Pre Calculus Syllabus

Course Content: This is an outline of the topics we will cover. There is some flexibility in this outline to meet the needs of the class.

Prerequisite Review Skills – Make sure you know this material

Algebra Review: Exponents, Roots, Combining Like Terms, etc.
Linear Equations - Solving Equations / Point – Slope Equation
Systems of Linear Equations
Use of Graphing Calculator and Graphical Representation of Data
Parallel and Perpendicular Lines
Distance, Midpoint and Slope

Functions

1.2 Definition of a Function – Domain, Range, Real Life Examples, Notation, Interval Notation, Difference Quotient, and Piecewise Functions
1.3 Graphs of Functions – Vertical Line Test, Restricting the Domain, Zeros, Odd/Even
1.4 Shifting, Reflecting, and Stretching Graphs
1.5 Combinations of Functions (including composition)
1.6 Inverse Functions – Algebraically and Graphically, 1 -1 Functions
Greatest Integer Function
** Word Problems – *Interpret the meaning of f(3) = 30, for example.*

Polynomial Functions and their Graphs

2.1 Quadratic Functions – Quadratic Formula, Discriminant, Zeros, Factoring, Completing the Square, Graphs, Shifting (pg 99: 5 & 6), Multiple Representation - Table/Graphs/Equation, Applications
2.2 Definitions of a Polynomial, Polynomial Functions of Higher Degree Sketching Graphs, End Behavior, Intermediate Value Theorem
2.3 Real Zeros of Polynomial Functions – Polynomial/Synthetic Division
Synthetic Division to find all Roots
Rational Root Theorem, Remainder and Factor Theorems
2.4 Complex Numbers and Imaginary Roots

Rational Functions and their Graphs

2.6 Rational Functions – Domains, Definition of Continuity,
Removable Discontinuities vs. Vertical Asymptotes
Horizontal Asymptotes, Applications
2.7 Graphs of Rational Functions
Sketching Graphs, Slant Asymptotes, Applications
2.8 Quadratic Models
7.3 Partial Fraction Decomposition

Exponential and Logarithmic Functions

3.1 Exponential Functions and Their Graphs
Definition, basic characteristics, ***e***
Applications – Compound Interest
3.2 Logarithmic Functions and Their Graphs
Basic Applications and Natural Logs
3.3 Properties of Logarithms
3.4 Solving Exponential and logarithmic Equations
3.5 Exponential and Logarithmic Models

Trigonometric Functions

4.1 Radian and Degree Measure - Conversion, Arc length
4.2 Trigonometric Functions - Unit Circle
4.3 Right Angle Trigonometry – Definition of Six Trig. Functions
Evaluating with/without a Calculator ($30^\circ, 45^\circ, 60^\circ$)
4.4 Trigonometric Functions of Any Angle
Reference Angles, "ASTC"
4.5/4.6 Graphs of Trigonometric Functions (Sin, Cos, Tan, Csc, Sec, Cot)
Period, Amplitude, Shifting, Reciprocal Functions
4.7 Inverse Trigonometric Functions and their Graphs
Solving for Angles using Inverses
4.8 Applications and Models of Trigonometric Functions

Analytical Trigonometry

5.1/5.2 Fundamental Identities
Rewriting/ Solving/ Simplifying equations
5.3 Solving Trigonometric Equations
Simplifying and Finding Zeros
Solving Equations with Multiple Angles
5.4 Sum and Difference Formulas
5.5 Multiple Angle Formulas
6.1/6.2 Law of Sines/Cosines – Finding values of Non-Right Angle Triangles
Area of a non-right triangle – Are of an Oblique Triangle and Hero's Formula

Vectors

6.3 Vectors in the Plane – Vector Operations, Applications
6.4 Vectors and Dot Products

Matrices

7.4 Matrices and Systems of Equations
7.5 Operations with Matrices
7.7 Determinant of a Square Matrix
7.8 Applications of Matrices and Determinants

Conics

9.1 Circles and Parabolas
9.2 Ellipses
9.3 Hyperbolas

Polar/Parametric Functions

~~9.5 Parametric Equations – Applications~~
9.6 Polar Equations – Applications

Limits and an Introduction to Calculus

11.1 Limits
11.2 Evaluating Limits
11.3 Tangent Line Problem – Introduction to Derivatives

We will review this section, but might not cover everything here. These are skills that were taught in Algebra 2 CC.