

# Algebra 1 Mathematics

## Key Instructional Activities

In high school, students will develop a deep understanding of mathematical concepts and use mathematical ways of thinking to solve real-world problems. Unlike previous grades where learning objectives are organized by grade level, high school learning objectives are organized by concepts—such as algebra, functions, or statistics—that students will learn and master in various mathematics courses. These concepts build on what students learned in grade eight and move toward greater depth of knowledge and skills throughout high school. Algebra I is the first course in a sequence of three required high school courses designed to ensure career and college readiness. The course represents a discrete study of algebra with correlated statistics applications.

Here's a brief snapshot of some of the work students will be doing in these areas:

- Creating and solving *equations* (mathematical statements that use letters to represent unknown numbers, such as  $2x-6y+z=14$ ) with two or more variables to describe numbers or relationships
- Building an understanding of *rational numbers* (such as  $\frac{3}{4}$ ) to include *rational expressions* (such as  $3/(x-4)$ )
- Adding, subtracting, and multiplying *polynomials* (an expression with multiple terms such as  $5xy_2+2xy-7$ )
- Interpreting the *slope* of a line as the rate of change in two variables and the *intercept* as the constant term in a *linear model*
- Building and analyzing *functions* that describe relationships between quantities and using *function notation* (for example,  $f(x)$  denotes the output of  $f$  corresponding to the input of  $x$ )
- Distinguishing between correlation and causation
- Interpreting quantitative and categorical data

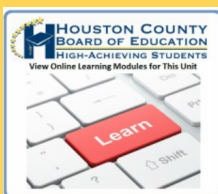


What resources  
are available for  
students and  
parents?

<https://hcbemath.weebly.com/>



- ✓ Online Math Textbook
- ✓ Parent Portal
- ✓ Overview of Units and Pacing
- ✓ The Learn Button!



What is the Learn Button on the Weebly Site? *Link to Georgia Virtual School Modules for instructional videos, examples, and practice by unit.*

# Algebra 1 Course Overview

## UNIT 1: RELATIONSHIPS BETWEEN QUANTITIES & EXPRESSIONS

**Expected Dates: Beginning of School Year to Late August**

By the end of 8th grade, students have had a variety of experiences working with expressions and creating equations. Students continue this work in Unit 1 by using quantities to model and analyze situations and to interpret expressions. Students solve unit conversion problems with dimensional analysis. In addition, students expand their algebraic and number sense by operating with polynomials and simplifying radicals.

## UNIT 2: REASONING WITH LINEAR EQUATIONS & INEQUALITIES

**Expected Dates: Late August to Late October**

By the end of 8th grade, students have learned to solve linear equations in one variable and systems of linear equations in two variables. In Unit 2 students extend their equation-solving reasoning by justifying their steps with properties. Students develop fluency writing, interpreting, and using various forms of linear equations and inequalities to solve problems. Students solve and interpret solutions of systems of equations and inequalities. In addition, students review the concept of a function and identify linear relationships that are functions. They graph linear functions and interpret the rate of change as well as the graph's key characteristics. Finally, they create function formulas for arithmetic sequences.

## UNIT 3: MODELING & ANALYZING EXPONENTIAL FUNCTIONS

**Expected Dates: November to December**

After students thoroughly learn linear functions, they explore exponential functions in Unit 3. They create function formulas for geometric sequences. Students develop fluency writing, interpreting, and using exponential functions to solve problems. They apply exponential equations to real-world situations. Students graph exponential functions and explore key characteristics of these graphs, including how transformations of the functions affect the graphs.

## UNIT 4: MODELING & ANALYZING QUADRATIC FUNCTIONS

**Expected Dates: January to February**

Students focus on another type of function in Unit 4: quadratic functions. They explore variables rate of change. In addition, they factor quadratic expressions and equations for math and real-world problems. Students rewrite polynomials in standard form to vertex form to see the vertex in an equation. They find solutions of quadratic equations by factoring or by using the quadratic formula. As a result of using the quadratic formula, they explore complex numbers as non-real solutions. Finally, they develop the concept of a discriminant of a quadratic equation.

## UNIT 5: COMPARING & CONTRASTING FUNCTIONS

**Expected Dates: Late February to Mid-March**

In Unit 5 students synthesize Units 2, 3, and 4. Presented with graphs, tables, and equations, students determine if they represent a linear function, a quadratic function, or an exponential function (or none of these) by checking first and second differences and evaluating the rates of change. They identify a graph as linear, exponential, quadratic, or none of these. Students also decide which function model best fits a variety of real-world situations.

## UNIT 6: DESCRIBING DATA

**Expected Dates: Mid-March to End of School Year**

Unit 6 builds upon students' prior experiences with data, providing students with opportunities to analyze data distributions in terms of center, spread, and shape. They mathematically identify outliers. Students also analyze bivariate data in two-way tables and scatter plots. In two way tables, students calculate relative frequencies and interpret the meaning of the frequencies in context of the data collection. In scatter plots, students more formally assess how a function model fits data. Students use regression techniques to describe approximately linear relationships between quantities. They use the correlation coefficient and knowledge of the context to make judgments about the appropriateness of a linear model.

## Helpful Tips for Parents and Guardians

Believe that every child can be successful in math. It takes good teaching, coaching, encouragement and practice.

### *Partnering with your child's teacher*

- Get to know your child's math teacher! Your child will thank you (someday) for being involved in his or her learning. Also – know about the online resources that are available!
- Don't be afraid to reach out to your child's teacher—you are an important part of your child's education. Ask to see a sample of your child's work or bring a sample with you.
- Talk with your child's teacher about difficulties he/she may be experiencing. When teachers and parents work together, children benefit.
- Ask the teacher questions like:
  - Where is my child excelling? How can I support this success?
  - What do you think is giving my child the most trouble? How can I help my child improve in this area?
  - What can I do to help my child with upcoming work?

### *Helping your child learn outside of school*

- Talk about math in a positive way. A positive attitude about math is infectious. Encourage your child to stick with it whenever a problem seems difficult. This will help your child see that everyone can learn math.
- Encourage persistence. Some problems take time to solve. Praise your child when he or she makes an effort, and share in the excitement when he or she solves a problem or understands something for the first time
- Encourage your child to experiment with different approaches to mathematics. There is often more than one way to solve a math problem.
- Encourage your child to talk about and show a math problem in a way that makes sense
- When your child is solving math problems ask questions such as: Why did you...? What can you do next? Do you see any patterns? Does the answer make sense? How do you know? This helps to encourage thinking about mathematics.
- Connect math to everyday life and help your child understand how math influences them.
- Play family math games together that add excitement such as checkers, junior monopoly, math bingo and uno.
- Computers + math = fun! There are great computer math games available on the internet that you can discover with your child.