



## Course Options

With the emphasis on students understanding mathematical concepts and achieving deeper learning, teachers will teach mathematics differently than in the past. Students will learn to “do math” through real-world situations and focus on fewer, more connected topics presented in a coherent progression that leads to readiness for college, careers, and civic life.

The higher mathematics standards are organized into model courses from two pathways that over three courses cover all the same standards but in a slightly different order. The model courses in the integrated pathway are Mathematics I, II, and III; the model courses in the traditional pathway are Algebra I, Geometry, and Algebra II. Generally, students take these higher mathematics courses in grades 9–12, though some students begin taking them in middle school.

In addition, there are four advanced courses: Precalculus, Statistics and Probability, Calculus, and Advanced Placement Probability and Statistics. Local school districts determine which courses to offer their students.



### To help your student learn mathematics:

- ▶ Talk with your student about the mathematics you use every day (computing gas mileage or the cost of an item after the sales tax is added, calculating the interest paid on a credit card bill, comparing the costs of cell phone plans).
- ▶ Discuss with your student how mathematics is used to develop possible solutions to real-world issues.

### For more information on the California Common Core State Standards for Mathematics and ideas for helping your student succeed, check out these resources:

- ▶ The Common Core Resources Web page is online at <http://www.cde.ca.gov/re/cc/>. Start by clicking on the Students/Parents tab.
- ▶ The California Common Core State Standards for Mathematics are available online at <http://www.cde.ca.gov/be/st/ss/documents/ccssmathstandardsaug2013.pdf>.
- ▶ The Mathematics Framework for California Public Schools is available online at <http://www.cde.ca.gov/ci/ma/cf/index.asp>.

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## What Your Student Will Learn: California Common Core State Standards for Mathematics

The California Common Core State Standards for Mathematics are based on three major principles: focus, coherence, and rigor. There are two types of standards—the Standards for Mathematical Practice and Standards for Mathematical Content—that together define the mathematics students need to understand, know, and be able to do at each grade level.

## Thinking Like a Mathematician

The Standards for Mathematical Practice (MP) help students learn to think like mathematicians—to reason quantitatively, use technology and other tools strategically, identify patterns that help them solve problems, and explain and defend both their answers and the reasoning they used to find them. Modeling with mathematics, MP.4, is emphasized in higher mathematics courses as students use mathematical tools and methods to ask and answer questions about real-world situations.

### Example of Modeling and Functions

Students apply functional reasoning to model real-world situations, such as investigating rates of change and patterns of growth. This example from Mathematics I and Algebra I illustrates the type of problems related to patterns of growth that students may face after they have worked with basic exponential functions:

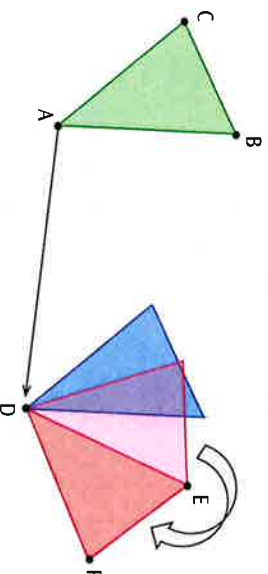
*On June 1, a fast-growing species of algae is accidentally introduced into a lake in a city park. It starts to grow and cover the surface of the lake in such a way that the area covered by the algae doubles every day. If the algae continue to grow unabated, the lake will be totally covered, and the fish in the lake will suffocate. Based on the current rate at which the algae are growing, this will happen on June 30.*

Write an equation that represents the percentage of the surface area of the lake that is covered in algae, as a function of time (in days) that passes since the algae were introduced into the lake.

## Example of Geometric Transformations

Geometric transformations are given a more prominent role in the geometry curriculum than in the past. Students in either Mathematics I or Geometry will use informal proofs, such as the one presented here, to explain geometric concepts.

### Illustration of the Reasoning That Congruent Corresponding Parts Imply Triangle Congruence



Point  $A$  is translated to  $D$ , the resulting image of  $\triangle ABC$  is rotated so as to place  $B$  onto  $E$ , and the image is then reflected along line segment  $DE$  to match point  $C$  to  $F$ .

## Example of Statistics and Probability

Statistics and probability is another important topic in higher mathematics and one that students can apply to real-world situations. For example, students in Mathematics II or Geometry explore probabilities and are able to draw on their knowledge to answer questions such as whether being a passenger in first class increased the chances of surviving the sinking of the RMS *Titanic*.

On April 15, 1912, the RMS *Titanic* rapidly sank in the Atlantic Ocean after hitting an iceberg. Only 710 of the ship's 2,204 passengers and crew members survived. Data on survival of passengers are summarized in the table.

	Survived	Did not survive	Total
First-class passengers	202	123	325
Second-class passengers	118	167	285
Third-class passengers	178	528	706
Total passengers	498	818	1,316

Using data from the table, students find that the probability of surviving for first-class passengers (0.622) was in fact higher than the probability of survival of second- and third-class passengers (0.378).