Precalculus, Part 1
Course Outline & Objectives

Course Description:
Students will build on previous fundamental concepts from Algebra I, Geometry, and Algebra II or Integrated Math 1, 2, & 3 courses. Students will use the concepts in this course, especially functions to strengthen previous mathematical reasoning and conceptual understanding for mathematical problem solving. Proficiency with these topics is especially important for students who are interested in preparing for college math courses and/or who intend to study Calculus.

Credits - One Semester (0.5 Carnegie unit / CA: 5 credits)
Prerequisites: Algebra 1; Geometry; and Algebra 2 OR Integrated Math 1; Integrated Math 2; and Integrated Math 3

Course Outline

Unit 1 – Seeing Structure in Algebraic Expressions

1.1 Identifying Key Components of an Expression/ Introduction to Polynomials
1.2 Adding, Subtracting, Multiplying & Dividing Polynomials
1.3 Factoring Polynomials
1.4 Simplifying Rational Expressions
1.5 Addition and Subtraction of Rational Expressions
1.6 Multiplication and Division of Rational Expressions

Common Core Standards

In this unit:
Students will learn to identify characteristics of algebraic expressions, including terms, variables, constants, and coefficients. They will simplify polynomials and perform the four basic operations with them. They will factor polynomials using various factoring methods. They will simplify rational expressions using factoring. They will complete operations of rational expressions using addition, subtraction, multiplication, and division.

[A-SSE, A-APR, N-RN, N-Q]

Unit 2 – Equations and Inequalities: Writing, Solving, and Graphing

2.1 Linear Equations: Writing, Solving, and Graphing
2.2 Systems of Linear Equations - Solve by Graphing
2.3 Systems of Linear Equations - Solve by Substitution or Elimination (Combination)
2.4 Solving Systems of Linear Inequalities
2.5 Quadratic Equations: Writing, Solving, and Graphing

In this unit
Students will learn to write, solve, and graph linear equations and inequalities. They will solve systems of linear equations and inequalities. They will graph and solve quadratic equations.

[A-CED, A-REI]

Unit 3 – Introduction to Functions

3.1 Defining and Evaluating Functions
3.2 Function Operations and Composition of Functions
3.3 Inverse Functions
3.4 Parent Functions and Transformations
3.5 Analyzing Graphs of Functions

In this unit:
Students will learn to identify, evaluate, and perform operations on functions. They will learn to find the inverses of functions and what they represent. They will learn to recognize the most common parent functions both algebraically and graphically, and how they can be transformed. They will learn to analyze graphs of functions by their most important characteristics.

[F-IF, F-BF, F-LE]

Course Outline

Unit 4 – Polynomial, Rational, Exponential and Logarithmic Functions

4.1 Polynomial Functions
4.2 Remainder & Factor Theorems
4.3 Rational Root Theorem and Descartes Rule of Signs
4.4 Rational Functions
4.5 Exponential Functions
4.6 Logarithmic Functions

Common Core Standards

In this unit:
Students will learn to analyze and graph polynomial functions. They will identify key characteristics of a polynomial function by using the remainder, factor, and rational roots theorems as well as Descartes' rule of signs. They will analyze and graph rational, exponential, and logarithmic functions.

[A-APR, F-IF, F-BF, F-LE]

Unit 5 – Trigonometry

5.1 Right Triangle Trigonometry
5.2 Trigonometric Functions on the Unit Circle
5.3 Inverse Trigonometric Functions
5.4 Finding the Area of a Triangle using the General Formula or Heron's Formula
5.5 Law of Sines and Law of Cosines
5.6 Graphing Trigonometric Functions
5.7 Trigonometric Identities
5.8 Sum and Difference Identities
5.9 Double and Half-Angle Identities & Formulas

In this unit:
Students will learn to solve right triangles using the six basic trigonometric functions. They will determine the 16-point unit circle and use it to find trigonometric function values. They will identify and evaluate inverse trigonometric functions. They will solve oblique triangles and find their areas. They will graph trigonometric functions. They will identify several trigonometric identities and use them to find trigonometric values, evaluate trigonometric functions and solve trigonometric equations.

[F-IF, F-TF, G-SRT]