



# Reavis High School

## PreCalculus Curriculum Snapshot



### Unit 1: Prerequisites

9  
Days

Students will review using the coordinate plane to graph lines, as well as use the Distance and Midpoint Formulas. Students will refresh their skills in solving linear, quadratic, polynomial, absolute value, and radical equations. Students will also practice solving linear inequalities, absolute value inequalities, and rational inequalities.



### Unit 2: Functions and their Graphs

9  
Days

Students will evaluate functions, analyze their graphs, and find their domain and range. Students will investigate and identify graph shifts, reflections, and nonrigid transformation of functions. Finally, students will find inverses of functions graphically and algebraically.



### Unit 3: Polynomial and Rational Functions

15  
Days

Students will go in depth sketching and analyzing graphs of quadratic and polynomial functions. Students will use long and synthetic division to divide polynomials. Students will learn how to determine and find the number of rational and real zeros of polynomials. Students will graph and perform operations with complex numbers. In addition, students will determine the domain, find asymptotes, and sketch graphs of rational functions.



## Unit 4: Exponential and Logarithmic Functions

9  
Days

Students will recognize, evaluate, and graph exponential and logarithmic functions. Students will use properties of logarithmic functions to evaluate, rewrite, expand, and condense logarithmic expressions. Students will explore logarithmic models, exponential growth and decay models to solve real-life problems. Students will also be exposed to finding the best fit exponential and logarithmic modes to sets of data using their graphing calculators.



## Unit 5a: Trigonometric Functions

20  
Days

Students will describe an angle and convert between degree and radian measures. Students will derive the unit circle and identify its relationship to real numbers. Students will evaluate trig functions of angles and use fundamental trig identities. Students will evaluate inverse trig functions and use trig function models to solve real-life problems. Finally, students will sketch graphs of all six trig functions.



## Unit 5b: Analytic Trigonometry

16  
Days

Students will use fundamental trigonometric identities to evaluate trig functions and simplify trig expressions. Students will verify trig functions and use standard algebraic techniques to solve trig equations. Students will use sum and difference formulas, multiple-angle formulas, power-reducing formulas, half-angle formulas, and product-sum formulas to rewrite and evaluate trig functions. In addition, the Law of Sines and the Law of Cosines will be used to solve and find the area of oblique triangles.



## Unit 6: Vectors

4-5  
Days

Students will represent vectors as directed line segments, write the component form of vectors, perform basic vector operations, and represent vectors graphically. Students will write vectors as linear combinations of unit vectors. Students will find the direction angles of vectors and will learn how to use vectors to model and solve real-life problems. Students will find the dot product of two vectors and use properties of dot product, find angles between vectors, and determine whether two vectors are orthogonal. Students will write vectors as sums of two components and use vectors to find work done by a force.



## Unit 7: Systems of Equations and Inequalities

9 - 10  
days

Students will solve systems of equations by substitution, elimination, and Gauss elimination methods as well as graphically. Students will be able to recognize linear systems in row-echelon form and use back substitution to solve the system. Students will be able to solve non-square systems of equations, sketch the graphs of inequalities in two variables, and solve systems of inequalities. Students will solve linear programming problems by using systems of equations and inequalities to model and solve real-life problems.



## Unit 8: Matrices and Determinants

11 - 12  
days

Students will write matrices, identify their order, and perform elementary row operations. Students will be able to use Gaussian elimination and Gauss-Jordan elimination with matrices to solve systems of linear equations. They will add, subtract, and multiply two matrices, multiply a matrix by a real number, and verify that two matrices are inverses of each other and find inverses of matrices. They will use inverse matrices to solve systems of linear equation. Students will find the determinants of square matrices and use Cramer's Rule to solve systems of linear equations.



## Unit 9: Topics in Analytic Geometry

15 - 16  
Days

Students will write, analyze, and sketch the graphs of parabolas, ellipses, and hyperbolas. Students will solve systems of quadratic equations. Students will be able to rotate the coordinate axis to eliminate the  $xy$ -term in equations of conics and use the discriminant to classify conics. Students will rewrite sets of parametric equations as rectangular equations and find sets of parametric equations for graphs. Students will be able to write equations in polar form, graph polar equations, recognize special polar graphs, and write equations of conics in polar form.



## Unit 10: Limits and Introduction to Calculus

13 - 15  
Days

Students will estimate limits and use direct substitution by using the dividing out and rationalizing techniques. Students will approximate slopes of tangent lines, use the limit definition of slope, and use derivatives to find slope of graphs. Students will evaluate limits at infinity and find limits of sequences. Students will find limits and summations and use them to find areas of regions bounded by graphs of functions.



## Unit 11: Sequences, Series, and Probability

9 -12  
Days

Students will use sequence, factorial, and summation notation to write the terms and sums of sequences. Students will recognize, write, and use arithmetic sequences and geometric sequences. Students will use mathematical induction to prove statements involving a positive integer  $n$ . Students will use the Binomial Theorem and Pascal's Triangle to calculate binomial coefficients and write binomial expansions. Students will solve counting problems using the Fundamental Counting Principle, permutations and combinations, and find the probability of events and their complements.