course instructor), but highly encouraged. National research has shown that students who attend PAL sessions tend to get higher grades than those who do not, and have a significantly lower rate of D grades, failures, and course withdrawals.

The schedule for PAL sessions is:

Monday, 10:00 – 11:00, S-126 (Emily Carens)

Tuesday, 1:15 – 2:15, S-102 (Dakota Hinerth)

Wednesday, 10:00 – 11:00, S-126 (Emily Carens)

Thursday, 1:15 – 2:15, S-102 (Dakota Hinerth)

**Extra Credit:** In general there will be no extra credit available. If you are interested in raising your grade, take the time that you would have spent on an extra credit assignment and spend it making sure you get more “regular credit” instead – master a topic you’ve found difficult, find some exercises in your textbook to work on, spend a few extra hours studying, etc. One exception: I will give a very small amount of extra credit to anyone with a perfect homework score (usually half a point – just enough to raise your grade if it is truly borderline).

**Accommodations:** If you anticipate issues related to the format or requirements of this course, please meet with me as early as possible in the semester to discuss ways to ensure your full participation. If you believe that formal, disability-related accommodations are appropriate, it is very important that you register with Student Accessibility Services (SAS) and notify me of your eligibility for such accommodations. We can then plan how to best coordinate your accommodations. SAS is located in the Administration Building, Room 131 and can be reached by phone ((508)929-8733) or email (sas@worchester.edu).

**Credit hours:** Inherent in the idea of a credit hour is the expectation that for each hour of class time the student will spend a minimum of two hours outside of class on homework, studying, reading the text, and similar activities. This is a four credit course; you should spend at least eight hours per week outside of class working on the class material.

### Approximate Schedule:

Week of	Topics
1/15	Exponential and logarithmic functions
1/22	Exponential and logarithmic equations
1/29	Radian measure, basic trigonometric functions, solving triangles
2/5	Reference angles, basic trigonometric identities, area of triangles
2/12	Inverse trigonometric functions, law of sines, law of cosines
2/19	The unit circle, trigonometric functions of real numbers
2/26	Graphs of trigonometric functions, exam
3/5	Graphs of inverse trigonometric functions, harmonic motion
3/12	Analytic trigonometry, addition and subtraction formulas
3/19	Spring break
3/26	Half-angle, product, and sum formulas
4/2	Trigonometric equations
4/9	Systems of linear equations, matrix methods
4/16	Algebra of matrices, exam
4/23	Inverse matrices, systems of linear inequalities, conic sections
4/30	Parabolas, ellipses, hyperbolas
5/7	Review

## How to do your Homework

First, *keep a notebook*. You will need it for studying. Although you will be entering only the answers online, you should work each problem as neatly and thoroughly as possible, as if it were a problem on an exam. Aside from being good practice, when you go back to look at your homework weeks or months later you need to be able to follow your reasoning. In essence, work as if you are carefully explaining the answer to yourself.

*Don't rush!* I get it, you have other things to do, and there are lots of possible shortcuts. But the homework is the key to success in the class – make sure you can do the problems with confidence, and on your own. If you're relying heavily on your notes, your friends, a textbook, or the internet, then you are setting yourself up for failure. To put it another way, a good homework grade will not earn you a good grade in the class – only the understanding that comes from doing the homework carefully and well can do that.

WeBWork will usually give you as many tries as you need to get the problem correct, with no penalty for initial wrong answers. *Don't abuse this feature by guessing!* Guessing the right answer, maybe after a few tries, does nothing to help you learn the concepts and techniques you will need to succeed in the class, and, more concretely, to get similar questions right on quizzes and exams – on quizzes and exams you will have only once chance to give the correct answer, and I will require detailed justification, so guessing will get you nowhere. Instead, try to get every question right the first time. If you get one wrong, try to find your mistake, fix it, and enter the correct answer with confidence. If you can't find a mistake, then go back through your notes or your textbook to see if there is some concept you have confused or technique you are missing or misapplying. Struggling to find and correct errors can be a very effective way to learn material that might initially seem difficult.

If you can't make progress on a problem, *don't give up*. Get help. Ask a friend, family member, classmate, random stranger, or me (not necessarily in that order). Ask in class if you can't get your question answered sooner. A homework problem that you can't do might indicate that you've missed something. You cannot afford to just let it go – it is entirely possible that the next topic we cover will build upon the concept or technique you've missed, and you could quickly find yourself falling behind. Although it will certainly take considerable effort, it is *much* easier to master the material as we cover it than to catch up once you've fallen behind.

Homework assignments will usually be due the morning of the following class, and will then remain open for an additional week at reduced credit (75%). (The “due date” that WeBWork displays is the end of the reduced-credit period, i.e. the last possible time to submit an answer. Keep in mind that for full credit you will need to submit your answers before the beginning of the reduced-credit period.)

In the past I have tried – and failed – to maintain a “no homework extensions” policy. So, as a compromise and in the interest of fairness, I will grant *one* homework extension per student. If you would like a homework assignment extended, let me know. Please do not ask twice.

**LASC:** This is a *Quantitative Reasoning* course in the *Liberal Arts and Sciences Curriculum*.

**Student Learning Outcomes:** Students will:

- be able to justify their mathematical reasoning.
- be able to simplify and interpret the difference quotient algebraically and geometrically.
- understand that the sine and cosine can be defined as functions that wrap the real line onto the unit circle.
- be able to identify, graph and perform computations with the trigonometric functions (sine, cosine, tangent, cotangent, secant, cosecant) using both the unit circle and the right triangle approaches.
- be able to identify the domain, range, intercepts, intervals of increasing/decreasing behavior, maxima/minima of the trigonometric functions and use them in modeling harmonic motion.
- be able to solve problems using a variety of trigonometric identities and formulas.
- become familiar with constructing and using the inverse trigonometric functions.
- solve trigonometric equations.
- use a matrix approach to solving linear systems of equations.
- solve systems of linear inequalities.
- study the geometric and analytical properties of parabolas, hyperbolas and ellipses and use these properties in solving applied problems.

The course addresses the following **LASC Quantitative Reasoning objectives:**

- Acquaint students with formal systems, procedures, and sequences of operations.
- Strengthen students' understanding of variables and functions.
- Apply mathematical techniques to the analysis and solution of real-life problems.
- Emphasize the importance of accuracy, including precise language and careful definitions of mathematical concepts.
- Understand both the underlying principles and practical applications of one or more fields of mathematics.
- Strengthen understanding of the relationship between algebraic and graphical representations.

and the following **LASC overarching objectives:**

- Communicate effectively orally and in writing.
- Understand and employ quantitative and qualitative reasoning.
- Apply skills in critical thinking.
- Understand the roles of science and technology in our modern world.
- Make connections across courses and disciplines.
- Develop as healthy individuals – physically, emotionally, socially, ethically, and intellectually.