College Algebra Course Lesson Plan: 36 weeks

Welcome to Thinkwell's Homeschool College Algebra! We're thrilled that you've decided to make us part of your homeschool curriculum. This lesson plan is meant to be a guide for you and your homeschool student. Each day, you'll tackle a different topic and all the materials associated with that topic, such as video lectures, exercises, and interactivities. If you follow our day-by-day schedule, you'll complete the full curriculum for the course in 36 weeks. Feel free to modify and amend the plan as it best works for you. And, as always, please <u>let us know</u> what we can do to help get you up and running with Thinkwell's College Algebra!

Week 1	
Chapter 1: Prerequisites	
Assignments	Notes
<u>Week 1, Day 1</u>	
1.1.1 An Introduction to Algebra	
1.1.2 The Top Ten List of Mistakes	
Week 1, Day 2	
1.2.1 Concepts of Inequality	
1.2.2 Inequalities and Interval Notation	
Week 1, Day 3	
1.3.1 Properties of Absolute Value	
1.3.2 Evaluating Absolute Value Expressions	
Week 1, Day 4	
1.4.1 An Introduction to Exponents	
Week 1, Day 5	
1.4.2 Evaluating Exponential Expressions	
1.4.3 Applying the Rules of Exponents	

Week 2	
Chapter 1: Prerequisites	
Assignments	Notes
<u>Week 2, Day 1</u>	
1.4.4 Evaluating Expressions with Negative Exponents	
1.5.1 Converting between Decimal and Scientific Notation	
Week 2, Day 2	
1.5.2 Converting Rational Exponents and Radicals	
1.6.1 Simplifying Radical Expressions	
Week 2, Day 3	
1.6.2 Simplifying Radical Expressions with Variables	
1.6.3 Rationalizing Denominators	
Week 2, Day 4	
1.7.1 Determining Components and Degree	

1.7.2 Adding, Subtracting, and Multiplying Polynomials	
Week 2, Day 5	
1.7.3 Multiplying Big Products	

Week 3	
Chapter 1: Prerequisites	
Assignments	Notes
<u>Week 3, Day 1</u>	
1.7.4 Using Special Products	
1.8.1 Factoring Using the Greatest Common Factor	
Week 3, Day 2	
1.8.2 Factoring by Grouping	
1.8.3 Factoring Trinomials Completely	
Week 3, Day 3	
1.9.1 Factoring Perfect Square Trinomials	
1.9.2 Factoring the Difference of Two Squares	
Week 3, Day 4	
1.9.3 Factoring Sums and Differences of Cubes	
1.9.4 Factoring by Any Method	
Week 3, Day 5	
1.10.1 Rational Expressions and Domain	
1.10.2 Working with Fractions	

Week 4	
Chapter 1: Prerequisites	
Assignments	Notes
Week 4, Day 1	
1.10.3 Writing Rational Expressions in Lowest Terms	
1.11.1 Multiplying and Dividing Rational Expressions	
Week 4, Day 2	
1.11.2 Adding and Subtracting Rational Expressions	
1.11.3 Rewriting Complex Fractions	
Week 4, Day 3	
1.12.1 Introducing and Writing Complex Numbers	
1.12.2 Rewriting Powers of i	
Week 4, Day 4	
1.12.3 Adding and Subtracting Complex Numbers	
Week 4, Day 5	
1.12.4 Multiplying Complex Numbers	
1.12.5 Dividing Complex Numbers	

Week 5	
Chapter 1 Test	
Chapter 2: Equations and Inequalities	
Assignments	Notes
<u>Week 5, Day 1</u>	
Chapter 1 Practice Test	
Week 5, Day 2	Chapter 1 Test
Chapter 1 Test	Score:
Week 5, Day 3	
2.1.1 An Introduction to Solving Equations	
2.1.2 Solving a Linear Equation	
Week 5, Day 4	
2.1.3 Solving a Linear Equation with Rationals	
2.1.4 Solving a Linear Equation That Has Restrictions	
<u>Week 5, Day 5</u>	
2.2.1 An Introduction to Solving Word Problems	
2.2.2 Solving for Perimeter	

Week 6	
Chapter 2: Equations and Inequalities	
Assignments	Notes
Week 6, Day 1	
2.2.3 Solving a Linear Geometry Problem	
2.2.4 Solving for Consecutive Numbers	
Week 6, Day 2	
2.2.5 Solving to Find the Average	
2.3.1 Solving for Constant Velocity	
Week 6, Day 3	
2.3.2 Solving a Problem about Work	
2.3.3 Solving a Mixture Problem	
Week 6, Day 4	
2.3.4 Solving an Investment Problem	
2.3.5 Solving Business Problems	
Week 6, Day 5	
2.5.1 Proving the Quadratic Formula	
2.5.2 Using the Quadratic Formula	

Week 7

Chapter 2: Equations and Inequalities	
Assignments	Notes
Week 7, Day 1	
2.5.3 Predicting the Type of Solutions Using the Discriminant	
2.6.1 Solving for a Squared Variable	
Week 7, Day 2	
2.6.2 Finding Real Number Restrictions	
2.6.3 Solving Fancy Quadratics	
Week 7, Day 3	
2.7.1 An Introduction to Word Problems with Quadratics	
2.7.2 Solving a Quadratic Geometry Problem	
Week 7, Day 4	
2.7.3 Solving with the Pythagorean Theorem	
2.8.1 Solving a Motion Problem	
Week 7, Day 5	
2.8.2 Solving a Projectile Problem	
2.8.3 Solving Other Problems	

Week 8	
Chapter 2: Equations and Inequalities	
Assignments	Notes
<u>Week 8, Day 1</u>	
2.9.1 Determining Extraneous Roots	
2.9.2 Solving an Equation Containing a Radical	
Week 8, Day 2	
2.9.3 Solving an Equation with Two Radicals	
2.9.4 Solving an Equation with Rational Exponents	
Week 8, Day 3	
2.10.1 An Introduction to Variation	
Week 8, Day 4	
2.10.2 Direct Proportion	
2.10.3 Inverse Proportion	
Week 8, Day 5	
2.11.1 An Introduction to Solving Inequalities	
2.11.2 Solving Compound Inequalities	

Week 9	
Chapter 2: Equations and Inequalities	
Assignments	Notes
Week 9, Day 1	
2.11.3 More on Compound Inequalities	
2.11.4 Solving Word Problems Involving Inequalities	

Week 9, Day 2	
2.12.1 Solving Quadratic Inequalities	
2.12.2 Solving Quadratic Inequalities: Another Example	
Week 9, Day 3	
2.13.1 Solving Rational Inequalities	
2.13.2 Solving Rational Inequalities: Another Example	
Week 9, Day 4	
2.13.3 Determining the Domains of Expressions with Radicals	
2.14.1 Matching Number Lines with Absolute Values	
Week 9, Day 5	
2.14.2 Solving Absolute Value Equations	

Week 10	
Chapter 2: Equations and Inequalities	
Chapter 2 Test	
Assignments	Notes
Week 10, Day 1	
2.14.3 Solving Equations with Two Absolute Value Expressions	
Week 10, Day 2	
2.14.4 Solving Absolute Value Inequalities	
<u>Week 10, Day 3</u>	
2.14.5 Solving Absolute Value Inequalities: More Examples	
Week 10, Day 4	
Chapter 2 Practice Test	
<u>Week 10, Day 5</u>	Chapter 2 Test
Chapter 2 Test	Score:

Week 11	
Chapter 3: Relations and Functions	
Assignments	Notes
<u>Week 11, Day 1</u>	
3.1.1 Using the Cartesian System	
3.1.2 Thinking Visually	
<u>Week 11, Day 2</u>	
3.2.1 Finding the Distance between Two Points	
3.2.2 Finding the Second Endpoint of a Segment	
<u>Week 11, Day 3</u>	
3.3.1 Collinearity and Distance	
3.3.2 Triangles	

Week 11, Day 4	
3.4.1 Finding the Center-Radius Form of the Equation of a Circle	
3.4.2 Finding the Center and Radius of a Circle	
Week 11, Day 5	
3.4.3 Decoding the Circle Formula	
3.4.4 Solving Word Problems Involving Circles	

Week 12	
Chapter 3: Relations and Functions	
Assignments	Notes
Week 12, Day 1	
3.5.1 Graphing Equations by Locating Points	
□ 3.5.2 Finding the <i>x</i> - and <i>y</i> -Intercepts of an Equation	
Week 12, Day 2	
3.6.1 Functions and the Vertical Line Test	
3.6.2 Identifying Functions	
Week 12, Day 3	
3.6.3 Function Notation and Finding Function Values	
3.7.1 Determining Intervals Over Which a Function Is Increasing	
Week 12, Day 4	
3.7.2 Evaluating Piecewise-Defined Functions for Given Values	
3.7.3 Solving Word Problems Involving Functions	
Week 12, Day 5	
3.8.1 Finding the Domain and Range of a Function	
3.8.2 Domain and Range: One Explicit Example	

Week 13	
Chapter 3: Relations and Functions	
Assignments	Notes
<u>Week 13, Day 1</u>	
3.8.3 Satisfying the Domain of a Function	
3.9.1 An Introduction to Slope	
<u>Week 13, Day 2</u>	
3.9.2 Finding the Slope of a Line Given Two Points	
3.9.3 Interpreting Slope from a Graph	
<u>Week 13, Day 3</u>	
3.9.4 Graphing a Line Using Point and Slope	
3.10.1 Writing an Equation in Slope-Intercept Form	
<u>Week 13, Day 4</u>	
3.10.2 Writing an Equation Given Two Points	
3.10.3 Writing an Equation in Point-Slope Form	
<u>Week 13, Day 5</u>	
3.10.4 Matching a Slope-Intercept Equation with Its Graph	

3.10.5 Slope with Parallel and Perpendicular Lines

Week 14	
Chapter 3: Relations and Functions	
Assignments	Notes
<u>Week 14, Day 1</u>	
3.11.1 Constructing Linear Function Models of a Set of Data	
3.11.2 Linear Cost and Revenue Functions	
Week 14, Day 2	
3.12.1 Graphing Some Important Functions	
3.12.2 Graphing Piecewise-Defined Functions	
Week 14, Day 3	
3.12.3 Matching Equations with Their Graphs	
3.13.1 The Greatest Integer Function	
Week 14, Day 4	
3.13.2 Graphing the Greatest Integer Function	
3.14.1 Using Operations on Functions	
Week 14, Day 5	
3.14.2 Composite Functions	
3.14.3 Components of Composite Functions	

Week 15	
Chapter 3: Relations and Functions	
Assignments	Notes
<u>Week 15, Day 1</u>	
3.14.4 Finding Functions That Form a Given Composite	
3.14.5 Finding the Difference Quotient of a Function	
Week 15, Day 2	
3.15.1 Deconstructing the Graph of a Quadratic Function	
3.15.2 Nice-Looking Parabolas	
Week 15, Day 3	
3.15.3 Using Discriminants to Graph Parabolas	
3.15.4 Maximum Height in the Real World	
<u>Week 15, Day 4</u>	
3.16.1 Finding the Vertex by Completing the Square	
3.16.2 Using the Vertex to Write the Quadratic Equation	
Week 15, Day 5	
3.16.3 Finding the Maximum or Minimum of a Quadratic	
3.16.4 Graphing Parabolas	

Week 16	
Chapter 3: Relations and Functions	
Assignments	Notes

Week 16, Day 1	
3.17.1 Shifting Curves along Axes	
3.17.2 Shifting or Translating Curves along Axes	
Week 16, Day 2	
3.17.3 Stretching a Graph	
3.17.4 Graphing Quadratics Using Patterns	
<u>Week 16, Day 3</u>	
3.18.1 Determining Symmetry	
□ 3.18.2 Reflections	
3.18.3 Reflecting Specific Functions	
Week 16, Day 4	
Chapter 3 Practice Test	
Week 16, Day 5	Chapter 3 Test
□ Chapter 3 Test	Score:

Week 17	
Chapter 4: Polynomial and Rational Functions	
Assignments	Notes
<u>Week 17, Day 1</u>	
4.1.1 Using Long Division with Polynomials	
4.1.2 Long Division: Another Example	
<u>Week 17, Day 2</u>	
4.2.1 Using Synthetic Division with Polynomials	
4.2.2 More Synthetic Division	
4.3.1 The Remainder Theorem	
<u>Week 17, Day 3</u>	
4.3.2 More on the Remainder Theorem	
4.4.1 The Factor Theorem and Its Uses	
Week 17, Day 4	
4.4.2 Factoring a Polynomial Given a Zero	
4.5.1 Presenting the Rational Zero Theorem	
<u>Week 17, Day 5</u>	
4.5.2 Considering Possible Solutions	
4.6.1 Finding Polynomials Given Zeros, Degree, and One Point	

Week 18	
Chapter 4: Polynomial and Rational Functions	
Assignments	Notes
Week 18, Day 1	
4.6.2 Finding all Zeros and Multiplicities of a Polynomial	
4.6.3 Finding the Real Zeros for a Polynomial	
Week 18, Day 2	
4.6.4 Using Descartes' Rule of Signs	

4.6.5 Finding the Zeros of a Polynomial from Start to Finish	
Week 18, Day 3	
4.7.1 Matching Graphs to Polynomial Functions	
4.7.2 Sketching the Graphs of Basic Polynomial Functions	
Week 18, Day 4	
4.8.1 Understanding Rational Functions	
4.8.2 Basic Rational Functions	
Week 18, Day 5	
4.9.1 Vertical Asymptotes	
4.9.2 Horizontal Asymptotes	

Week 19	
Chapter 4: Polynomial and Rational Functions	
Chapter 4 Test	
Midterm Exam	
Assignments	Notes
<u>Week 19, Day 1</u>	
4.9.3 Graphing Rational Functions	
4.9.4 Graphing Rational Functions: More Examples	
<u>Week 19, Day 2</u>	
Chapter 4 Practice Test	
<u>Week 19, Day 3</u>	
Chapter 4 Test	
<u>Week 19, Day 4</u>	
Practice Midterm Exam	
<u>Week 19, Day 5</u>	Midterm Exam
Midterm Exam	Score:

Week 20	
Chapter 5: Exponential and Logarithmic Functions	
Assignments	Notes
<u>Week 20, Day 1</u>	
5.1.1 Understanding Inverse Functions	
Week 20, Day 2	
5.1.2 The Horizontal Line Test	
5.1.3 Are Two Functions Inverses of Each Other?	
Week 20, Day 3	
5.1.4 Graphing the Inverse	
Week 20, Day 4	
5.2.1 Finding the Inverse of a Function	
Week 20, Day 5	
5.2.2 Finding the Inverse of a Function with Higher Powers	

Week 21	
Chapter 5: Exponential and Logarithmic Functions	
Assignments	Notes
<u>Week 21, Day 1</u>	
5.3.1 An Introduction to Exponential Functions	
5.3.2 Graphing Exponential Functions: Useful Patterns	
Week 21, Day 2	
5.3.3 Graphing Exponential Functions: More Examples	
Week 21, Day 3	
5.4.1 Using Properties of Exponents to Solve Exponential	
Equations	
<u>Week 21, Day 4</u>	
5.4.2 Finding Present Value and Future Value	
Week 21, Day 5	
5.4.3 Finding an Interest Rate to Match Given Goals	

Week 22	
Chapter 5: Exponential and Logarithmic Functions	
Assignments	Notes
<u>Week 22, Day 1</u>	
□ 5.5.1 <i>e</i>	
<u>Week 22, Day 2</u>	
5.5.2 Applying Exponential Functions	
Week 22, Day 3	
5.6.1 An Introduction to Logarithmic Functions	
5.6.2 Converting between Exponential and Logarithmic Functions	
Week 22, Day 4	
5.7.1 Finding the Value of a Logarithmic Function	
Week 22, Day 5	
5.7.2 Solving for <i>x</i> in Logarithmic Equations	

Week 23	
Chapter 5: Exponential and Logarithmic Functions	
Assignments	Notes
Week 23, Day 1	
5.7.3 Graphing Logarithmic Functions	
5.7.4 Matching Logarithmic Functions with Their Graphs	
Week 23, Day 2	
5.8.1 Properties of Logarithms	
Week 23, Day 3	

5.8.2 Expanding a Logarithmic Expression Using Properties	
<u>Week 23, Day 4</u>	
5.8.3 Combining Logarithmic Expressions	
<u>Week 23, Day 5</u>	
5.9.1 Evaluating Logarithmic Functions Using a Calculator	
5.9.2 Using the Change of Base Formula	

Week 24	
Chapter 5: Exponential and Logarithmic Functions	
Assignments	Notes
Week 24, Day 1	
5.10.1 The Richter Scale	
5.10.2 The Distance Modulus Formula	
Week 24, Day 2	
5.11.1 Solving Exponential Equations	
Week 24, Day 3	
5.11.2 Solving Logarithmic Equations	
Week 24, Day 4	
5.11.3 Solving Equations with Logarithmic Exponents	
Week 24, Day 5	
5.12.1 Compound Interest	
5.12.2 Predicting Change	

Week 25	
Chapter 5: Exponential and Logarithmic Functions	
Chapter 5 Test	
Assignments	Notes
<u>Week 25, Day 1</u>	
5.13.1 An Introduction to Exponential Growth and Decay	
5.13.2 Half-Life	
Week 25, Day 2	
5.13.3 Newton's Law of Cooling	
Week 25, Day 3	
5.13.4 Continuously Compounded Interest	
Week 25, Day 4	
Chapter 5 Practice Test	
Week 25, Day 5	Chapter 5 Test
Chapter 5 Test	Score:

Week 26

Chapter 6: Systems of Equations

Assignments	Notes
<u>Week 26, Day 1</u>	
6.1.1 An Introduction to Linear Systems	
6.1.2 Solving Systems with Substitution	
<u>Week 26, Day 2</u>	
6.1.3 Solving Systems by Elimination	
Week 26, Day 3	
6.2.1 An Introduction to Linear Systems in Three Variables	
6.2.2 Solving Linear Systems in Three Variables	
<u>Week 26, Day 4</u>	
6.2.3 Solving Inconsistent Systems	
<u>Week 26, Day 5</u>	
6.2.4 Solving Dependent Systems	
6.2.5 Solving Systems with Two Equations	

Week 27	
Chapter 6: Systems of Equations	
Assignments	Notes
<u>Week 27, Day 1</u>	
□ 6.3.1 Investments	
Week 27, Day 2	
6.3.2 Solving with Partial Fractions	
Week 27, Day 3	
6.4.1 Solving Nonlinear Systems Using Elimination	
6.4.2 Solving Nonlinear Systems with Substitution	
Week 27, Day 4	
6.5.1 An Introduction to Matrices	
Week 27, Day 5	
6.5.2 The Arithmetic of Matrices	

Week 28	
Chapter 6: Systems of Equations	
Assignments	Notes
<u>Week 28, Day 1</u>	
6.5.3 Multiplying Matrices by a Scalar	
Week 28, Day 2	
6.5.4 Multiplying Matrices	
Week 28, Day 3	
6.6.1 Using the Gauss-Jordan Method	
Week 28, Day 4	
6.6.2 Using Gauss-Jordan: Another Example	
Week 28, Day 5	
6.7.1 Evaluating 2x2 Determinants	

□ 6.7.2 Evaluating <i>n</i> x <i>n</i> Determinants	

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Week 29	
Chapter 6: Systems of Equations	
Assignments	Notes
<u>Week 29, Day 1</u>	
6.7.3 Applying Determinants	
<u>Week 29, Day 2</u>	
6.7.4 Finding a Determinant using Expanding by Cofactors	
<u>Week 29, Day 3</u>	
6.8.1 Using Cramer's Rule	
6.8.2 Using Cramer's Rule in a 3x3 Matrix	
Week 29, Day 4	
6.9.1 An Introduction to Inverses	
Week 29, Day 5	
6.9.2 Inverses: 2x2 Matrices	
Week 30	
Chapter 6: Systems of Equations	
Assignments	Notes
<u>Week 30, Day 1</u>	
6.9.3 Another Look at 2x2 Inverses	
Week 30, Day 2	
6.9.4 Inverses: 3x3 Matrices	
Week 30, Day 3	
6.9.5 Solving a System of Equations with Inverses	
Week 30, Day 4	
6.10.1 An Introduction to Graphing Linear Inequalities	
Week 30, Day 5	
6.10.2 Graphing Linear and Nonlinear Inequalities	

Week 31	
Chapter 6: Systems of Equations	
Chapter 6 Test	
Assignments	Notes
<u>Week 31, Day 1</u>	
6.10.3 Graphing the Solution Set of a System of Inequalities	
Week 31, Day 2	
6.11.1 Solving for Maxima-Minima	
Week 31, Day 3	
6.11.2 Applying Linear Programming	
Week 31, Day 4	
Chapter 6 Practice Test	
<u>Week 31, Day 5</u>	Chapter 6 Test

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Chapter 6 Test	Score:

Week 32	
Chapter 7: Conic Sections	
Assignments	Notes
<u>Week 32, Day 1</u>	
7.1.1 An Introduction to Conic Sections	
<u>Week 32, Day 2</u>	
7.1.2 An Introduction to Parabolas	
<u>Week 32, Day 3</u>	
7.1.3 Determining Information about a Parabola from Its	
Equation	
7.1.4 Writing an Equation for a Parabola	
<u>Week 32, Day 4</u>	
7.2.1 An Introduction to Ellipses	
<u>Week 32, Day 5</u>	
7.2.2 Finding the Equation for an Ellipse	
7.2.3 Applying Ellipses: Satellites	
Week 33	
Chapter 7: Conic Sections	
Chapter 7 Test	
Assignments	Notes
Week 33, Day 1	
7.3.1 An Introduction to Hyperbolas	
7.3.2 Finding the Equation for a Hyperbola	
Week 33, Day 2	
7.3.3 Applying Hyperbolas: Navigation	
Week 33, Day 3	
7.4.1 Identifying a Conic	
7.4.2 Name That Conic	
Week 33, Day 4	
Chapter 7 Practice Test	
Week 33, Day 5	Chapter 7 Test
Chapter 7 Test	Score:

Week 34	
Chapter 8: Further Topics in Algebra	
Assignments	Notes
Week 34, Day 1	
8.1.1 Using the Binomial Theorem	
8.1.2 Binomial Coefficients	
Week 34, Day 2	
8.1.3 Finding a Term of a Binomial Expansion	

Week 34, Day 3	
8.2.1 Understanding Sequence Problems	
8.2.2 Solving Problems Involving Arithmetic Sequences	
Week 34, Day 4	
8.2.3 Solving Problems Involving Geometric Sequences	
Week 34, Day 5	
8.3.1 Proving Formulas Using Mathematical Induction	
8.3.2 Examples of Induction	

Week 35	
Chapter 8: Further Topics in Algebra	
Chapter 8 Test	
Assignments	Notes
<u>Week 35, Day 1</u>	
8.4.1 Solving Problems Involving Permutations	
8.4.2 Solving Problems Involving Combinations	
Week 35, Day 2	
8.4.3 Independent Events	
Week 35, Day 3	
8.4.4 Inclusive and Exclusive Events	
Week 35, Day 4	
Chapter 8 Practice Test	
Week 35, Day 5	Chapter 8 Test
Chapter 8 Test	Score:

Week 36	
Chapter 9: Conclusion	
Final Exam	
Assignments	Notes
<u>Week 36, Day 1</u>	
9.1.1 Final Close	
Week 36, Day 2	
Study for Final Exam	
Week 36, Day 3	
Study for Final Exam	
Week 36, Day 4	
Practice Final Exam	
Week 36, Day 5	Final Exam
Final Exam	Score: