# **Making Decisions about High School Course Sequences and Algebra I in Grade 8**

## Course Sequences and the Model Algebra I Course

**The 2017 *Massachusetts Curriculum Framework for Mathematics* represents an opportunity to revisit course sequences in middle and high school mathematics.** Districts should work with stakeholders, including middle and high school teachers, guidance counselors, external partners and families, to systematically consider the full range of considerations related to course offerings and sequencing in mathematics in light of these revised standards*.*

Students who follow the grade-by-grade pre-kindergarten to grade 8 sequence will be prepared for either the Traditional or Integrated Model Course high school pathways beginning with Algebra I or Mathematics I in grade 9 and will be ready to take a fourth year advanced course in grade 12, such as the Model Precalculus Course, the Model Quantitative Reasoning Course, or other advanced courses offered in the district, such as Statistics.

Decisions about secondary students’ course-taking sequences should be made with the goal of identifying each student’s path to success and ensuring that **no** student who graduates from a Massachusetts High School and enrolls in a Massachusetts public college or university will be placed into a non-credit bearing remedial mathematics course.

All students should be encouraged to meet the full expectations of the pre-K to high school standards. There should also be a variety of ways and opportunities for students to take advanced mathematics courses beyond those included in this Framework. Districts are encouraged to work with their mathematics teachers and curriculum coordinators to design pathways that best meet the needs of their students.

**This section presents information and resources** to ground discussions and decision-making about course-taking sequences in three inter-related areas of consideration:

* The rigor of the grades 6–8 standards and the Model High School Algebra I Course standards.
* The offering of the Model High School Algebra I Course in grade 8 for students for whom it is appropriate.
* Options for high school pathways that accelerate starting in grade 9 to allow students to reach advanced mathematics courses, such as Calculus in grade 12.

### I. Rigor of Grade 8 and the Model High School Algebra I Standards

Success in Algebra I is crucial to students’ overall academic success and their continued interest and engagement in mathematics. The pre-kindergarten to grade 8 standards in the 2017 Frameworkpresent a tight progression of skills and knowledge that is rigorous and designed to provide a strong foundation for success in Algebra I as defined in the High School Model Algebra I Course.

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The grade 8 standards address foundations of algebra, a more formal treatment of functions, the exploration of irrational numbers and the Pythagorean Theorem; and include geometry standards that relate graphing to algebra and statistics concepts; and skills that are sophisticated and connect linear relations with the representation of bivariate data.

The Model Algebra I course formalizes and builds on the grade 8 standards. This course begins with more advanced topics and deepens and extends students’ understanding of linear functions, exponential functions and relationships, introduces quadratic relationships, and includes rigorous statistics concepts and skills.

### II. Offering the Model High School Algebra I course in middle school to grade 8 students for whom it is appropriate (Compacted Pathway)

The Mathematics Standards in grades 6–8 are coherent, rigorous, and non-redundant, so the offering of high school coursework in middle school to students for whom it is appropriate requires careful planning to ensure that all content and practice standards are fully addressed. For those students ready to move at a more accelerated pace, one option is to compress the standards for any three consecutive grades and/or courses into an accelerated two-year pathway.

Compressing the standards from grade 7, grade 8, and the Model Algebra I (or Model Mathematics I) course into an accelerated pathway for students in grades 7 and 8 could allow students to enter the Model Geometry (or Model Mathematics II) course in grade 9.

Selecting and placing students into accelerated opportunities must be done carefully in order to ensure success. Students who follow a compacted pathway will be undertaking advanced work at an accelerated pace. This creates a challenge for these students as well as their teachers, who will be teaching the grade 8 standards and Model Algebra I standards within a compressed timeframe without compromising any of the rigor. Placement decisions should be made based upon a common assessment to be reviewed by a team of stakeholders that includes teachers and administrators.

### III. Accelerated High School Pathways starting in grade 9 to allow students to reach advanced mathematics courses, such as Calculus, by grade 12

For many students, high school mathematics will culminate during grade 12 with courses such as Model Precalculus and/or Model Advanced Quantitative Reasoning. Although this would represent a robust and rigorous course of study, some students will seek the opportunity to advance to mathematics courses beyond those included in this Framework (for example, Discrete Mathematics, Linear Algebra, AP Statistics and/or AP Calculus). The following models are only some of the pathways by which students’ mathematical needs could be met. Districts are encouraged to work with their mathematics administrators, teachers, and curriculum coordinators to design pathways that best meet the abilities and needs of their students.

In high school, compressed and accelerated pathways may follow these models, among others:

* Students could “double up” by enrolling in the Model Geometry course during the same year as Model Algebra I or Model Algebra II.
* Standards from the Model Precalculus course could be added to other courses in a high school pathway, allowing students to enter a Calculus course without enrolling in the Model Precalculus course.
* Standards that focus on a sub-topic such as trigonometry or statistics could be pulled out and taken alongside the Model courses so that students would only need to “double up” for one semester.
* Standards from the Model Mathematics I, Model Mathematics II, and Mathematics III course could be compressed into an accelerated pathway for students for two years, allowing students to enter the Model Precalculus course in the third year.

The graphics below depict options for grades 6–12 course sequences:

**Figure 1 shows a 6**–**8 grade-by-grade progression** followed by the three Model High School Courses culminating in an advanced mathematics course in grade 12.

**Figure 2**–**4 depicts three accelerated pathways leading to Calculus.** The first accelerated pathway in **Figure 2** compresses grades 7, 8, and the High School Model Algebra I course standards in two years. This compacting of standards begins during middle school at the end of grade 6 and ends with Algebra I in grade 8.

The last two pathways in **Figure 3** and **Figure 4** are high school accelerated pathway options, titled “Doubling Up” and “Enhanced Pathway.” Note that the accelerated high school pathways delay decisions about accelerating students until they are in high school while still allowing access to advanced mathematics in grade 12.



