

Andover Public Schools
Office of the Assistant Superintendent

MEMORANDUM

Date: October 27, 2015
To: Dr. Shelley Berman, Superintendent of Schools
From: Dr. Nancy Duclos, Assistant Superintendent for Teaching and Learning
Ms. Katherine Richard, K – 12 Mathematics Program Coordinator
Re: Mathematics Sequencing

Mathematics Sequencing/ Course Acceleration Options

As you know, there has been much discussion in regards to the Andover Grades 6 – 12 math programming and its effects on enrichment and acceleration. We thought it best to begin setting a historical context for the change in sequencing and provide parents with a number of options to reach the desired AP Calculus course.

Prior to 2014 Connected Math (CMP) was the math program at all three middle schools. This program addressed some of the most basic algebraic concepts and introduced students to equation solving and linear relationships. These topics were typically covered in the first 4 -5 chapters of an Algebra I textbook and were aligned to Algebra standards in the Massachusetts Curriculum Framework for Math (MA Math Framework) but they did not encompass all the standards associated with Algebra I. The district named this foundational course as Algebra I.

As a result of that action, students entering the high school were enrolled in Geometry as freshman. This course was a full-credit semester course and students were placed based on teacher recommendations into four ability levels. Students entering sophomore year were required to take a full year of math for two credits, Algebra II – first semester and Algebra III – second semester. However, the course titles were very misleading because there are no standards in any MA Math Framework that correspond to an Algebra III course. This course was designed as a gap filling measure. The Algebra II course became the second half of a typical Algebra I course and the start of an Algebra II course and the Andover Algebra III course continued with Algebra II topics. At some levels, the content may have extended into Pre-Calculus.

The release of the 2011 Massachusetts State Frameworks for mathematics necessitated that we review our programming to determine alignment and address the changes. The 2014 mathematics program review highlighted this mis-alignment in what was being taught in Grade 8, Algebra II and the course that we named as Algebra III. We believed that we were not hitting standards for either grade 8 or Algebra I. The newly adopted middle school math program, Math-In-Focus, aligns with Grade 8 standards and the shift in the high school program better aligns with Algebra I and Algebra II.

When it was determined that the high school would be moving to a full year schedule and departing from the 4 X 4 semester based schedule, it was realized that math would no longer be able to require all students to take two Algebra courses their sophomore year. The math department decided to rename the Algebra courses to more closely align to what was really being taught and the standards were being met. The math department also changed the order in which the courses are taught which allows students the opportunity to double up in math their sophomore year in order to reach calculus, this is illustrated below.

The typical course sequence for high school students will be as follows:

<i>Freshman</i>	<i>Sophomore</i>	<i>Junior</i>	<i>Senior</i>
Geometry*	Algebra II with Trig	Pre-Calculus	Advanced Placement Calculus
			Calculus
			Statistics or other math elective
			Advanced Placement Statistics
Algebra I	Geometry Plus Algebra II with Trig concurrently**	Pre-Calculus	Advanced Placement Calculus
			Calculus
			Statistics or other math elective
		Advanced Placement Statistics	

*Student must demonstrate proficiency in meeting all Algebra standards prior to course enrollment in Geometry.

**This action is not that dissimilar to what is happening now. Only students are taking double math concurrently as opposed to sequentially as in the 4X4 schedule.

As a district, we heard the parent concern around doubling up and created a number of options to consider. These options, while not perfect, will allow students to reach AP Calculus by 12th grade.

- Option #1 (Double up in 10th grade) Students may take Geometry and Algebra II concurrently, in order to reach AP Calculus as seniors.
- Option #2 (Summer Course 2015)
 - Rising 9th grader – In the summer before 9th grade, students who have successfully completed Grade 8 math with the recommendation of their 8th grade math teacher, may opt to take an accelerated Algebra I course as a summer course at AHS, allowing them to take Geometry as freshmen.
 - Rising 10th graders – In the summer after 9th grade, students who have successfully completed Honors Algebra 1 in their freshman year, may opt to take an accelerated Geometry course as a summer course at AHS, allowing them to take Algebra II as sophomores.
- Option #3 (Independent /Private Tutoring) Students who choose to take a course or participate in outside tutoring will have an option to demonstrate proficiency by taking either an algebra I exam or a geometry exam that is written and administered by the High School Math Department.

We are proposing that all three options be available to parents and that the School Committee vote to enable us to begin planning for summer school courses.

Andover Public Schools
Summer Mathematics Acceleration Classes

- 6-weeks, 8:00 am – 12:00 pm, Monday – Thursday (92 hours)
 - June 27 – June 30
 - July 5 – July 7 (No class July 4th)
 - July 11 – July 14
 - July 18 – July 21
 - July 25 – July 28
 - August 1 – August 4

- Geometry Course open only to students who will be entering 10th grade in the fall, have completed Honors Algebra I successfully, and for accelerating purposes

- Algebra I Course open only to students who will be entering 9th grade in the fall, have been recommended by their eighth grade teacher, and for accelerating purposes

- 1 credit earned upon successful completion/ not included in GPA

Pricing Structure

Andover Summer Math Program 2015 - 16		
Figures for 1 Class		
	1	# class/teachers
Teacher cost	\$ 6,500.00	Fixed Stipend per class
Coordination	\$ 500.00	Fixed Stipend per class
Location cost	\$ 1,500.00	\$250 per week for 6 weeks*
Copying	\$ 100.00	
**Scholarships	\$ 1150	2 scholarships per class
Total Costs	\$ 9,100.00	
Student Cost	575.00	

*Location for the program has not yet been determined

**Student costs of \$575 enable us to offer full/partial scholarships for students to participate.