

# Math: Honors Algebra I

| UNIT/Weeks (not consecutive) | Timeline/Topics   | Essential Questions  |
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| 1                            | <p><b><u>Solving Equations and Inequalities</u></b></p> <ul style="list-style-type: none"> <li>• Operations on Real Numbers</li> <li>• Solving Linear Equations</li> <li>• Solving Equations with a Variable on Both Sides</li> <li>• Literal Equations and Formulas</li> <li>• Solving Inequalities in One Variable</li> <li>• Compound Inequalities</li> <li>• Absolute Value Equations and Inequalities</li> </ul> | <ul style="list-style-type: none"> <li>• What general strategies can you use to solve simple equations?</li> <li>• How can you classify the results of operations on real numbers?</li> <li>• How can you create equations and/or inequalities and use them to solve problems?</li> <li>• How are solutions of an inequality different from the solutions of an equation?</li> </ul>                               |
| 2                            | <p><b><u>Linear Equations</u></b></p> <ul style="list-style-type: none"> <li>• Slope-Intercept Form</li> <li>• Point-Slope Form</li> <li>• Standard Form</li> <li>• Parallel and Perpendicular Lines</li> </ul>   | <ul style="list-style-type: none"> <li>• Why is it useful to have different forms of linear equations?</li> <li>• What information does the slope-intercept form of a linear equation reveal about a line?</li> <li>• What information does the point-slope form of a linear equation reveal about a line?</li> <li>• What information does the standard form of a linear equation reveal about a line?</li> </ul> |
| 3                            | <p><b><u>Linear Functions</u></b></p> <ul style="list-style-type: none"> <li>• Relations and Functions</li> <li>• Linear Functions</li> <li>• Transforming Linear Functions</li> <li>• Arithmetic Sequences</li> <li>• Scatter Plots and Lines of Fit</li> <li>• Analyzing Lines of Fit</li> <li>• </li> </ul>  | <ul style="list-style-type: none"> <li>• How can linear functions be used to model situations and solve problems?</li> <li>• What is a function and how do you identify a function?</li> <li>• How does modifying the input or output of a linear function transform its graph?</li> <li>• How can you use a scatter plot to describe the relationship between two data sets?</li> </ul>                           |

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| <p style="text-align: center;"><b>4</b></p> | <p style="text-align: center;"><b><u>Systems of Linear Equations and Inequalities</u></b></p> <ul style="list-style-type: none"> <li>• Solving Systems of Equations by Graphing</li> <li>• Solving Systems of Equations by Substitution</li> <li>• Solving Systems of Equations by Elimination</li> <li>• Linear Inequalities in Two Variables</li> <li>• Systems of Linear Inequalities</li> </ul> | <ul style="list-style-type: none"> <li>• How do you use systems of linear equations and inequalities to model situations and solve problems?</li> <li>• How can you use a graph to illustrate the solution to a system of linear equations?</li> <li>• How do you know whether to use graphing, substitution or elimination to solve your system of equations?</li> <li>• How does the graph of a linear inequality in two variables help you identify the solutions of the inequality?</li> <li>• How is the graph of a system of linear inequalities related to the solutions of the system of inequalities?</li> </ul> |
| <p style="text-align: center;"><b>5</b></p> | <p style="text-align: center;"><b><u>Piecewise Functions</u></b></p> <ul style="list-style-type: none"> <li>• The Absolute Value Function</li> <li>• Piecewise-Defined Functions</li> <li>• Step Functions</li> <li>• Transformations of Piecewise-Defined Functions</li> </ul>   | <ul style="list-style-type: none"> <li>• How do you use piecewise-defined functions to model situation and solve problems?</li> <li>• What are the key features of the graph of the absolute value function?</li> <li>• What are the key features of piecewise-defined functions?</li> <li>• How do constants affect the graphs of functions?</li> </ul>  |
| <p style="text-align: center;"><b>6</b></p> | <p style="text-align: center;"><b><u>Exponents and Exponential Functions</u></b></p> <ul style="list-style-type: none"> <li>• Rational Exponents and Properties of Exponents</li> <li>• Exponential Functions</li> <li>• Exponential Growth and Decay</li> <li>• Transformations of Exponential Functions</li> </ul>  | <ul style="list-style-type: none"> <li>• What are the properties of rational exponents and how are they used to solve problems?</li> <li>• What are the characteristics of exponential functions?</li> <li>• What kind of situations can be modeled with exponential growth or exponential decay?</li> <li>• How do changes in an exponential function relate to translations of its graph?</li> </ul>  |
| <p style="text-align: center;"><b>7</b></p> | <p style="text-align: center;"><b><u>Polynomials and Factoring</u></b></p>  | <ul style="list-style-type: none"> <li>• How do operations with polynomials compare</li> </ul>  |

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|   | <ul style="list-style-type: none"> <li>• Adding and Subtracting Polynomials</li> <li>• Multiplying Polynomials</li> <li>• Multiplying Special Cases</li> <li>• Factoring Polynomials</li> <li>• Factoring <math>x^2 + bx + c</math></li> <li>• Factoring <math>ax^2 + bx + c</math></li> <li>• Factoring Special Cases</li> </ul>  | <p>with operations with integers?</p> <ul style="list-style-type: none"> <li>• How do patterns help you when you factor and multiply polynomials?</li> <li>• How does recognizing patterns in signs of terms help you factor polynomials?</li> <li>• How do you work with polynomials to rewrite expressions and solve problems?</li> </ul>  |
| 8 | <p><b><u>Quadratic Equations</u></b></p> <ul style="list-style-type: none"> <li>• Key Features of Graphs of a Quadratic Function</li> <li>• Quadratic Functions in Vertex Form</li> <li>• Quadratic Functions in Standard Form</li> <li>• Modeling with Quadratic Functions</li> <li>• Comparing Linear, Exponential, and Quadratic Models</li> </ul>  | <ul style="list-style-type: none"> <li>• What are the characteristics of the quadratic parent function and how do they help you graph it?</li> <li>• What kinds of real-world situations can be modeled by quadratic functions?</li> <li>• How can you use sketches and equations of quadratic functions to model situations and make predictions?</li> <li>• How can you determine whether a linear, exponential, or quadratic function best models data?</li> </ul>                          |
| 9 | <p><b><u>Solving Quadratic Equations</u></b></p> <ul style="list-style-type: none"> <li>• Solving Quadratic Equations Using Graphs and Tables</li> <li>• Solving Quadratic Equations by Factoring</li> <li>• Rewriting Radical Expression</li> <li>• Solving Quadratic Equations Using Square Roots</li> <li>• Completing the Square</li> <li>• The Quadratic Formula and the Discriminant</li> <li>• Solving Systems of Linear and Quadratic Equations</li> </ul> | <ul style="list-style-type: none"> <li>• How can graphs and tables help you solve quadratic equations?</li> <li>• How does factoring help you solve quadratic equations?</li> <li>• How do you determine which method to use to solve quadratic equations?</li> <li>• How is solving linear-quadratic systems of equations similar to and different from solving systems of linear equations?</li> <li>• How do you use quadratic equations to model situations and solve problems?</li> </ul> |

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| <p style="text-align: center;"><b>10</b></p> | <p><b><u>Working with Functions</u></b></p> <ul style="list-style-type: none"> <li>• The Square Root Function</li> <li>• The Cube Root Function</li> <li>• Analyzing Functions Graphically</li> <li>• Translations of Functions</li> <li>• Compressions and Stretches of Functions</li> <li>• Operations with Functions</li> <li>• Inverse Functions</li> </ul> | <ul style="list-style-type: none"> <li>• What are key features of the square root function or the cube root function?</li> <li>• What can you learn about a function by analyzing its graph?</li> <li>• What operations cause the transformations of the graphs of functions?</li> <li>• How can you use inverse functions to help solve problems?</li> <li>•</li> </ul> |
| <p style="text-align: center;"><b>11</b></p> | <p><b><u>Statistics</u></b></p> <ul style="list-style-type: none"> <li>• Analyzing Data Displays</li> <li>• Comparing Data Sets</li> <li>• Interpreting the Shapes of Data Displays</li> <li>• Standard Deviation</li> <li>• Two-Way Frequency Tables</li> </ul>  | <ul style="list-style-type: none"> <li>• How do you use statistics to model situations and solve problems?</li> <li>• How can you use measures of center and spread to compare data sets?</li> <li>• How does the shape of a data set help you understand the data?</li> <li>• How can you use two-way frequency tables to analyze data?</li> </ul>                      |