

# Precalculus Year-Long Map

## Chapter 0: Preparing for Precalculus

### Objectives:

- Write numbers in proper set notation.
- Perform basic operations with complex numbers.
- Graph quadratic functions and solve quadratic equations.
- Simplify expressions in radical and exponential form.
- Perform basic operations with matrices.

## UNIT 1: Linear Relations and Functions

### Chapter 1: Functions from a Calculus Perspective

#### Objectives:

- Identify functions and determine their domains, ranges, y-intercepts, and zeros.
- Evaluate the continuity, end behavior, limits, and extrema of a function.
- Calculate rates of change of nonlinear functions.
- Identify parent functions and transformations.
- Perform operations with functions, identify composite functions, and calculate inverse functions

### Chapter 2: Power, Polynomial, and Rational Functions

#### Objectives:

- Graph and analyze power, radical, polynomial, and rational functions.
- Divide polynomials using long division and synthetic division.
- Use the Remainder and Factor Theorems.
- Find all zeros of polynomial functions.
- Solve radical and rational equations.
- Solve polynomial and rational inequalities.

### Chapter 3: Exponential and Logarithmic Functions

#### Objectives:

- Identify the mathematical domains, ranges, and end behaviors of exponential and logarithmic functions.
- Use the properties of exponents and logarithms to solve exponential and logarithmic equations.
- Collect and organize data, make and interpret scatter plots, fit the graph of a function to the data, and interpret the results.
- Use function models to predict and make decisions and critical judgments.
- Use nonlinear regression.

# Precalculus Year-Long Map

## Chapter 4: Trigonometric Functions

### Objectives:

- Solve right triangles using trigonometric and inverse trigonometric functions.
- Convert between degrees and radians.
- Solve real-world problems using trigonometric functions.
- Graph trigonometric functions and their inverses.
- Solve oblique triangles and find their area using various laws and formulas.

## UNIT 2: Quadratic, Polynomial, and Radical Functions and Relations

### Chapter 5: Trigonometric Identities and Equations

#### Objectives:

- Identify and use trigonometric identities to find trigonometric values.
- Use trigonometric identities to simplify and rewrite trigonometric expressions.
- Verify trigonometric identities.
- Solve trigonometric equations.
- Use sum and difference identities to evaluate trigonometric functions.
- Use double-angle, power-reducing, half-angle, and product-to-sum identities to evaluate trigonometric expressions and solve trigonometric equations.

### Chapter 6: Systems of Equations and Matrices

#### Objectives:

- Solve systems of linear equations using matrices and Gaussian or Gauss-Jordan elimination.
- Multiply matrices.
- Find determinants and inverses of 2 by 2 and 3 by 3 matrices.
- Solve systems of linear equations using inverse matrices and Cramer's Rule.
- Write partial fraction decompositions of rational expressions with linear and irreducible quadratic factors.
- Use linear programming to solve applications.
- Recognize situations in which there are no solutions or more than one solution of a linear programming application.

### Chapter 7: Conic Sections and Parametric Equations

#### Objectives:

- Analyze, write, and graph equations of parabolas, ellipses, circles, and hyperbolas.
- Use equations to identify types of conic sections.
- Graph parametric equations.
- Solve problems related to the motion of projectiles.