

730 **Third- and Fourth-Year Courses**

731 In addition to offering Mathematics III or Algebra II, districts have the flexibility to offer
732 other third-year and fourth-year courses. One example that is already offered by some
733 districts (and is University of California A–G approved) is Financial Algebra. In this
734 course, students engage in mathematical modeling in the context of personal finance
735 (this course is comparable in rigor to a Mathematics III or Algebra II course; it is not the
736 same as a “Consumer Math” or “Accounting and Finance” class currently offered by
737 some schools, which are not UC A–G approved). Through this modeling lens, they
738 develop understanding of mathematical topics from advanced algebra, statistics,
739 probability, precalculus, and calculus. Instead of simply incorporating a finance-focused
740 word problem into each Algebra II lesson, this course incorporates the mathematics
741 concept when it applies to the financial concept being discussed. For example, the
742 concept of exponential functions is explored through the comparison of simple and
743 compound interest; continuous compounding leads to a discussion of limits; and tax
744 brackets shed light on the practicality of piecewise functions. In this way, the course
745 ignites students' curiosity and ultimately their engagement. The scope of the course
746 covers financial topics, such as taxes, budgeting, buying a car/house, (investing for)
747 retirement, and credit, and develops algebra and modeling content wherever it is
748 needed. “Never has mathematics seemed so relevant to students as it does in this
749 course,” says one teacher.

750 Another third-year course currently offered by several districts is a Data Science course.
751 Data science courses usually have a broader focus on reasoning with data. Because
752 data science is still an emerging field with changing implications in the K–12 landscape,
753 some data science courses are constructed to develop the elements of Mathematics III
754 content within the course, while others might require students to already have
755 encountered the full Mathematics I–III content. As such, Data Science might be either a
756 third- or fourth-year course, depending on the content included. In keeping with the
757 University of California (UC) updated mathematics (area C) course criteria and
758 guidelines, a course approved as “advanced” may be used to satisfy the third or fourth

year requirement provided it “substantially align with Common Core (+) standards” and therefore relies upon the foundational Common Core content.

Any of these third-year courses could lead to a range of fourth-year options as set out in the course diagram above (figure 8.4). If students take another third-year course (besides Mathematics III or Algebra II), they should be made aware that they are leaving the usual pathway for taking Calculus in high school or in their first semester of college (as is expected in some universities for STEM majors). While many colleges and universities accept a wide range of mathematical backgrounds and provide pathways for students in STEM majors to complete Calculus in their first year, others expect to see incoming STEM majors having completed the content of Mathematics III/Algebra II followed by a precalculus and/or calculus course.

College Expectations and Sample Student Pathways

By completing Algebra I and Geometry or Mathematics I and II,¹ students will satisfy the requirements of California Assembly Bill 220 of the 2015 legislative session that requires students to complete two mathematics courses in order to receive a diploma of graduation from high school, with at least one course meeting the rigor of Algebra I. Depending upon their post-secondary goals, students may choose different third- and fourth-year courses, and all college-intending students should complete four years of mathematics in high school to meet California State University and University of California recommendations.

Giving students a choice of pathways through their last two years of high school can elevate a student’s real-world application of mathematics understanding. The variety of pathways reflect the many different interests and aims of students, such as those seeking employment directly after high school; others whose objective is a career requiring a university degree in a quantitative field (including STEM and data science) or a social science field that heavily uses statistics (such as sociology, psychology, economics, or political science); others who are interested in a university degree in a

¹ Note that the second course (beyond Algebra I or Mathematics I) can be any mathematics course of the student’s choosing.