

# Honors Advanced Mathematics 2009–10 course guide

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Class web site: <http://lhs.lexingtonma.org/Teachers/Kelly/advmath/>

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Information and policies in this guide are subject to change as the year progresses; see the class web site for the latest version.

## Course description

This intensive course prepares students to take college level courses in calculus and statistics. General ideas about functions are developed and used throughout the course, such as: multiple representations (graphical, numerical, algebraic, and verbal), function operations, composition and inverses, transformations, and modeling and regression. Specific topics include polynomial and rational functions, exponential and logarithmic functions, trigonometric functions, complex numbers and vectors, polar and parametric equations, matrices and linear systems, analytic geometry, combinations and probability, sequences and series, and limits. Students must adopt a theoretical approach to mathematics, reason carefully to solve problems, and communicate their ideas effectively. The course demands a substantial commitment of time and effort, and strong mathematical abilities and interests are essential for success.

## More about the course

This is a culminating high-school-level math course, so it ties together what students have already learned about algebra and geometry, and prepares students for college-level subjects such as calculus, statistics, and linear algebra.

An overarching goal of the course is to develop students' abilities to engage in the intellectual processes of mathematics, including exploration, reasoning, problem solving, and communicating about math both orally and in writing. These aims will be pursued through varied class activities including frequent work in groups. Active participation by every student will be necessary to achieve the best learning outcomes for individuals and the class.

## Textbook, coverage, and materials

Our main textbook is *Precalculus: Graphical, Numerical, and Algebraic* by Demana, Waits, et al. The material in Chapter P (Prerequisites) was covered in prior courses, and students were expected to review this chapter over the summer. The course will cover nearly all the math content of Chapters 1–8, 9.4, and 10.3. However, some of these topics will be covered using an alternate textbook, *Advanced Mathematics* by Brown, and/or using teacher-written materials.

Textbook solution manuals containing detailed problem solutions are available in the school library. Students may wish to buy a personal copy of the *Student's Solution Manual* for the Demana textbook; see the class web site right column for an ordering link.

## Graphing calculators

Graphing calculators will be used daily for class activities and homework. They help students develop a strong understanding of relationships between algebraic and graphical representations, and enable graphical solutions to problems that may not be solvable by any other means.

The Mathematics Department strongly recommends owning a graphing calculator. Students who do not already have one are encouraged to get a calculator in the TI-83 or TI-84 family, which may be purchased or borrowed from school.

Calculators will be allowed during tests unless otherwise announced. However, certain advanced calculators with symbolic algebra features (such as the TI-89, TI-92, and TI-nspire CAS) will not be permitted, as they would provide an unfair advantage.

## Performing as an honors-level student

What does it mean to be an honors-level math student? Here is how the *LHS Program of Studies* describes honors math:

“Honors courses progress at a very fast pace, covering the greatest breadth and depth of topics. Students are expected to have mastered the skills and thoroughly understood the concepts covered in prior courses. They are expected to have retained this past knowledge, which will generally not be reviewed in the course. Mathematical concepts are often introduced at an abstract and theoretical level. New ideas are often developed through student investigation with minimal guidance from the teacher. Students will be expected to apply their knowledge to open-ended and non-routine problems. Students will sometimes be expected to learn material by reading the textbook and/or solving problems on their own. Typical classes include minimal review of homework and previously covered material. Students are expected to be highly self-motivated, taking the fullest responsibility for their own learning and seeking help when needed. The course is designed to meet the needs of a student who thrives in a more independent learning environment.”

While some of the qualities mentioned above pertain to ability, others relate more to effort and initiative. Developing mature work habits is critical for success in this course.

Also, it is important that all students be actively involved in class, during both lectures and group work. It is everyone's responsibility to make academic contributions and to help others learn.

## Behavior expectations

A productive and respectful classroom atmosphere is essential for learning. Individual behavior can support or undermine the learning environment. To make our classroom work well, here is what is expected of you:

- Be ready for the beginning of class when the bell rings. (Lengthy or frequent tardiness is unacceptable.)
- Bring your homework and a notebook to class every day. Bring a textbook when asked.
- Listen silently when it is someone else's turn to talk.
- Stay focused on the current learning activity.
- Follow all school rules.

In general, these expectations will be upheld by consequences that begin with verbal warnings, and progress to detentions or school-level discipline for serious or repeated offenses.

## Homework and assessments

Homework will be assigned daily and must be completed before the next meeting. Timely completion is important because the assignment will often form the basis for the next class. A running list of assignments will be kept on the class web site. Because this is an upper-grade honors-level class, students are expected to self-monitor their daily homework completion (this is part of “taking the fullest responsibility for their own learning”). If you need a teacher to check up on you meeting your basic daily responsibilities, you have chosen the wrong course level for you. That said, in the unlikely event that the whole class does not appear to be living up to its homework responsibilities, the teacher may find it necessary to check and/or grade homework.

There will be two kinds of in-class assessments: quizzes (short, frequent, not pre-announced) and tests (usually full period, about 2-3 times per quarter, always pre-announced). Quizzes are meant to measure learning-in-progress while tests are meant to measure completed learning, so you should expect a higher level of challenge on the tests. You are encouraged to use the archive of past-year tests on the class web site as practice material.

Students entitled to extended testing time under an IEP or 504 Plan will receive 50% additional time, unless a different amount is established either by the Plan or through a team meeting.

## Scoring system

For most test problems and graded assignments, you will be asked to provide a fully explained and justified solution. Problems of this kind will be marked on a 0-to-5 numerical scale. Here is a brief description of each level of the scale.

- 5: a correct solution that is presented well or shows exceptional understanding
- 4: a solution that is correct, complete, and adequately presented
- 3: a mostly satisfactory solution with a few missing details or minor errors
- 2: a partial solution with at least one major step or idea missing
- 1: a minimal start toward a correct solution
- 0: no progress toward a correct solution

Sometimes, questions that require only a short response may just be scored right-or-wrong (usually 5-or-0).

Test grades will be computed by taking a weighted average of problem scores. Then, a letter grade will be assigned using the closest number on this scale:

4.3	4.0	3.7	3.3	3.0	2.7	2.3	2.0	1.7	less than 1.5	less than 1.0
A+	A	A-	B+	B	B-	C+	C	C-	D	F

## Report card grades

Each quarter grade will be based on a weighted average of tests, quizzes, and any other graded work during the quarter. All full-period tests will have the same weight. Quizzes will weigh 1/4 as much as a test, unless a different weight is announced. There may occasionally be other graded assignments; their weights will be announced as a certain fraction of a test. Finally, if homework completion checks become necessary, their weight will be set at the teacher’s discretion.

Students sometimes ask about “extra credit” assignments. At the end of each quarter, I may give a bonus to the most valuable and

active participants in homework problem discussions in the course conference on FirstClass. The bonus will be fairly small but may make the difference on a borderline grade.

Your numerical quarter average will be converted to a quarterly letter grade. The scale shown above will be used, but rounding of in-between grades (for example, whether a 2.9 is a B or a B-) will be at the teacher’s discretion. The year grade will be based on four quarters (22% each) and a departmental final exam (12%).

## Absences and makeup tests

When you are absent, it is your responsibility to find out what you missed (check the homework list on the class web site and ask a classmate what happened during class), and then I will provide reasonable support to help you catch up. Following the usual practice at LHS, the time allowed for completing missed work is usually one day for each day missed, with the following exceptions. If there is a test or an assignment due on the first day of your absence, you are responsible for it on the day you return. Also, if you miss class because of a field trip, you must be prepared for the next class just as if you had been in class.

The first missed quiz of a quarter is waived, but all other quizzes and all tests must be made up. To ensure that makeups are prompt and fair, they must be completed done within the number of days specified above. If you have no other available time during those days, as a last resort you may ask to take the test during a class. Students who have been absent repeatedly should expect that makeup deadlines will be rigidly enforced. Also, at my discretion, I may require additional documentation validating your excuse (such as a doctor’s note) before giving or grading a makeup test. If an absence is unexcused or not satisfactorily documented, you will receive a zero for any missed work, with no makeup.

## Getting help

I encourage you to seek my assistance with your math learning outside of class time. This support can benefit anyone, not just students who are struggling. I am almost always available to help after school and during X blocks. To be sure I can help you on a particular day you can make an appointment with me in advance, but you are also welcome to just drop by without an appointment. You’ll be able to find me either in the math teacher office (room 713) or in our classroom (room 819). Feel free to e-mail me also; it’s usually not feasible to give help over e-mail, but it’s a good way to make an appointment or clarify an assignment.

Consider other students as a source of help: you will have time to help each other learn during class, but some students also find it valuable to plan study sessions outside class. Also, the course conference in FirstClass is a good place to discuss homework problems. Other sources of help include drop-in tutoring from adult volunteers in room 828, and student tutoring from the Peer Tutoring Organization. Try several of these sources of support to find out which are most beneficial to you.

## About the teacher

Kevin A. Kelly has been teaching math at LHS since 1994. A New Jersey native, Mr. Kelly was educated at Rutgers, MIT, and Harvard. He is a Massachusetts Master Teacher and a National Board Certified Teacher, qualifications held by only a few dozen math teachers statewide. He is most honored to be a two-time recipient, in 2001 and 2004, of the Mathematical Association of America’s Sliffe Award for Distinguished High School Teaching, since he was nominated for these national awards by LHS students. Mr. Kelly lives in Bedford with his family Amy, Evan (age 3), and Amelie (age 2).