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Description automatically generated with medium confidenceMath Standards

**Tip Sheet**



**What to do:** Talk with a math teacher or a school district math specialist. Ask for a copy of the learning standards for your State or look them up on your State educational agency’s website. The chart below highlights key elements.

**Why it matters:** Each State establishes its own standards. State standards and practices draw on an established body of knowledge for math education. Knowing what is expected of the students in your program will help guide decisions for enrichment activities.

**Tips to Learn More About Math Standards in Your State**

Many States use the Common Core State Standards for math. You can find information about those standards at [Mathematics Standards | Common Core State Standards Initiative (thecorestandards.org)](https://www.thecorestandards.org/Math/). But remember: States often revise or add to these standards, so school-day math teachers and your State educational agency’s website are the best sources for up-to-date information about what your students are learning in school.

| **National Research Council** | **Common Core State Standards** | **National Council of Teachers of Mathematics** | | |
| --- | --- | --- | --- | --- |
| **Five Strands of Mathematical Proficiency** | **Eight Mathematical Practices** | **Five Process**  **Standards** | **Eight Mathematical Teaching and Learning Practices** | **Five Essential Elements of Mathematics Programs** |
| Conceptual understanding  Procedural fluency  Strategic competence  Adaptive reasoning  Productive disposition | Make sense of problems and persevere in solving them  Reason abstractly and quantitatively  Construct viable arguments and critique the reasoning of others  Model with mathematics  Use appropriate tools strategically  Attend to precision  Look for and make use of structure  Look for and express regularity in repeated reasoning | Problem solving  Reasoning and proof  Communications  Connections  Representations | Establish mathematics goals to focus learning  Implement tasks that promote reasoning and problem solving  Use and connect mathematical representations  Facilitate meaningful mathematical discourse  Pose purposeful questions  Build procedural fluency from conceptual understanding  Support productive struggle in learning mathematics  Elicit and use evidence of student thinking | Access and equity  Curriculum  Tools and technology  Assessment  Professionalism |

# Examples of Math Standards at Different Grade Levels

These examples aren’t comprehensive. They’re meant to give you a “quick peek” into math classes so you can see some things students are expected to learn at different grade levels. As you read, notice how later knowledge builds on earlier understandings and goes to a deeper level.

## Kindergarten

* Count and compare: The tall stack has 8 blocks and the short one has 3.
* Identify and name shapes: There’s a circle, a triangle, and a square.

## Grade 1

* Number families:6 + 3 = 9, and 9 ‒ 6 = 3
* In a dozen eggs, there’s one group of 10 eggs with 2 eggs left over.

## Grade 2

* The number 23 means there are 2 tens and 3 ones.
* I measured this table, and it’s 6 feet long and 3 feet wide.

## Grade 3

* 8 x 10 = 80, and 80/10 = 8.
* For this recipe you need 1/2 cup of berries and 1/3 cup of nuts.

## Grade 4

* Hey, 3/6 is the same as 1/2! Also 1/2 x 10 = 5.
* This rectangle has parallel and perpendicular sides, four 90-degree angles, and symmetry.

## Grade 5

* You can write the fraction 1/2 as a decimal number: .5.
* How many 2-inch cubes fit into this 6-inch cube?

## Grade 6

* What’s the ratio of apples to oranges on this snack tray?
* Variables: These expressions mean the same thing: 3 x y, 3 • y, and 3(y).

## Grade 7

* Let’s figure out the surface area of this basketball.
* Chart, scatter chart

  Description automatically generatedBased on a survey of 50 people where 28 said they loved chocolate, how many people in our school probably love chocolate?

## Grade 8

* An example of using functions in everyday life is when you figure what it costs to fill your gas tank based on the price per gallon and how many gallons it takes.
* I’ll explain the Pythagorean Theorem and its uses.

Pythagorean Theorem

## High School

In U.S. high schools, students typically complete Algebra I, Geometry, and Algebra II before taking higher-level math classes like Precalculus, Calculus, Advanced Statistics, Discrete Mathematics, Advanced Quantitative Reasoning, or courses designed for certain fields in career and technical education. (Many other countries teach “the maths” in a more integrated way.) Here are examples of six domains usually covered in U.S. high school math, with examples of real-world applications.

## High School: Number and Quantity

* High school math extends students’ understanding of “number” beyond real numbers to include imaginary numbers and complex numbers. Students reason quantitively and use units to solve problems.
* **Application:** Deciding which measures (e.g., fatalities per year, fatalities per year per driver, or fatalities per vehicle-mile traveled) might be a good indicator of overall highway safety.

## High School: Algebra

* Algebra is part of all higher math classes. It involves seeing structure in expressions, doing arithmetic with polynomials and rational functions, creating equations that describe numbers or relationships, and reasoning with equations and inequalities.
* **Application:** Using letters, numbers, and symbols to express a problem so that you can solve it (e.g., If 3*x* = 6, *x* = 2).

## High School: Functions

* Functions describe situations where one quantity determines another.
* **Application:** Estimating when to leave for a soccer game 20 miles away if you drive the speed limit and traffic flow is normal.

## High School: Modeling

* Modeling is the process of choosing and using appropriate mathematics and statistics to analyze empirical situations, to understand them better, and to improve decisions.
* **Application:** Planning a table tennis tournament for seven players at a club with four tables, where each player plays against each other player.

## High School: Geometry

* Geometry is a branch of mathematics that deals with the measurement, properties, and relationships of points, lines, angles, surfaces, and solids.
* **Application:** Designing a stairway.

## High School: Statistics and Probability

* Statistics provides tools for describing variability in data and for making informed decisions that take it into account. Probability rules can help you interpret data to make a judgment or decision.
* **Application:** Forecasting the weather.

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