

# Parents' Guide to Student Success



## HIGH SCHOOL MATH

This guide provides an overview of what your child will learn during high school in mathematics. This guide is based on Ohio's New Learning Standards, including the Common Core State Standards in mathematics. If your child is meeting the expectations outlined in these standards, he or she will be well prepared for graduation.

### Why Are Academic Standards Important?

Ohio's New Learning Standards provide students with practical experience applying math, reading, and writing skills that employers need. The new standards emphasize the ability to collaborate, communicate, and tackle challenges. They will help your child gain the critical thinking and problem-solving skills they need to succeed in college, in their careers, and in life.

## Mathematics

Numerical skill and quantitative reasoning remain crucial even as students move forward with algebra. Algebra, functions, and geometry are important not only as mathematical subjects in themselves but also because they are the language of technical subjects and the sciences. And in a data-rich world, statistics and probability offer powerful ways of drawing conclusions from

data and dealing with uncertainty. The high school standards also emphasize using mathematics creatively to analyze real-world situations — an activity sometimes called “mathematical modeling.”

The high school standards are organized into six major content areas: Number and Quantity; Algebra; Functions; Modeling; Geometry; and Statistics and Probability.

### An Overview of the Work Your Child Will Be Doing in High School to Become Ready for College and Career

#### Number and Quantity

- Working with rational and irrational numbers, including working with rational exponents (e.g., rewriting  $(5^3)^{1/2}$  as  $5\sqrt{5}$ )
- Solving problems with a wide range of units and solving problems by thinking about units (e.g., “The Trans Alaska Pipeline System is 800 miles long and cost \$8 billion to build. Divide one of these numbers by the other. What is the meaning of the answer?”; “Greenland has a population of 56,700 and a land area of 2,175,600 square kilometers. By what factor is the population density of the United States, 80 persons per square mile, larger than the population density of Greenland?”)

#### Algebra

- Solving real-world and mathematical problems by writing and solving nonlinear equations, such as quadratic equations ( $ax^2 + bx + c = 0$ )
- Interpreting algebraic expressions and transforming them purposefully to solve problems (e.g., in solving a problem about a loan with interest rate  $r$  and principal  $P$ , seeing the expression  $P(1+r)$  as a product of  $P$  with a factor not depending on  $P$ )



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### Functions

- Analyzing functions algebraically and graphically, and working with functions presented in different forms (e.g., given a graph of one quadratic function and an algebraic expression for another, say which has the larger maximum)
- Working with function families and understanding their behavior (such as linear, quadratic, and exponential functions)

### Modeling

- Analyzing real-world situations using mathematics to understand the situation better and optimize, troubleshoot, or make an informed decision (e.g., estimating water and food needs in a disaster area, or using volume formulas and graphs to find an optimal size for an industrial package)

### Geometry

- Proving theorems about triangles and other figures (e.g., that the angles in a triangle add to  $180^\circ$ )
- Using coordinates and equations to describe geometric properties algebraically (e.g., writing the equation for a circle in the plane with specified center and radius)

### Statistics and Probability

- Making inferences and justifying conclusions from sample surveys, experiments, and observational studies
- Working with probability and using ideas from probability in everyday situations (e.g., comparing the chance that a person who smokes will develop lung cancer to the chance that a person who develops lung cancer smokes)

### Talking to Your Child's Teacher

When you talk to the teacher, don't worry about covering everything. Instead, keep the conversation focused on the most important things. Ask questions such as:

- Is my child comfortable using coordinates in algebra and geometry?
- Can my child break a complex problem down into parts and apply the math he or she knows to problems outside of mathematics?
- Does my child have the knowledge to learn advanced mathematics after high school if he/she so chooses?
- Ask to see samples of your child's work. Ask the teacher questions such as: Is this piece of work satisfactory? How could it be better? How can I help my child improve or excel in this area?

### Parent Tips: Planning for College and Career

At the beginning of high school, sit down with your child's teachers, counselor or other advisor to discuss what it will take for your child to graduate, your child's goals, and his/her plans after high school. Create a plan together to help your child reach these goals. This plan should include:

- An appropriate **course sequence** to meet your child's goals.
- The most appropriate **extracurricular activities** for your child.

- Your **plan to help your child prepare for college or career**. For example, if your child is interested in a particular field, look to see if internships exist to build his/her work experience in that subject area.
- Finding ways to pay for college or advanced training.

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