# Algebra 2 Curriculum Map

## ALGEBRA 2 UNITS

### Overview: Suggested Pacing

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<th>Unit</th>
<th>Topic</th>
<th>Suggested Pacing</th>
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<td>Basic Equations</td>
<td>12 Days</td>
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<td>2</td>
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<td>3</td>
<td>Linear Systems</td>
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<td>Roots &amp; Radicals</td>
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<td>8</td>
<td>Exponential &amp; Logarithmic Functions</td>
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<td>11</td>
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<td>12</td>
<td>Using Trigonometry</td>
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<td>13</td>
<td>Sequences &amp; Series</td>
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<td>14</td>
<td>Probability &amp; Statistics</td>
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<td><strong>Total:</strong></td>
<td><strong>164 Days</strong></td>
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### Unit Breakdowns with Suggested Pacing

#### Unit 1 Basic Equations (12 Days)

1.1 Introduction to Complex Numbers  
1.2 Algebraic Expressions (1.5 days)  
1.3 Linear Equations (1.5 days)  
1.4 Linear Inequalities  
1.5 Absolute Value Equations (2 days)  
1.6 Compound Inequalities (1.5 days)  
1.7 Absolute Value Inequalities (1.5 days)  
   Review  
   Test

#### Unit 2 Linear Functions (12 Days)

2.1 Relations & Functions  
2.2 Relations and Functions (1.5 days)  
2.3 Linear Functions (1.5 days)  
2.4 Writing Equations of Lines (1.5 days)  
2.5 Linear Models (1.5 days)  
2.6 Absolute Value Functions (1.5 days)  
2.7 Graphing Inequalities  
2.8 Piecewise Functions  
   Review  
   Test

#### Unit 3 Linear Systems (12 Days)

3.1 Solving Systems by Graphing  
3.2 Solving Systems Algebraically (3 Days)  
3.3 Systems of Inequalities (1.5 days)  
3.4 Linear Programming (1.5 days)  
3.5 Linear Systems with Three Variables (2 Days)  
   Review  
   Test

#### Unit 4 Matrices (12 Days)

4.1 Data Organization with Matrices  
4.2 Matrix Addition  
4.3 Matrix Multiplication (1.5 Days)  
4.4 Transformations with Matrices (1.5 Days)  
4.5 Determinants (1.5 Days)  
4.6 Inverses of Matrices (1.5 Days)  
   Optional Activity: Matrix Coding Activity  
4.7 Solving Systems with Matrices  
   Review  
   Test

#### Unit 5 Quadratics (12 Days)

5.1 Graphing Quadratic Functions (1.5 days)  
5.2 Solving Quadratic Equations by Factoring (1.5 days)  
5.3 Solving Quadratic Equations using Roots  
5.4 Complex Numbers  
   Optional Activity: Complex Numbers & Mandelbrot Set  
5.5 Completing the Square  
5.5 The Quadratic Formula  
5.6 Quadratic Inequalities  
5.7 Quadratic Models  
   Review  
   Test
Unit 6 Polynomial Functions (12 Days)
6.1 Identifying Functions
6.2 Dividing Polynomials
6.3 Factoring Polynomials (1.5 days)
6.4 Solving Polynomial Equations (1.5 days)
   Optional Activity: Polynomial Function End Behavior
6.5 Interpreting Polynomial Functions
6.6 Graphing Polynomial Functions (2 days)
6.7 Modeling Polynomial Functions
   Review
   Test

Unit 7 Roots & Radicals (12 Days)
7.1 Forms of Radicals (1.5 days)
7.2 Properties of Rational Exponents (1.5 days)
7.3 Radical Operations (1.5 days)
7.4 Radical Equations (1.5 days)
7.5 Function Operations
   Optional Activity: Inverse Functions Activity
7.6 Inverse Functions
7.7 Radical Functions
   Review
   Test

Unit 8 Exponential & Logarithmic Functions (12 Days)
8.1 Exponential Functions (1.5 days)
8.2 Exponential Models (1.5 days)
8.3 Common Logarithms
8.4 Properties of Logarithms
8.5 Natural Logarithms
8.6 Exponential & Logarithmic Equations (2 days)
   Optional: Forensic Science Activity
8.7 Exponential & Logarithmic Functions
   Review
   Test

Unit 9 Rational Functions (11 Days)
9.1 Simplifying Complex Fractions (2 days)
9.2 Rational Equations (2 days)
9.3 Inverse Variations
9.4 Graphing Inverse Variations
   Optional: Discontinuous Functions Activity
9.5 Rational Functions
   Review
   Test

Unit 10 Conic Sections/Quadratic Relations (11 Days)
10.1 Parabolas (2 days)
10.2 Circles
10.3 Ellipses (2 days)
10.4 Hyperbolas (2 days)
   Optional: Discontinuous Functions Activity
10.5 Classifying Conics
   Review
   Test

Unit 11 Trigonometry (12 Days)
11.1 Trig Ratios
11.2 Solving Right Triangles
11.3 Trig in a Cartesian Plane (2 Days)
11.4 Sine & Cosine Functions (2 days)
   Optional Activity: Cosecant and Secant Graphing
11.5 Tangent & Cotangent Functions
11.6 Translating Trig Functions (2 days)
   Review
   Test

Unit 12 Using Trigonometry (12 Days)
12.1 Area & the Law of Sines (2 days)
   Optional Activity: Law of Sines Ambiguous Case Activity
12.2 The Law of Cosines
12.3 Basic Trig Identities
12.4 Simplifying Trig Expressions (2 days)
12.5 Basic Trig Equations
12.6 Trig Equations with Different Periods (2 days)
   Review
   Test

Unit 13 Sequences & Series (11 Days)
13.1 Mathematical Patterns
13.2 Arithmetic Sequences
13.3 Arithmetic Series & Sigma Notation (2 Days)
13.4 Geometric Sequences
13.5 Geometric Series & Sigma Notation (2 Days)
13.6 Mathematical Induction
13.7 Area Under a Curve
   Review
   Test

Unit 14 Probability & Statistics (11 Days)
14.1 Counting Principles & Permutations
14.2 Combinations & Binomial Theorem (1.5 Days)
14.3 Basic Probability (1.5 Days)
14.4 Probability of Compound Events
14.5 Standard Deviation
14.6 Binomial Distributions (2 days)
14.7 Normal Distributions
   Review
   Test
# Algebra 2 Curriculum Map

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<th>Core Skills</th>
<th>Key Vocabulary</th>
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<td><strong>Unit 1: Basic Equations</strong></td>
<td>12 Days</td>
<td>HSA-REI.B.3; HSA-REI.A.1; HSA-CED.A.4; HSA-CED.A.1; HSA-APR.A.1; HSA-SSE.B.3; HSN-RN.B.3; 8.NS.A.2; 8.NS.A.1</td>
<td>Simplifying Exponents; Literal Equations; Solve and Graph Linear; Solve and Graph Linear Inequalities; Find the midpoint; Solve and Write Absolute Value Equations and Inequalities; Solve and Graph Compound Inequalities</td>
</tr>
<tr>
<td><strong>Unit 2: Linear Functions</strong></td>
<td>12 Days</td>
<td>HSS-ID.B.6; HSF-LE.A.2; HSF-IF.C.7D; HSF-IF.C.7B; HSF-IF.A.2; HSA-REI.D.12; HSA-REI.D.10; HSA-CED.A.2;</td>
<td>Graph Relations; Identify Functions; Find slope; Graph linear functions; Write equation of lines (including parallel &amp; perpendicular); Model real-world data; Make predictions from linear data; Translate absolute value functions; Graph linear and absolute value inequalities; Graph and write piecewise functions</td>
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<tr>
<td><strong>Unit 3: Linear Systems</strong></td>
<td>12 Days</td>
<td>HSA-REI.D.12; HSA-REI.D.11; HSA-CED.A.2; HSA-REI.C.6; HSA-REI.C.7</td>
<td>Analyze solutions of linear systems; Solve linear systems by graphing, substitution &amp; elimination; Algebraically solve consistent, inconsistent &amp; dependent systems; Solve real-world problems with linear systems; Solve &amp; write systems of linear inequalities; Plot points in three dimensions; Determine octant of points in space; Graph plane of a function; solve linear systems with three variables</td>
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<td><strong>Unit 4: Matrices</strong></td>
<td>12 Days</td>
<td>HSA-REI.C.9; HSN-VM.C.12; HSN-VM.C.11; HSN-VM.C.10; HSN-VM.C.9; HSN-VM.C.8; HSN-VM.C.7; HSN-VM.C.6</td>
<td>Identify matrices and elements; Organize data with matrices; Add, subtract, multiply matrices; Scalar multiplication; Verify and find inverse matrices; Translation, dilation, reflection, rotation matrices; Find determinants; Solve matrix equations; Solve systems using Cramer’s rule; Use matrices to find area; Solve matrix equations using minors; Solve augmented matrices</td>
</tr>
<tr>
<td><strong>Unit 5: Quadratics</strong></td>
<td>12 Days</td>
<td>HSF-IF.C.9; HSF-IF.C.8a; HSF-IF.C.7c; HSF-IF.C.7a; HSF-IF.B.4; HSA-REI.D.12; HSA-REI.B.4b; HSA-REI.B.4a; HSA-REI.B.4; HSN-CN.B4; HSN-CN.A.2; HSN-CN.A.1</td>
<td>Identify linear, quadratic &amp; polynomial equations; Determine quadratic function max/min, vertex coordinates, axis of symmetry &amp; relative width of a parabola; Graph quadratic functions using standard, vertex, intercept, &amp; factored form; Solve quadratic equations using roots; Rationalize the denominator; +x / &amp; graph complex numbers; Find the absolute value of complex numbers; Complete the square; Use quadratic formula; Evaluate quadratics using discriminant; Write quadratic equations &amp; functions; Graph &amp; solve quadratic inequalities; Solve quadratic inequalities in two variables</td>
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<tr>
<td><strong>Unit 6:</strong> Polynomial Functions</td>
<td>12 Days</td>
<td>HSA-SSE.B.3; HSA-APR.A.1; HSA-APR.B.2; HSA-APR.B.3; HSA-APR.C5; HSA-APR.D.6; HSA-APR.D.7; HSA-REI.A.1; HSF-IF.C.7c; HSF-IF.C.8; HSS-ID.B.6a</td>
<td>Classify polynomials by degree &amp; # of terms; Place polynomials into standard form; Divide a polynomial by a monomial, binomial, using synthetic division; Factor sum &amp; difference of two cubes; Completely factor and solve polynomial equations; Write polynomial equations from solutions or zeros; Determine function end behavior; Determine the relative extrema; Graph and model polynomial functions</td>
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<tr>
<td><strong>Unit 7:</strong> Roots and Radicals</td>
<td>12 Days</td>
<td>HSF-BF.B.4c; HSF-BF.B.4b; HSF-BF.A.1c; HSA-REI.A.2; HSN-RN.A.2; HSN-RN.A.1</td>
<td>Simplifying radicals; Change between radical form and exponent form; Add, subtract, multiply &amp; divide radicals and functions; Herron's area formula; Compound interest formula; Solve and graph radical &amp; exponential equations; Extraneous solutions to radical equations; Composition of functions; Find and graph inverse of a function; Verify inverse functions using composition</td>
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<tr>
<td><strong>Unit 8:</strong> Exponential and Logarithmic Functions</td>
<td>12 Days</td>
<td>HSF-LE.A.1c; HSF-BF.B.5; HSF-IF.C.8; HSF-IF.C.7e; HSA-CED.A.2</td>
<td>Graph, translate &amp; analyze exponential functions; Solve exponential, log, and growth &amp; decay problems; Convert between exponent &amp; log form; Evaluate common &amp; natural logs; Expand &amp; condense expressions using log properties; Change log bases; Solve continuous compounding problems; Graph log functions; Solve &amp; graph logistic growth problems</td>
</tr>
<tr>
<td><strong>Unit 9:</strong> Rational Functions</td>
<td>11 Days</td>
<td>HSF-BF.A.1; HSF-IF.C.7d; HSA-REI.D.11; HSA-REI.A.2; HSA-CED.A.1; HSA-APR.D.7; HSA-SSE.B.3a; HSA-SSE.B.3</td>
<td>Simplify complex fractions; Find harmonic mean; Determine extraneous values; Solve rational equations; Solve work problems; Differentiate between direct &amp; inverse variation; Solve inverse variation problems; Solve combined variation problems; Translate and graph inverse variations; Identify properties of rational functions; Graph rational functions</td>
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<td><strong>Unit 10:</strong> Conic Sections/Quadratic Relations</td>
<td>11 Days</td>
<td>HSG-GPE.A.3; HSG-GPE.A.2; HSG-GPE.A.1</td>
<td>Analyze and graph parabolas, circles, ellipses &amp; hyperbolas; Find the eccentricity; Solve systems of conic sections; Use the determinant to classify conics; Write the equation of parabolas, circles, ellipses &amp; hyperbolas</td>
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<td>Unit 11: Periodic Functions &amp; Trigonometry</td>
<td>12 Days</td>
<td>HSF-IF.C.7e; HSF-TF.A.1; SHF-TF.A.2; HSF-TF.A.3; HSG-SRT.C.6; HSG-SRT.C.7; HSG-SRT.C.8</td>
<td>Find sin, cos, tan, csc, sec &amp; cot ratios; Find angle given trig ratio; Solve right triangles; Find exact value of 45 &amp; 30 degree angles and multiples; Find trig ratios in a cartesian plane; Convert between radians &amp; degrees; Find length of an arc; Find area of circle’s sector; Find angle measures and sin, cos &amp; tan using unit circle; Determine the amplitude, period, horizontal and vertical shift of a trig function; Graph the sine, cosine and tangent functions</td>
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<tr>
<td>Unit 12: Using Trigonometric Identities</td>
<td>12 Days</td>
<td>HSG-SRT.C.7; HSG-SRT.D.9; HSG-SRT.D.10; HSG-SRT.D.11; HSF-TF.C.9; HSF-TF.B.6; HSF-TF.A.2</td>
<td>Find area of oblique triangles; Use law of sines to solve oblique triangles; Solve the ambiguous case; Verify trig identities; Simplify trig expressions; Solve trig equations for a given domain if b = 1 or b ≠1; Solve trig equations for all solutions if b = 1 or b ≠1</td>
</tr>
<tr>
<td>Unit 13: Sequences &amp; Series</td>
<td>11 Days</td>
<td>HSA-SSE.B.4; HSF-IF.A.3; HSF-BF.A.2</td>
<td>Find a sequence’s next and nth term; Write recursive &amp; explicit formulas for arithmetic or geometric sequences &amp; identify its graph; Distinguish between a geom. &amp; arith. sequence; Find the arithm. &amp; geom. mean; Find partial sum of a sequence; Evaluate sigma notation; Infinite sum of convergent sequences; Estimate area under a curve</td>
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<td>Unit 14: Probability &amp; Statistics</td>
<td>11 Days</td>
<td>HSS-ID.A.4; HSS-CP.A.2; HSS-CRP.B.8; HSS-CP.B.9</td>
<td>Determine the number of ways an event can occur; Solve permutation and combination probablenes; Find terms of binomial expansion; Find theoretical, experimental, geometric and binomial probabilities; Find the probability of compound, independent and dependent events; Find probability of an event’s compliment; Find mean, median, mode, variance, standard deviation, and z-score for a set of values; Solve normal distribution problems</td>
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