

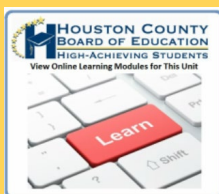
Pre-Calculus Mathematics

Key Instructional Activities

Pre-Calculus focuses on standards to prepare students for a more intense study of mathematics. The critical areas organized in eight units delve deeper into content from previous courses. The study of circles and parabolas is extended to include other conics such as ellipses and hyperbolas. Trigonometric functions are introduced and developed to include inverses, general triangles and identities. Matrices provide an organizational structure in which to represent and solve complex problems. Students expand the concepts of complex numbers and the coordinate plane to represent and operate upon vectors. Probability rounds out the course using counting methods, including their use in making and evaluating decisions. The Mathematical Practice Standards apply throughout each course and, together with the content standards, prescribe that students experience mathematics as a coherent, useful, and logical subject that makes use of their ability to make sense of problem situations.

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

- They graph trigonometric functions and conic sections, identifying the key characteristics of each.
- Students will develop and verify trigonometric identities and use them to solve trigonometric equations, understanding the cyclical nature of the functions and therefore of their solutions, either solving for general solutions or for specific solutions if the domain is limited.
- Students will explore matrices and vectors and their relationship to one another.
- Students will extend their study of probability by computing and interpreting probabilities of compound events. Students will calculate expected values and use them to solve problems and make informed decisions.



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!
- ✓ While PreCalculus does not have a dedicated Weebly page, the other HCBE sites are helpful.

PreCalculus Course Overview

Unit 1: Introduction to Trigonometric Functions

Expected Dates: Beginning of School Year to Early September

Students will use the unit circle to extend the domain of trigonometric functions to include all real numbers. Students will develop understanding of the radian measure of an angle, graph trigonometric functions, and derive and apply the Pythagorean identity.

Unit 2: Trigonometric Functions

Expected Dates: Early September to Mid-October

Building on standards from Unit 1, students extend their study of the unit circle and trigonometric functions. Students will create inverses of trigonometric functions and use the inverse functions to solve trigonometric equations that arise in real-world problems.

Unit 3: Trigonometry of General Triangles

Expected Dates: Mid-October to Early November

Building on standards from Unit 1 and Unit 2, students will apply trigonometry to general triangles. Students will derive the trigonometric formula for the area of a triangle and prove and use the Laws of Sines and Cosines to solve problems.

Unit 4: Trigonometric Identities

Expected Dates: Early November to Mid-December

Building on standards from the first three units, students will prove and use addition, subtraction, double, and half-angle formulas to solve problems..

Unit 5: Matrices

Expected Dates: Early January to Early February

Students will perform operations on matrices, use matrices in applications, and use matrices to represent and solve systems of equations.

Unit 6: Conics

Expected Dates: Early February to Early March

Building on standards from previous courses, students will derive the equations of conic sections (parabolas, ellipses, and hyperbolas). Students will solve systems of a linear and quadratic equation in two variables.

Unit 7: Vectors

Expected Early March to Mid-April

Students will extend their understanding of complex numbers and their operations through graphical representations. Students will perform operations on vectors and use the operations to represent various quantities

Unit 8: Probability

Expected Dates: Mid-April to End of School Year

Students will extend their study of probability by computing and interpreting probabilities of compound events. Students will calculate expected values and use them to solve problems and make informed decisions.

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.