Kingsborough Community College
Department of College Now
Pre-Calculus and Analytical Geometry (M1400)
Curriculum

1. Functions and Their Graphs
    1.1 Lines in the Plane
    1.2 Functions
        - Odd and even functions / proving that functions are odd and even
    1.3 Graphs of Functions
    1.4 Shifting, Reflecting, and Stretching Graphs
    1.5 Combinations of Functions
    1.6 Inverse Functions
    1.7 Linear Models and Scatter Plots

2. Polynomial and Rational Functions
    2.1 Quadratic Functions
        - Proving the quadratic formula
        - Writing quadratic functions in the form a(x+h)^2+k
        - Identifying axis of symmetry and vertex of a quadratic function
            - Graphically
            - Completing the square
    2.2 Polynomial Functions of Higher Degree
        - End behavior of a polynomial
    2.3 Real Zeros of Polynomial Functions
    2.4 Complex Numbers
    2.5 The Fundamental Theorem of Algebra
    2.6 Rational Functions and Asymptotes
    2.7 Graphs of Rational Functions
    2.8 Quadratic Models

3. Exponential and Logarithmic Functions
    3.1 Exponential Functions and Their Graphs
    3.2 Logarithmic Functions and Their Graphs
    3.3 Properties of Logarithms
    3.4 Solving Exponential and Logarithmic Equations
    3.5 Exponential and Logarithmic Models
    3.6 Nonlinear Models

4. Trigonometric Functions
    4.1 Radian and Degree Measure
    4.2 Trigonometric Functions: The Unit Circle
    4.3 Right Triangle Trigonometry
    4.4 Trigonometric Functions of Any Angle

4.5 Graphs of Sine and Cosine Functions
4.6 Graphs of Other Trigonometric Functions
4.7 Inverse Trigonometric Functions
4.8 Applications and Models

5. Analytic Trigonometry
5.1 Using Fundamental Identities
5.2 Verifying Trigonometric Identities
- Proving the Pythagorean theorem
5.3 Solving Trigonometric Equations
5.4 Sum and Difference Formulas
5.5 Multiple-Angle and Product-to-Sum Formulas

6. Additional Topics in Trigonometry
6.1 Law of Sines
6.2 Law of Cosines
6.3 Vectors in the Plane
6.4 Vectors and Dot Products
6.5 Trigonometric Form of a Complex Number

7. Linear Systems and Matrices
7.1 Solving Systems of Equations
7.2 Systems of Linear Equations in Two Variables
7.3 Multivariable Linear Systems
7.4 Matrices and Systems of Equations
7.5 Operations with Matrices
7.6 The Inverse of a Square Matrix
7.7 The Determinant of a Square Matrix
7.8 Applications of Matrices and Determinants

8. Sequences, Series, and Probability
8.1 Sequences and Series
8.2 Arithmetic Sequences and Partial Sums
8.3 Geometric Sequences and Series
8.4 Mathematic Induction
8.5 The Binomial Theorem
8.6 Counting Principles
8.7 Probability

9. Topics and Analytic Geometry
9.0 Using coordinate geometry to prove that a polygon is a:
- Scalene triangle
- Isosceles triangle
- Equilateral triangle

- Rectangle
- Square
- Parallelogram
- Rhombus

9.1 Circles and Parabolas
9.2 Ellipses
9.3 Hyperbolas
9.4 Rotation and Systems of Quadratic Equations
9.5 Parametric Equations
9.6 Polar Coordinates
9.7 Graph of Polar Equations
9.8 Polar Equations of Conics

10. Analytic Geometry in Three Dimensions
    10.1 The Three-Dimensional Coordinate System
    10.2 Vectors in Space
    10.3 The Cross Product of Two Vectors
    10.4 Lines and Planes in Space

11. Limits and an Introduction to Calculus
    11.1 Introduction to Limits
    11.2 Techniques for Evaluating Limits
    11.3 The Tangent Line Problem
    11.4 Limits at Infinity and Limits of Sequences
    11.5 The Area Problem