Wayland High School

Mathematics Department
Honors Algebra 2
Curriculum Guide

Unit 1: Review Topics

- Distributive Property
- Absolute Value – Solving equations and inequalities
- Order of Operations
- Function Notation
  - Algebraically
  - Graphically
- Laws of Exponents
- Simplifying Radicals

Unit 2: Linear Functions

- Slope-Intercept form, Point-Slope Form, Standard Form
- Slope as a concept of a rate of change
- Solving a system using substitution, elimination, and graphing
- Creating scatter plots on calculators
- Correlation coefficient
- Distinguish between correlation and causation
- Using a calculator to generate the line of best fit
- Evaluating piecewise functions
- Graphing piecewise functions
- Writing piecewise functions from a graph
- Writing a piecewise function that represents an absolute value function

Unit 3: Quadratic Expressions and Functions

- Intro to Transformations – Horizontal shifts and reflections only
- Definite/identify/graph quadratic functions in vertex form, intercept form, and standard form
- Factoring quadratic expressions
- Factoring the sum and difference of cubes
- Writing equations from coordinates and graphs (vertex or intercept forms)
- Completing the square to convert from standard to vertex forms
- Solving quadratic equations using factoring and the quadratic formula
- Using the discriminant to determine the number of real roots of a quadratic
- Quadratic inequalities
- Patterns in roots

Unit 4: Transformations and Rational Functions

- Parent functions
- Vertical and horizontal shifts
- Vertical and horizontal stretches
- Reflections
- Graphing rational functions
- Removable discontinuities

Unit 5: Functions and Their Inverses

- Representing relations and functions
- Identifying domains and ranges algebraically and graphically
- Function compositions
- The Property of Inverse Functions
- Finding the inverse of a function
- Restricting domains in order for the inverse of a function to be a function
- Graphing inverse functions
- Recursive functions
- Writing closed-form and recursive functions from a list of outputs

Unit 6: Multivariable Systems

- Matrices
  - Dimensions
  - Notation
  - Scalar values
  - Addition, subtraction, and multiplication
- Writing a multivariable system as a matrix equation
- Inputting a matrix equation into a TI-84 calculator
- Use a TI-84 to solve a matrix equation
- Solve real-world problems using multi-variable systems
- Linear programming – identifying constraints the feasible region, and the max/min of the objective quantity

Unit 7: Statistics

- Data Displays
  - Dot plots
  - Histograms
  - Box plots
- Distributions
- Determine the shape of a distribution
- Measures of Central Tendency: Mean, Median, and Mode
- Measures of Spread: Range, IQR, Standard Deviation
- Determine which center and spread are appropriate for different distributions
- Outliers and their impact on center and spread
- Z-scores
- The Empirical Rule
- Finding a data value from a z-score and standard deviation

Unit 8: Radicals and Complex Numbers

- Rational Exponents
- Simplifying radicals of order higher than two
- Solving radical equations
- Solving equations that have rational exponents
- Checking for extraneous solutions
- Complex Numbers
- Equivalent complex numbers
- Solving equations that have complex roots
- Write a function if given the complex roots
- Powers of *i*

Unit 9: Polynomials

- Long division
- Synthetic division
- Remainder Theorem
- Factor Theorem
- Rational Roots Theorem
- Graphing Polynomials
- End Behavior
- Writing polynomials from graphs
- Fundamental Theorem of Algebra

Unit 10: Rational Expressions

- Identifying a common denominator
- Simplifying, multiplying, and dividing rational expressions
- Identifying domain restrictions
- Adding and subtracting
- Simplifying complex fractions
- Solving rational inequalities

Unit 11: Logarithms

- Graphs of exponential functions
- Definition of a logarithm
- Log graphs
- Evaluating logs
- Common logs
- Laws of logs
- Change of base formula
- Solving exponential and log equations
- Newton's Law of Cooling
- Other applications

Unit 12: Sequences and Series

- Identify the terms of a sequence
- Finding the nth term of a sequence
- Finding the nth term of a sequence

- Evaluate and write recursive sequences
- Arithmetic sequences
- Geometric sequences
- Partial sums
- Sigma notation
- Sequences of partial sums
- Arithmetic series
- Geometric series
- Infinite geometric series
- Applications of sequences are series