4th Year Overview

The Complex Number System
• Perform arithmetic operations with complex numbers
• Represent complex numbers and their operations on the complex plane
• Use complex numbers in polynomial identities and equations
Vector and Matric Quantities
• Represent and model with vector quantities.
• Perform operations on vectors.
• Perform operations on matrices and use matrices in applications.
Seeing Structure in Expressions
• Write expressions in equivalent forms to solve problems
Arithmetic with Polynomials
• Use polynomial identities to solve problems
• Rewrite rational functions
Reasoning with Equations and Inequalities
• Solve systems of equations
• Solve equations and inequalities
Interpreting Functions
• Analyze functions using different representations
Building Functions
• Build a function that models a relationship between two quantities
• Build new functions from existing functions
Trigonometric Functions
• Extend the domain of trigonometric functions using the unit circle
• Model periodic phenomena with trigonometric functions
• Prove and apply trigonometric identities
Similarity, Right Triangle and Trigonometry
• Apply trigonometry to general triangles
Expressing Geometric Properties with Equations
• Translate between the geometric description and the equation for a conic section
Conditional Probability an the Rules of Probability
• Use the rules of probability to compute probabilities of compound events in a uniform probability model
Using Probability to Make Decisions

Mathematical Practices

1. Make sense of problems and persevere in solving them.

2. Reason abstractly and quantitatively.

3. Construct viable arguments and critique the reasoning of others.

4. Model with mathematics.

5. Use appropriate tools strategically.

6. Attend to precision.

7. Look for and make use of structure.

8. Look for and express regularity in repeated reasoning.

• Calculate expected values and use them to solve problems • Use probability to evaluate outcomes of decisions	
Polar Coordinates	
• Define polar coordinates and the relationship between polar coordinates and Cartesian coordinates.	
Parametric Equations	
• Define parametric equations	
Limits	
• Define a continuous function • Define limits	
Sequences	
• Define sequences	

4th Year Introduction

A fourth year course can look different at each school. The standards listed are the (+) standards that would be appropriate for a variety of courses. These standards could be used as a basis for a precalculus course or could be selectively used to create a different 4th year course.

A precalculus course combines concepts of trigonometry, geometry, and algebra that are needed to prepare students for the study of calculus. This course is intended to strengthen students' conceptual understanding of problems and mathematical reasoning in solving problems. Facility with these topics is especially important for students who intend to study calculus, physics, other sciences, and engineering in college. The main topics in the precalculus course are complex numbers, rational functions, trigonometric functions and their inverses, inverse functions, vectors, matrices, parametric and polar equations, and conic sections. Students will continue their work with functions, using composition, inverses, exponents, trigonometry, and logarithms to build, model, and interpret functions along with careful examination of the domain and restrictions that apply.

Because the standards that comprise this course are (+) standards, students who enroll in precalculus should have met the college- and career-ready standards of the previous courses in an Integrated Pathway or Traditional Pathway. It is recommended that students complete precalculus before taking an Advanced Placement (AP) calculus course.

Since not all students will need a precalculus course, school districts could develop a fourth year course utilizing the (+) standards that best meet the scholastic needs of their students.

The Mathematical Practice standards apply throughout the Fourth Year Course and together with the content standards prescribe that students experience math as a coherent, useful, and logical subject that makes use of their ability to make sense of problem situations.