Algebra 2 Academic Syllabus

Unit 1: Equations and Inequalities

- Classify/order numbers
- Properties of Algebra
- Unit Analysis….ex: MPH -> Kilo to min
- Evaluate expressions using PEMDAS with and without substitution
    - Do problems that involve writing expressions using variables to represent common real world problems: cost (pg. 15 in McDougal Littell)
- Solve linear equations and inequalities
    - Include clearing the fractions
    - Include real world problems
- Solve absolute value equations and inequalities
- Rewrite equations and formulas; include common geom. Formulas (volume, surface area) Pg. 31 in McDougal Littell. Also include Compound Interest Formula

Unit 2: Functions and Inequalities

- Relations and functions
    - Domain, range, and be able to use vertical line test
    - Introduce composite functions EX: f(x) = 2x+5, g(x) = 3x-2, find:
        - f(2), g(3) and f(g(5))
- Slope/Rate of change
    - Emphasize this relationship: recognize they are the same
    - Calculate slope
        - Relationships with slopes and parallel and perpendicular lines
        - Include real world applications
- Write linear equations
    - Make transitions between forms
    - Include real world applications

- Scatter plots and best fitting line
    - By hand and using technology
    - Include real world problems
- Absolute Value functions and Transformations
- Piecewise functions
    - Real world applications (cell phone bills; peak-off peak hours, in network vs out of network…)
- Graphing inequalities in two variables

Unit 3: Systems and Matices

- Solving Linear Systems
    - Graphing and algebraic Methods; by hand and using technology
        - For non-basic math students, be sure they can MASTER substitution method.
    - Use Real World Applications
- Graph systems of Linear inequalities
- 3 variable Systems (A_1 and Honors Only)
- Basic Matrix Operations (If time allows)
    - All: add, subtract, multiply

Unit 4: Quadratics

- Graphing Quadratic Functions in all forms
    - Be sure to focus on Intercepts, Max and Min
- Solving Quadratic Equations (Include real world Apps along with Max and Mins)
    - By Factoring
        - Factoring Quadratic Expressions
            - Factoring out GCF – All NOTE: DO FIRST!
            - Trinomials – All
            - Difference of two squares – All

        - Sum/Difference of cubes – A_1 and Honors
        - Factoring by grouping – All
    - By Square Roots
        - Simplifying Square roots, include conjugates
- Perform Operations with Complex Numbers
    - Pacing Note: Show $i = -1$ first.
- Quadratic Formula
    - NOTE: Formula is expected to be memorized by ALL.
- Writing Quadratic Functions and Models: A_1 and Honors only

Unit 5 : Polynomials

- Properties of Exponents
- Scientific Notation
- Classify, Evaluate, and Graph Polynomial Functions
- Polynomial Operations (Add, subtract, multiply and divide)
    - Synthetic Division (A_1 and Honors)
- Factor and Solve Polynomial Equations (A_1 and Honors)
    - Sum and difference of cubes
- Apply Factor and Remainder Theorems (A_1 and Honors)
- Find Rational Zeros (Honors)
- Regressions

Unit 6: Rational and Radical Equations

- Converting between Rational Exponents and Radical Notation (A_1 and Honors only)
- Solving n^{th} roots equations – ALL
- Apply Properties of Rational Exponents (A_1 and Honors only)
    - Simplify Expressions
- Composite Functions
- Inverse Functions (Honors only)
- Solve Radical Equations
    - Square roots and Cube Roots (All)
    - Rational Exponents (A_1 and Honors)

Unit 8 : **Rational Expressions & Equations**

- Multiply and Divide Rational Expressions
- Add and Subtract Rational Expressions
- Simplify Rational Expressions
    - By LCD
    - Complex Fractions
- Solve Rational Equations
    - By Cross Multiplication
    - By LCD