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| **Course Title:** Algebra 2 Honors | **Length of Course:** 30 cycles |
| **Grade Level(s):** 9-11 | **Periods Per Cycle:** 6 |
| **Units of Credit:** 1 | **Length of Period:** 43 minutes |
| **Classification:** Required | **Total Instructional Time:** 129 hours |

## Course Description

This course offers a similar approach as Algebra 2 but will require a more in-depth analysis, synthesis, and application of all algebraic concepts. Algebra 2 Honors stresses the structure of the real number system and complex numbers, along with helping students to do the following: Recognize techniques of algebra; acquire facility in applying deductive reasoning in algebra; and appreciate the need for precision of language.

## Instructional Strategies, Learning Practices, Activities, and Experiences

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| Anticipatory Sets | Flexible Groups | Projects |
| Assessments | Graphic Organizers | Teacher Demonstrations |
| Bell Ringers | Guided Practice | Technology Integration |
| Class Discussions | High-Level Questioning | Videos/DVD's |
| Closure | Homework | Wait Time |
| Critical Thinking | Posted Objectives | |

## Assessments

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| Teacher Made Assessments | Higher-Level Questioning | Homework |
| Self-Assessment | Classwork | |

## Materials/Resources

College Algebra: 10th Edition (Larson)     Internet Resources

**Adopted:** 9/17/03
**Revised:** 8/17/09; 5/19/14; 5/20/2019

| Preparing for Advanced Algebra |
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| The Standards of Mathematical Practices |
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| Make sense of problems and persevere in solving them<br>Construct viable arguments and critique the reasoning of others.<br>Use appropriate tools strategically.<br>Look for and make use of structure. | Reason abstractly and quantitatively.<br>Model with mathematics.<br>Attend to precision.<br>Look for and express regularity in repeated reasoning. |
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| CONTENT/KEY CONCEPTS | OBJECTIVES/STANDARDS |
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| **Preparing for Advanced Algebra**<br>• Review of Real Numbers and their Properties<br>• Exponents and Radicals<br>• Polynomials and Special Products<br>• Factor Polynomials<br>• The Rectangular Coordinate System and Graphs | **CC.2.1.HS.F.1** - Apply and extend the properties of exponents to solve problems with rational exponents.<br>**CC.2.2.HS.D.3** - Extend the knowledge of arithmetic operations and apply to polynomials.<br>**CC.2.2.HS.D.5** - Use polynomial identities to solve problems.<br>**CC.2.2.HS.D.10** - Represent, solve, and interpret equations/inequalities and systems of equations/inequalities algebraically and graphically. |

| **Equations, Inequalities, and Mathematical Modeling** | |
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| **CONTENT/KEY CONCEPTS** | **OBJECTIVES/STANDARDS** |
| **Equations, Inequalities, and Mathematical Modeling**<br>• Graphs of Equations<br>• Linear Equations in One Variable<br>• Model with Linear Equations<br>• Quadratic Equations and Applications<br>• Complex Numbers<br>• Other Types of Equations<br>• Linear Inequalities in One Variable<br>• Other Types of Inequalities | **CC.2.1.HS.F.6** - Extend the knowledge of arithmetic operations and apply to complex numbers.<br><br>**CC.2.2.HS.D.2** - Write expressions in equivalent forms to solve problems.<br>**CC.2.2.HS.D.5** - Use polynomial identities to solve problems.<br>**CC.2.2.HS.C.3** - Write functions or sequences that model relationships between two quantities.<br>**CC.2.2.HS.C.5** - Construct and compare linear, quadratic, and exponential models to solve problems.<br>**CC.2.2.HS.C.6** - Interpret functions in terms of the situations they model.<br>**CC.2.2.HS.D.8** - Apply inverse operations to solve equations or formulas for a given variable.<br>**CC.2.2.HS.D.7** - Create and graph equations or inequalities to describe numbers or relationships.<br>**CC.2.2.HS.D.10** - Represent, solve and interpret equations/inequalities and systems of equations/inequalities algebraically and graphically.<br><br>**CC.2.1.HS.F.7** - Apply concepts of complex numbers in polynomial identities and quadratic equations to solve problems. |

| Functions and Their Graphs | |
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| **CONTENT/KEY CONCEPTS** | **OBJECTIVES/STANDARDS** |
| **Functions and Their Graphs**<br>• Linear Equations in Two Variables<br>• Functions<br>• Analyze Graphs of Functions<br>• A Library of Parent Functions<br>• Transformations of Functions<br>• Combinations of Functions:  Composite Functions<br>• Inverse Functions | **CC.2.2.HS.D.4** - Understand the relationship between zeros and factors of polynomials to make generalizations about<br>functions and their graphs.<br>**CC.2.2.HS.C.2** - Graph and analyze functions, and use their properties to make connections between the different representations.<br>**CC.2.2.HS.C.3** - Write functions or sequences that model relationships between two quantities.<br>**CC.2.2.HS.C.4** - Interpret the effects transformations have on functions, and find the inverses of functions.<br>**CC.2.2.HS.D.10** - Represent, solve and interpret equations/inequalities and systems of equations/inequalities algebraically and graphically.<br>**CC.2.2.HS.C.5** - Construct and compare linear, quadratic, and exponential models to solve problems.<br>**CC.2.2.HS.C.6** - Interpret functions in terms of the situations they model.<br>**CC.2.2.HS.D.7** - Create and graph equations or inequalities to describe numbers or relationships.<br>**CC.2.2.HS.D.8** - Apply inverse operations to solve equations or formulas for a given variable.<br><br>**CC.2.4.HS.B.2** - Summarize, represent, and interpret data on two categorical and quantitative variables. |

| Polynomial Functions | |
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| **CONTENT/KEY CONCEPTS** | **OBJECTIVES/STANDARDS** |
| **Polynomial Functions**<br>• Quadratic Functions and Models<br>• Polynomial Functions of Higher Degree<br>• Polynomials and Synthetic Division | **CC.2.2.HS.D.3** - Extend the knowledge of arithmetic operations and apply to polynomials.<br>**CC.2.2.HS.D.4** - Understand the relationship between zeros and factors of polynomials to make generalizations about<br>functions and their graphs.<br>**CC.2.2.HS.D.5** - Use polynomial identities to solve problems.<br>**CC.2.2.HS.C.2** - Graph and analyze functions, and use their properties to make connections between the different representations.<br>**CC.2.2.HS.C.6** - Interpret functions in terms of the situations they model.<br>**CC.2.2.HS.D.10** - Represent, solve and interpret equations/inequalities and systems of equations/inequalities algebraically and graphically.<br><br>**CC.2.1.HS.F.7** - Apply concepts of complex numbers in polynomial identities and quadratic equations to solve problems. |

| **Rational Functions and Conics** | |
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| **CONTENT/KEY CONCEPTS** | **OBJECTIVES/STANDARDS** |
| **Rational Functions and Conics**<br>• Rational Expressions<br>• Rational Functions an Asymptotes<br>• Graphs of Rational Functions<br>• Conics<br>• Translations of Conics | **CC.2.2.HS.C.2** - Graph and analyze functions, and use their properties to make connections between the different representations.<br>**CC.2.2.HS.C.6** - Interpret functions in terms of the situations they model.<br>**CC.2.2.HS.D.10** - Represent, solve and interpret equations/inequalities and systems of equations/inequalities algebraically and graphically.<br><br>**CC.2.3.HS.A.10** - Translate between the geometric description and the equation for a conic section. |

| **Exponential and Logarithmic Functions** | |
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| **CONTENT/KEY CONCEPTS** | **OBJECTIVES/STANDARDS** |
| **Exponential and Logarithmic Functions**<br>• Exponential Functions and Their Graphs<br>• Logarithmic Functions and Their Graphs<br>• Properties of Logarithms<br>• Exponential and Logarithmic Equations | **CC.2.2.HS.C.5** - Construct and compare linear, quadratic, and exponential models to solve problems.<br>**CC.2.2.HS.C.6** - Interpret functions in terms of the situations they model.<br>**CC.2.2.HS.D.10** - Represent, solve, and interpret equations/inequalities and systems of equations/inequalities algebraically and graphically.<br>**CC.2.2.HS.C.2** - Graph and analyze functions, and use their properties to make connections between the different representations. |

| Systems of Equations and Inequalities | |
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| **CONTENT/KEY CONCEPTS** | **OBJECTIVES/STANDARDS** |
| **Systems of Equations and Inequalities**<br>• Linear and Nonlinear Systems of Equations<br>• Two Variable Linear Systems<br>• Multivariable Linear Systems | **CC.2.2.HS.D.10** - Represent, solve and interpret equations/inequalities and systems of equations/inequalities algebraically and graphically.<br><br>**CC.2.4.HS.B.2** - Summarize, represent, and interpret data on two categorical and quantitative variables. |

| **Matrices and Determinants** | |
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| **CONTENT/KEY CONCEPTS** | **OBJECTIVES/STANDARDS** |
| **Matrices and Determinants**<br>• Matrices and Systems of Equations<br>• Operations with Matrices<br>• The Inverse of a Square Matrix<br>• The Determinant of a Square Matrix | **CC.2.2.HS.D.1** - Interpret the structure of expressions to represent a quantity in terms of its context.<br><br>**CC.2.1.HS.F.3** - Apply quantitative reasoning to choose and interpret units and scales in formulas, graphs, and data displays.<br>**CC.2.1.HS.F.4** - Use units as a way to understand problems and to guide the solution of multi-step problems.<br>**CC.2.1.HS.F.5** - Choose a level of accuracy appropriate to limitations on measurement when reporting quantities.<br><br>**CC.2.4.HS.B.2** - Summarize, represent, and interpret data on two categorical and quantitative variables.<br>**CC.2.4.HS.B.3** - Analyze linear models to make interpretations based on the data.<br>**CC.2.4.HS.B.4** - Recognize and evaluate random processes underlying statistical experiments.<br>**CC.2.4.HS.B.5** - Make inferences and justify conclusions based on sample surveys, experiments, and observational studies.<br>**CC.2.4.HS.B.6** - Use the concepts of independence and conditional probability to interpret data.<br>**CC.2.4.HS.B.7** - Apply the rules of probability to compute probabilities of compound events in a uniform probability model. |