

Honors Algebra 1

Instructors:

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This course is designed for those students who excelled in their eight grade mathematics requirement. Course work includes all concepts covered in Algebra 1 with a more in-depth analysis of the theoretical side of mathematics. Students will develop a firm background for further Honors courses.

Graduation Standards (the number of the standard is referenced in the performance indicators listed in each unit):

Standard 1: Reason and model quantitatively, using units and number systems to solve problems.

Standard 2: Interpret, represent, create and solve algebraic expressions.

Standard 3: Interpret, analyze, construct, and solve linear, quadratic, and trigonometric functions.

Unit 1 Introduction Unit

Summary In this unit, students will use variables to represent data. They will learn to write expressions and equations. They will also evaluate and simplify variable expressions using properties of real numbers.

Performance Indicators Assessed in Unit
S1: B. Use the properties of rational and irrational numbers. (N.RN.B)
S1: F. Compute within the real number system.
S2: A. Interpret the structure of expressions. (A.SSE.A)
S2: H. Understand solving equations as a process of reasoning and explain the reasoning. (A.REI.A)

Unit 2 Linear Equations & Inequalities in One Variable

Summary In this unit students develop the properties of solving equations and inequalities. They apply the Addition, Subtraction, Multiplication, and Division properties of equations and inequalities to solve problems, and can graph their solutions on a number line. Students will be able to apply equations and inequalities in one variable to real-world problems. Students will also be able to use units to understand problems, and define appropriate quantities with appropriate accuracy.

Performance Indicators Assessed in Unit
S2: A. Interpret the structure of expressions. (A.SSE.A)
S2: H. Understand solving equations as a process of reasoning and explain the reasoning. (A.REI.A)
S2: I. Solve equations and inequalities in one variable. (A.REI.B)

Unit 3 Modeling Functions

Summary In this unit students will define a function, and function notation. They will identify common algebraic functions based on their graphs and general equations. Students will also determine a function's domain and range, increasing/decreasing intervals, relative maxima and minima, and end behavior. They will understand the basic properties of linear, quadratic, and exponential functions, and be able to identify each type graphically.

Performance Indicators Assessed in Unit
S2: K. Represent and solve equations and inequalities graphically. (A.REI.D)
S3: A. Understand the concept of a function and use function notation. (F.IF.A)
S3: B. Interpret functions that arise in applications in terms of the context. (F.IF.B)
S3: C. Analyze functions using different representations. (F.IF.C.7A-C,E,8-9)

S3: D. Build a function that models a relationship between two quantities. (F.BF.A.1A-B,2)

S3: F. Construct and compare linear, quadratic, and exponential models and solve problems. (F.LE.A)

Unit 4 Graphing Linear Functions

Summary In this unit students will identify and interpret key features of linear functions in all their forms. They will graph linear functions in their different forms. Students will also create and analyze linear functions that model real-world data.

Performance Indicators Assessed in Unit

S2: K. Represent and solve equations and inequalities graphically. (A.REI.D)
S3: A. Understand the concept of a function and use function notation. (F.IF.A)
S3: D. Build a function that models a relationship between two quantities. (F.BF.A.1A-B,2)
S3: E. Build new functions from existing functions. (F.BF.B.3,4A)
S3: F. Construct and compare linear, quadratic, and exponential models and solve problems. (F.LE.A)
S3: G. Interpret expressions for functions in terms of the situation they model. (F.LE.B)

Unit 5 Graphing Linear Equations

Summary In this unit students will be able to identify different forms, and change between all forms of linear equations. They will be able to calculate slope algebraically and relate it to real-world situations. They will be able to create inverse linear functions both algebraically and graphically. They will be able to compare and contrast a linear relationship represented graphically and algebraically.

Performance Indicators Assessed in Unit

S2: B. Write expressions in equivalent forms to solve problems. (A.SSE.B)
S2: K. Represent and solve equations and inequalities graphically. (A.REI.D)
S3: C. Analyze functions using different representations. (F.IF.C.7A-C,E,8-9)
S3: E. Build new functions from existing functions. (F.BF.B.3,4A)

Unit 6 Compound Inequalities & Absolute Value Equations & Inequalities

Summary In this unit students will be able to solve compound inequalities and graph their solutions. Students will be able to solve absolute value equations and inequalities in one variable and graph their solution on a number line. Students will be able to graph inequalities into variables on a coordinate plane. This unit will have a strong emphasis on the application of inequalities and absolute value.

Performance Indicators Assessed in Unit

S2: G. Create equations that describe numbers or relationships. (A.CED.A)
S2: I. Solve equations and inequalities in one variable. (A.REI.B)
S2: K. Represent and solve equations and inequalities graphically. (A.REI.D)

Unit 7 Linear Equations and Inequalities in Two Variables

Summary In this unit students will be introduced to systems of linear equations and inequalities. They learn how to solve by graphing systems of equations and inequalities, and classify the systems as consistent or inconsistent, dependent or independent. Students also learn how to apply algebraic methods including, substitution, elimination, using addition and subtraction, and elimination using multiplication. Students will create equations and inequalities that model real-world data, and determine which method is best to solve the system.

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| Performance Indicators Assessed in Unit | <p>S2: H. Understand solving equations as a process of reasoning and explain the reasoning. (A.REI.A)</p> <p>S2: J. Solve systems of equations. (A. REI.C.5-7)</p> <p>S2: K. Represent and solve equations and inequalities graphically. (A.REI.D)</p> |
| Unit 8 | Quadratic Functions |
| Summary | In this unit students will be identifying and interpreting key features of quadratic functions. They will be able to manually graph a quadratic function, and in addition graph using technology. They will also graph systems of linear and quadratic functions. Students will then explore transformations on a coordinate plane of a quadratic function. |
| Performance Indicators Assessed in Unit | <p>S2: D. Understand the relationship between zeros and factors of polynomials. (A.APR.B)</p> <p>S2: J. Solve systems of equations. (A. REI.C.5-7)</p> <p>S2: K. Represent and solve equations and inequalities graphically. (A.REI.D)</p> <p>S3: B. Interpret functions that arise in applications in terms of the context. (F.IF.B)</p> <p>S3: C. Analyze functions using different representations. (F.IF.C.7A-C,E,8-9)</p> <p>S3: E. Build new functions from existing functions. (F.BF.B.3,4A)</p> |
| Unit 9 | Quadratic Equations |
| Summary | In this unit students will be algebraically manipulating quadratic equations to reveal key features of the related function. Students will first learn about polynomials and operations involving monomials and polynomials. They will also solve the quadratic equations for their roots by factoring, completing the square, and using the quadratic formula. |
| Performance Indicators Assessed in Unit | <p>S2: A. Interpret the structure of expressions. (A.SSE.A)</p> <p>S2: B. Write expressions in equivalent forms to solve problems. (A.SSE.B)</p> <p>S2: C. Perform arithmetic operations on polynomials. (A.APR.A)</p> <p>S2: D. Understand the relationship between zeros and factors of polynomials. (A.APR.B)</p> <p>S2: E. Use polynomial identities to solve problems. (A.APR.C.4)</p> <p>S2: F. Rewrite rational expressions. (A. APR.D.6)</p> <p>S2: I. Solve equations and inequalities in one variable. (A.REI.B)</p> |