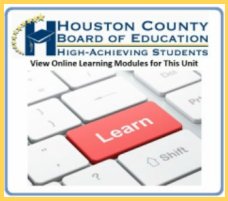
Algebra 2
Mathematics

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. It is in Algebra 2 students pull together and apply the accumulation of learning that they have from their previous courses, with content grouped into six critical areas, organized into units. Algebra 2 is the culminating course in a sequence of three high school courses designed to ensure career and college readiness. It is designed to prepare students for fourth course options relevant to their career pursuits.

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

- They apply methods from probability and statistics to draw inferences and conclusions from data.
- Students expand their repertoire of functions to include quadratic (with complex solutions), polynomial, rational, and radical functions.
- And, finally, students bring together all of their experience with functions to create models and solve contextual problems



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

Houston County Board of Education
High-Achieving Students

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!

Algebra 2 Course Overview

Unit 1: Quadratics Revisited

Expected Dates: Beginning of School Year to August

Students will revisit solving quadratic equations in this unit. Students learn that when quadratic equations do not have real solutions the number system must be extended so that solutions exist, analogous to the way in which extending the whole numbers to the negative numbers allows x+1 = 0 to have a solution. Students explore relationships between number systems: whole numbers, integers, rational numbers, real numbers, and complex numbers. Students will perform operations with complex numbers and solve quadratic equations with complex solutions. The guiding principle is that equations with no solutions in one number system may have solutions in a larger number system. Students will also extend the laws of exponents to rational exponents and use those properties to evaluate and simplify expressions containing rational exponents.

Unit 2: Operations with Polynomials

Expected Dates: Late August to Mid-September

This unit develops the structural similarities between the system of polynomials and the system of integers. Students draw on analogies between polynomial arithmetic and base-ten computation, focusing on properties of operations, particularly the distributive property. Students connect multiplication of polynomials with multiplication of multi-digit integers, and division of polynomials with long division of integers. Students will find inverse functions and verify by composition that one function is the inverse of another function.

Unit 3: Polynomial Functions

Expected Dates: Mid-September to November

In this unit, students continue their study of polynomials by identifying zeros and making connections between zeros of a polynomial and solutions of a polynomial equation. Students will see how the Fundamental Theorem of Algebra can be used to determine the number of solutions of a polynomial equation and will find all the roots of those equations. Students will graph polynomial functions and interpret the key characteristics of the function.

Unit 4: Rational and Radical Function

Expected Dates: November to Mid-February

Rational numbers extend the arithmetic of integers by allowing division by all numbers except 0. Similarly, rational expressions extend the arithmetic of polynomials by allowing division by all polynomials except the zero polynomial. A central theme of this unit is that the arithmetic of rational expressions is governed by the same rules as the arithmetic of rational numbers. Similarly, radical expressions follow the rules governed by irrational numbers.

Unit 5: Exponential and Logarithmic Functions

Expected Dates: Mid-February to March

Students extend their work with exponential functions to include solving exponential equations with logarithms. They analyze the relationship between these two functions.

Unit 6: Mathematical Modeling

Expected Dates: April

In this unit students synthesize and generalize what they have learned about a variety of function families. They explore the effects of transformations on graphs of diverse functions, including functions arising in an application, in order to abstract the general principle that transformations on a graph always have the same effect regardless of the type of the underlying functions. They identify appropriate types of functions to model a situation, they adjust parameters to improve the model, and they compare models by analyzing appropriateness of fit and making judgments about the domain over which a model is a good fit. They determine whether it is best to model with multiple functions creating a piecewise function. Students will also explore finite the sum of finite geometric series. The description of modeling as "the process of choosing and using mathematics and statistics to analyze empirical situations, to understand them better, and to make decisions" is at the heart of this unit. The narrative discussion and diagram of the modeling cycle should be considered when knowledge of functions and statistics is applied in a modeling context.

Unit 7: Inferences and Conclusions from Data

Expected Dates: Late April to End of School Year

In this unit, students see how the visual displays and summary statistics they learned in earlier grades relate to different types of data and to probability distributions. They identify different ways of collecting data— including sample surveys, experiments, and simulations—and the role that randomness and careful design play in the conclusions that can be drawn

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.