ALGEBRA II CURRICULAR DRAFT
(LAST CHANGED 01/25/2015)

UNIT #1 – BASIC ALGEBRA REVIEW AND COURSE PRIMER (6 LESSONS)

- Terminology review: terms, expressions, equations, and inequalities.
- Linear equation solving review (all types).
- The Real Number System (basic number type work)
- Properties of Real Numbers (basic work)
- Graphing Calculator Review (solving equations, creating tables, storing values, etcetera)

UNIT #2 – FUNCTIONS AS THE BUILDING BLOCKS OF ALGEBRA (7 LESSONS)

- Basic Function Definition.
- Modeling with functions.
- Function Notation
- Composition of Functions
- Domain and Range of Functions
- One-to-one and Inverse Functions
- Key Characteristics of Functions (Intercepts, intervals of increase/decrease, relative maxima and minima, symmetry, and even and odd functions)

UNIT #3 - LINEAR EQUATIONS AND FUNCTIONS (6 LESSONS)

- Average Rate of Change and Units of Rate
- Linear Functions - Slope - Intercept Form
- The Point-Slope Form of a Line
- Piecewise Linear Functions
- Solving Systems of Linear Equations
- Solving Systems of Three Equations with Three Unknowns

UNIT #4 – EXPONENTIAL AND LOGARITHMIC FUNCTIONS (13 LESSONS)

- Exponent Laws, Positive and Negative Exponents
- Rational Exponents as Roots
- Review of Key Exponential Characteristics
- Finding the Equation of Exponential Functions
- Comparing and Contrasting Linear and Exponential Functions??
- The Method of Common Bases
- Exponential Modeling
- Introduction to Logarithms
- Logarithmic Function Characteristics
- Logarithm Laws??? Not in CCSS curriculum.
- Solving Exponential Equations Using Logarithms

(31 to 32 Lessons)

UNIT #5 – SEQUENCES AND SERIES (6 LESSONS)

- Sequences As Functions
- Sequence Notation
- Sequences Defined Recursively
- Arithmetic and Geometric Series and Their Ties to Linear and Exponential Functions
- Summation Notation
- Series
- Arithmetic and Geometric Series
- Finance and Payments - Connections to Geometric Series

UNIT #6 – QUADRATIC FUNCTIONS AND THEIR TRANSFORMATIONS (11 LESSONS)

- General Polynomial Terminology
- Algebra Review of Multiplying Binomials
- Factoring
- The Conic Definition of a Quadratic: Finding Its Equation Based on Its Focus and Directrix
- The Distance Formula
- Equations of Circles
- The Factored Form of a Quadratic and Finding Equations of Quadratics Based on Roots
- The Vertex Form of a Quadratic and Transformation of Quadratic Functions
- Solving Linear/Quadratic Systems

UNIT #7 – TRANSFORMATIONS OF FUNCTIONS (5 LESSONS)

- Additional Function Types: Piecewise, absolute value.
- Transformations of Functions: $f(x)+k$, $kf(x)$, $f(kx)$, and $f(x+k)$. Graphically, algebraically, etcetera.
- Symmetry and Even/Odd Functions

UNIT #8 – RADICALS AND THE QUADRATIC FORMULA (7 LESSONS)

- Square Root and Cube Root Functions and Graphs
- Solving Equations with Square Roots (Rational Solutions Only, Including Extraneous Roots)
- Completing the Square
- Solving Quadratics Using Completing the Square
- Quadratic Formula Review
- Exponent Properties – Standard Manipulations (No simplifying radicals)
- Fractional Powers as Roots
- Simplifying Expressions Containing Fractional Powers/Roots (No simplifying radicals – more conversion between different representations)

(38 LESSONS)

UNIT #9 – COMPLEX NUMBERS (3 LESSONS)

- Definition of *i*
- Powers of *i*
- The Complex Number System
- Adding, subtracting, and multiplying complex numbers
- Solving Quadratic Equations with Imaginary Solutions

UNIT #10 – POLYNOMIAL AND RATIONAL FUNCTIONS (14 LESSONS)

- Power Functions with Positive Integers
- Long-run Polynomial Behavior
- Zeroes and Turning Points of Polynomials
- The Factored Form of a Polynomial (In depth connections between factors and zeros/roots)
- Rational Expressions and Their Domains
- Simplifying Rational Expressions
- Rational Algebra (multiplying, dividing, complex fractions, etcetera)
- Solving "Simple" Rational Equations with Extraneous Solutions
- Rational Inequalities
- Polynomial Long Division
- The Quotient Remainder form of a Rational Expression
- The Remainder Theorem

UNIT #11 – TRIGONOMETRIC FUNCTIONS (10 LESSONS)

- Review Equations of Circles and Unit Circle
- Basic Right Triangle Review
- Defining Sine, Cosine, and Tangent Based on the Unit Circle
- Radian Measure
- Using the Pythagorean Identity
- Modeling with Trigonometry Functions (Midline, Amplitude, Frequency and Period – no phase shift)
- Calculation of sine, cosine, and tangent values from the Pythagorean Identity and quadrant

(32 to 34 Lessons)

UNIT #12 – PROBABILITY (7 LESSONS)

- Sample Spaces, Outcomes, and Events
- Events within a Sample Space (Sets, Unions, Intersections, and Complements)
- The Fundamental Conditional Probability Formula: $P(\text{B} \mid \text{A}) = \dfrac{P(\text{B and A})}{P(\text{A})}$
- Two-Way Frequency Charts and Conditional Probability
- Independent Events and the Product Test for Independence
- The Addition Rule of Probability: $P(A \text{ or } B) = P(A) + P(B) - P(A \text{ and } B)$
- Binomial Probability

UNIT #13 – STATISTICS (10 LESSONS)

- Surveys, Experiments, and Observational Studies
- Randomizing and Bias
- Basic Population Parameters (mean, standard deviation, quartiles, interquartile range)
- The Normal Distribution (z-score work with tables and calculators)
- Using Samples to Estimate Population Parameters (mean and proportion)
- Making Decisions about Populations Based on Samples
- Using Simulation to Determine Significance of Results and Establish Confidence Intervals
- Using 2 Standard Deviations to Establish Theoretical 95% Confidence Interval
- Bivariate Data and Regression

APPROXIMATE LESSON COUNT = 105