Algebra 2 Topics List

Functions
- Solve equations/inequalities in given set
- Function notation (algebraically and graphically)
- Domain and range; graphically and situations
    - Interval notation where appropriate
- Function characteristics (increasing, decreasing, etc.)
- Piecewise functions, and applications of piecewise
- Review of linear applications
- Graphing parent functions and function transformations
    - Linear, quadratic, cubic, square root, absolute value, exponential growth and decay
- Solving absolute value equations/inequalities algebraically and graphically

Quadratic Functions
- Transform quadratic functions and describe the effects of changes in the coefficients of vertex form
- Identify standard form vs. vertex form
- Convert from vertex form to standard form
- Solving quadratic equations by factoring and the zero product property; both when $a = 1$ and when $a \neq 1$
- Convert from standard form to vertex form by utilizing the method of completing the square; both when $a = 1$ and when $a \neq 1$
- Recognize and factor perfect square trinomials
- Graph a quadratic function given in either standard or vertex form
- Solve a quadratic equations by:
    - Square roots (completing the square as needed)
    - Quadratic formula
- Classify roots using the discriminant
- Define and use imaginary numbers
- Determine the imaginary roots of a quadratic function by either solving by square roots or the quadratic formula
- Perform operations with imaginary numbers
- Polynomials: Identify, classify, perform operations, and end behaviors.

Polynomials
- Multiplying polynomials
- Factoring polynomials – all methods
- Dividing polynomials – synthetic OR long division
- Factor/Rational root theorem
- End Behavior
- Transformations

Exponential & Logarithmic Functions
- Exponent properties and rational exponents
- Graphing exponential functions (recognizing transformations and restrictions)
- Inverse functions
- Graphing logarithmic functions and transformations
- Logarithms (including natural log) and Properties of Logarithms
- Equation solving
  - Exponential equations with a common base
  - Exponential equations requiring logarithms
  - Radical equations/equations with rational exponents
  - Logarithmic equations (including e)
- Exponential functions as mathematical models

Radical Functions
- Graphing Radical Functions & Transformations

Rational Functions
- Graphing Rational Functions
- Simplifying Rational Expressions
- Multiplying and Dividing Rational Expressions
- Adding and Subtracting Rational Expressions
- Solving Rational Equations

Graphing calculator competencies

- Basic order of operations
- Calculating point of intersection, min/max value, and zeros
- Using a regression to determine a linear, quadratic, or exponential function to best fit data
- Using table feature
- Adjusting the window as needed