



## Precalculus Honors Year at a Glance

### Scope and Sequence 2022 - 2023

**Please Note:** All standards in the state course description are designed to be learned by the end of the course. This guide represents a recommended timeline and sequence to be used voluntarily by teachers for planning purposes. Specific question regarding when content will be addressed in a specific course are best answered by the individual teacher.

### Course Resources

#### Publisher Resource:

Precalculus with Limits: A Graphing Approach, National Geographic Learning Cengage (Clever – use your active directory; does not support Internet Explorer)

#### Supplemental Resources:

[Khan Academy](#) (does not support Internet Explorer)

### In Precalculus Honors, instructional time will emphasize six areas:

(1) Extending right triangle trigonometry to unit circle trigonometry and trigonometric functions; (2) extending understanding of functions to trigonometric; (3) developing and understanding of conic sections; (4) representing and performing operations with complex numbers and vectors in the coordinate plane; (5) extending understanding of relations in the plane using parametric representations, including polar coordinates and (6) analyzing arithmetic and geometric sequences and series.

Quarter 1 (August 10 – October 14)

### Chapter 1: Functions and Their Graphs

Students will be introduced to the concept of functions. Students will focus on graphing, solving and evaluating the three functions that are most important in modeling real-life situations (algebraic functions, exponential and logarithmic functions, and trigonometric and inverse trigonometric functions).

### Chapter 2: Polynomial and Rational Functions



## Precalculus Honors Year at a Glance

Students will graph quadratic functions, polynomial functions and rational functions and describe key features such as end behavior, zeros, asymptotes, and intercepts of these graphs. Students will find both real and complex zeros of polynomial functions algebraically using the idea of repeated zeros, long and synthetic division, and the remainder and factor theorems.

### **Chapter 3: Exponential and Logarithmic Functions**

Students will graph exponential and logarithmic functions and describe features such as end behavior, zeros, asymptotes, and intercepts of these graphs. Students will evaluate exponential and logarithmic equations. Students will solve logarithmic and exponential equations using properties, expanding and condensing and the change of base formula. Students will create equations and graphs the model exponential growth and decay.

#### Quarter 2 (October 18 – December 21)

### **Chapter 4: Trigonometric Functions**

Students will work with trigonometric functions and the unit circle in both radian and degree measures. Students will use right triangle trigonometry to find and evaluate the six trigonometric values. Students will graph all six trigonometric functions and describe key features of the graphs. Students will apply knowledge of trigonometric functions to real-world application problems.

### **Chapter 5: Analytic Trigonometry**

Students will evaluate and simplify fundamental trigonometric identities. Students will solve trigonometric equations using factoring, trigonometric substitution, sum/difference formulas, and double angle/half angle formulas.

#### Quarter 3 (January 5 – March 9)

### **Chapter 5: Analytic Trigonometry**

Students will evaluate and simplify fundamental trigonometric identities. Students will solve trigonometric equations using factoring, trigonometric substitution, sum/difference formulas, and double angle/half angle formulas.

### **Chapter 6: Additional Topics in Trigonometry**



## Precalculus Honors Year at a Glance

Students will learn the law of sines and law of cosines and apply these laws to application problems. Students will learn about the component form of vectors and perform operations on vectors, and they will use vectors in application of real-world problems. Students will calculate the dot product of vectors and find the angle between two vectors.

### **Chapter 9: Topics in Analytical Geometry**

Students will write equations in standard form of conic sections (circles, parabolas, ellipses, and hyperbolas). Students will graph these conic sections and find the tangent lines of these graphs. Students will solve real-world application problems that involve conic sections. Students will plot polar coordinates and convert between polar and rectangular coordinates. Students will create graphs of polar equations and write and solve polar equations of conics.

### Quarter 4 (March 20 – May 25)

### **Chapter 9: Topics in Analytical Geometry**

Students will write equations in standard form of conic sections (circles, parabolas, ellipses, and hyperbolas). Students will graph these conic sections and find the tangent lines of these graphs. Students will solve real-world application problems that involve conic sections. Students will plot polar coordinates and convert between polar and rectangular coordinates. Students will create graphs of polar equations and write and solve polar equations of conics.

### **Chapter 8: Sequences, Series, and Probability**

Students will work with arithmetic and geometric sequences and series. Students will be able to write these sequences in both explicit and recursive form. Students will be able to find the sum of both arithmetic and geometric series using formulas and sigma notation. Students will be able to solve real world application problems that involve sequences and series.

### **Chapter 7: Linear Systems and Matrices**

Students will solve systems of equations by graphing, substitution, and elimination. Students will solve these systems in mathematical context as well as in real-world context.