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## Algebra I | The New Illinois Learning Standards for Mathematics Correlation to *Eureka Math*<sup>2</sup>

When the original *Eureka Math*<sup>®</sup> curriculum was released, it quickly became the most widely used K–5 mathematics curriculum in the country. Now, the Great Minds<sup>®</sup> teacher–writers have created *Eureka Math*<sup>2</sup><sup>®</sup>, a groundbreaking new curriculum that helps teachers deliver exponentially better math instruction while still providing students with the same deep understanding of and fluency in math. *Eureka Math*<sup>2</sup> carefully sequences mathematical content to maximize vertical alignment—a principle tested and proven to be essential in students’ mastery of math—from kindergarten through high school.

While this innovative new curriculum includes all the trademark *Eureka Math* aha moments that have been delighting students and teachers for years, it also boasts these exciting new features:

### Teachability

*Eureka Math*<sup>2</sup> employs streamlined materials that allow teachers to plan more efficiently and focus their energy on delivering high-quality instruction that meets the individual needs of their students. Differentiation suggestions, slide decks, digital interactives, and multiple forms of assessment are just a few of the resources built right into the teacher materials.

### Accessibility

*Eureka Math*<sup>2</sup> incorporates Universal Design for Learning principles so all learners can access the mathematics and take on challenging math concepts. Student supports are built into the instructional design and are clearly identified in the *Teach* book. Further, the curriculum carries a focus on readability. By eliminating unnecessary words and using simple, clear sentences, the *Eureka Math*<sup>2</sup> teacher–writers have created one of the most readable mathematics curricula on the market. The curriculum’s readability and accessibility help all students see themselves as mathematical thinkers and doers who are fully capable of owning their mathematics learning.

### Digital Engagement

The digital elements of *Eureka Math*<sup>2</sup> add to students’ engagement with the math. The curriculum provides teachers with digital slides for each lesson. In addition, each grade level includes wordless videos that spark students’ interest and curiosity. Students at all levels work through mathematical explorations that help lead to their own mathematical discoveries. Digital lessons and videos provide opportunities for students to wonder, explore, and make sense of mathematics, which contributes to the development of a strong, positive mathematical identity.

Standards for Mathematical Practice	Aligned Components of <i>Eureka Math</i> <sup>2</sup>
<p><b>MP.1</b> Make sense of problems and persevere in solving them.</p>	<p>Lessons in every module engage students in mathematical practices. These are indicated in margin notes included with every lesson.</p>
<p><b>MP.2</b> Reason abstractly and quantitatively.</p>	<p>Lessons in every module engage students in mathematical practices. These are indicated in margin notes included with every lesson.</p>
<p><b>MP.3</b> Construct viable arguments and critique the reasoning of others.</p>	<p>Lessons in every module engage students in mathematical practices. These are indicated in margin notes included with every lesson.</p>
<p><b>MP.4</b> Model with mathematics.</p>	<p>Lessons in every module engage students in mathematical practices. These are indicated in margin notes included with every lesson.</p>
<p><b>MP.5</b> Use appropriate tools strategically.</p>	<p>Lessons in every module engage students in mathematical practices. These are indicated in margin notes included with every lesson.</p>
<p><b>MP.6</b> Attend to precision.</p>	<p>Lessons in every module engage students in mathematical practices. These are indicated in margin notes included with every lesson.</p>
<p><b>MP.7</b> Look for and make use of structure.</p>	<p>Lessons in every module engage students in mathematical practices. These are indicated in margin notes included with every lesson.</p>
<p><b>MP.8</b> Look for and express regularity in repeated reasoning.</p>	<p>Lessons in every module engage students in mathematical practices. These are indicated in margin notes included with every lesson.</p>

## Arithmetic with Polynomials and Rational Expressions

**HSA-APR.A Perform arithmetic operations on polynomials.**

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### Aligned Components of *Eureka Math*<sup>2</sup>

<p><b>HSA-APR.A.1</b></p> <p>Understand that polynomials form a system analogous to the integers, namely, they are closed under the operations of addition, subtraction, and multiplication; add, subtract, and multiply polynomials.</p>	<p>A1 M1 Lesson 3: Polynomial Expressions</p> <p>A1 M1 Lesson 4: Adding and Subtracting Polynomial Expressions</p> <p>A1 M1 Lesson 5: Multiplying Polynomial Expressions</p> <p>A1 M1 Lesson 6: Polynomial Identities</p>
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## Creating Equations

**HSA-CED.A Create equations that describe numbers or relationships.**

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### Aligned Components of *Eureka Math*<sup>2</sup>

<p><b>HSA-CED.A.1</b></p> <p>Create equations and inequalities in one variable and use them to solve problems.</p>	<p>A1 M1 Lesson 7: Printing Presses</p> <p>A1 M1 Lesson 11: Writing and Solving Equations in One Variable</p> <p>A1 M1 Lesson 13: Solving Linear Inequalities in One Variable</p> <p>A1 M1 Lesson 15: Solving and Graphing Compound Inequalities</p> <p>A1 M4 Lesson 9: Creating and Solving Quadratic Equations in One Variable</p>
<p><b>HSA-CED.A.2</b></p> <p>Create equations in two or more variables to represent relationships between quantities; graph equations on coordinate axes with labels and scales.</p>	<p>A1 M2 Lesson 1: Solution Sets of Linear Equations in Two Variables</p> <p>A1 M2 Lesson 2: Graphing Linear Equations in Two Variables</p> <p>A1 M2 Lesson 3: Creating Linear Equations in Two Variables</p> <p>A1 M2 Lesson 6: Applications of Linear Equations and Inequalities</p> <p>A1 M4 Lesson 11: Graphing Quadratic Functions from Factored Form</p>

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<p><b>HSA-CED.A.2 <i>continued</i></b></p>	<p>A1 M4 Lesson 12: Using Symmetry to Graph Quadratic Functions from Standard Form</p> <p>A1 M4 Lesson 23: Creating Equations of Quadratic Functions to Model Contexts</p> <p>A1 M4 Lesson 25: Maximizing Area</p> <p>A1 M4 Lesson 26: Modeling Data with Quadratic Functions</p> <p>A1 M4 Lesson 27: Search and Rescue Helicopter</p>
<p><b>HSA-CED.A.3</b></p> <p>Represent constraints by equations or inequalities, and by systems of equations and/or inequalities, and interpret solutions as viable or non-viable options in a modeling context.</p>	<p>A1 M1 Lesson 11: Writing and Solving Equations in One Variable</p> <p>A1 M1 Lesson 14: Solution Sets of Compound Statements</p> <p>A1 M1 Lesson 15: Solving and Graphing Compound Inequalities</p> <p>A1 M2 Lesson 1: Solution Sets of Linear Equations in Two Variables</p> <p>A1 M2 Lesson 6: Applications of Linear Equations and Inequalities</p> <p>A1 M6 Lesson 5: Solar System Models</p>
<p><b>HSA-CED.A.4</b></p> <p>Rearrange formulas to highlight a quantity of interest, using the same reasoning as in solving equations.</p>	<p>A1 M1 Lesson 12: Rearranging Formulas</p> <p>A1 M4 Lesson 13: Using Square Roots to Solve Quadratic Equations</p>

## Reasoning with Equations and Inequalities

**HSA-REI.A Understand solving equations as a process of reasoning and explain the reasoning.**

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<p><b>HSA-REI.A.1</b></p> <p>Explain each step in solving a simple equation as following from the equality of numbers asserted at the previous step, starting from the assumption that the original equation has a solution. Construct a viable argument to justify a solution method.</p>	<p>A1 M1 Lesson 9: Solving Linear Equations in One Variable</p> <p>A1 M1 Lesson 10: Some Potential Dangers When Solving Equations</p> <p>A1 M1 Lesson 11: Writing and Solving Equations in One Variable</p>
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## Reasoning with Equations and Inequalities

**HSA-REI.B Solve equations and inequalities in one variable.**

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<p><b>HSA-REI.B.3</b></p> <p>Solve linear equations and inequalities in one variable, including equations with coefficients represented by letters.</p>	<p>A1 M1 Lesson 7: Printing Presses</p> <p>A1 M1 Lesson 8: Solution Sets for Equations and Inequalities in One Variable</p> <p>A1 M1 Lesson 9: Solving Linear Equations in One Variable</p> <p>A1 M1 Lesson 10: Some Potential Dangers When Solving Equations</p> <p>A1 M1 Lesson 11: Writing and Solving Equations in One Variable</p> <p>A1 M1 Lesson 13: Solving Linear Inequalities in One Variable</p> <p>A1 M1 Lesson 15: Solving and Graphing Compound Inequalities</p> <p>A1 M1 Lesson 16: Solving Absolute Value Equations</p> <p>A1 M1 Lesson 17: Solving Absolute Value Inequalities</p>
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<p><b>HSA-REI.B.4</b> Solve quadratic equations in one variable.</p>	<p><i>This standard is fully addressed by the lessons aligned to its subsections.</i></p>
<p><b>HSA-REI.B.4.a</b> Use the method of completing the square to transform any quadratic equation in <math>x</math> into an equation of the form <math>(x - p)^2 = q</math> that has the same solutions. Derive the quadratic formula from this form.</p>	<p>A1 M4 Lesson 14: Solving Quadratic Equations by Completing the Square A1 M4 Lesson 15: Deriving the Quadratic Formula</p>
<p><b>HSA-REI.B.4.b</b> Solve quadratic equations by inspection (e.g., for <math>x^2 = 49</math>), taking square roots, completing the square, the quadratic formula and factoring, as appropriate to the initial form of the equation. Recognize when the quadratic formula gives complex solutions and write them as <math>a \pm bi</math> for real numbers <math>a</math> and <math>b</math>.</p>	<p>A1 M4 Lesson 5: Solving Equations That Contain Factored Expressions A1 M4 Lesson 6: Solving Quadratic Equations by Factoring: Identities and Guess and Check A1 M4 Lesson 7: Solving Quadratic Equations by Factoring: Splitting the Linear Term A1 M4 Lesson 8: A Summary of Solving Quadratic Equations by Factoring A1 M4 Lesson 9: Creating and Solving Quadratic Equations in One Variable A1 M4 Lesson 13: Using Square Roots to Solve Quadratic Equations A1 M4 Lesson 14: Solving Quadratic Equations by Completing the Square A1 M4 Lesson 15: Deriving the Quadratic Formula A1 M4 Lesson 16: Solving Quadratic Equations A1 M4 Lesson 18: The Quadratic Formula and Zeros of a Function</p>

## Reasoning with Equations and Inequalities

### HSA-REI.C Solve systems of equations.

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<p><b>HSA-REI.C.5</b></p> <p>Prove that, given a system of two equations in two variables, replacing one equation by the sum of that equation and a multiple of the other produces a system with the same solutions.</p>	<p>A1 M2 Lesson 9: A New Way to Solve Systems</p>
<p><b>HSA-REI.C.6</b></p> <p>Solve systems of linear equations exactly and approximately (e.g., with graphs), focusing on pairs of linear equations in two variables.</p>	<p>A1 M2 Lesson 7: Low-Flow Showerhead</p> <p>A1 M2 Lesson 8: Systems of Linear Equations in Two Variables</p> <p>A1 M2 Lesson 9: A New Way to Solve Systems</p> <p>A1 M2 Lesson 10: The Elimination Method</p> <p>A1 M2 Lesson 11: Applications of Systems of Equations</p>
<p><b>HSA-REI.C.7</b></p> <p>Solve a simple system consisting of a linear equation and a quadratic equation in two variables algebraically and graphically.</p>	<p>A1 M4 Lesson 24: Another Look at Systems of Equations</p>

## Reasoning with Equations and Inequalities

**HSA-REI.D** Represent and solve equations and inequalities graphically.

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<p><b>HSA-REI.D.10</b></p> <p>Understand that the graph of an equation in two variables is the set of all its solutions plotted in the coordinate plane, often forming a curve (which could be a line).</p>	<p>A1 M2 Lesson 1: Solution Sets of Linear Equations in Two Variables</p> <p>A1 M2 Lesson 2: Graphing Linear Equations in Two Variables</p>
<p><b>HSA-REI.D.11</b></p> <p>Explain why the <math>x</math>-coordinates of the points where the graphs of the equations <math>y = f(x)</math> and <math>y = g(x)</math> intersect are the solutions of the equation <math>f(x) = g(x)</math>; find the solutions approximately, e.g., using technology to graph the functions, make tables of values, or find successive approximations. Include cases where <math>f(x)</math> and/or <math>g(x)</math> are linear, polynomial, rational, absolute value, exponential, and logarithmic functions.</p>	<p>A1 M3 Lesson 10: Using Graphs to Solve Equations</p> <p>A1 M3 Lesson 15: The Absolute Value Function</p> <p>A1 M4 Lesson 24: Another Look at Systems of Equations</p> <p>A1 M5 Lesson 13: Using Transformations to Graph Exponential Functions (Bases Between 0 and 1)</p> <p>A1 M5 Lesson 20: Comparing Growth of Functions</p>
<p><b>HSA-REI.D.12</b></p> <p>Graph the solutions to a linear inequality in two variables as a half-plane (excluding the boundary in the case of a strict inequality), and graph the solution set to a system of linear inequalities in two variables as the intersection of the corresponding half-planes.</p>	<p>A1 M2 Lesson 4: Solution Sets of Linear Inequalities in Two Variables</p> <p>A1 M2 Lesson 5: Graphing Linear Inequalities in Two Variables</p> <p>A1 M2 Lesson 12: Solution Sets of Systems of Linear Inequalities</p> <p>A1 M2 Lesson 13: Graphing Solution Sets of Systems of Linear Inequalities</p> <p>A1 M2 Lesson 14: Applications of Systems of Linear Inequalities</p> <p>A1 M6 Lesson 5: Solar System Models</p>



## Seeing Structure in Expressions

**HSA-SSE.A Interpret the structure of expressions.**

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### Aligned Components of *Eureka Math*<sup>2</sup>

<p><b>HSA-SSE.A.1</b></p> <p>Interpret expressions that represent a quantity in terms of its context.</p>	<p><i>This standard is fully addressed by the lessons aligned to its subsections.</i></p>
<p><b>HSA-SSE.A.1.a</b></p> <p>Interpret parts of an expression, such as terms, factors, and coefficients.</p>	<p>A1 M4 Lesson 3: Analyzing Functions That Model Projectile Motion</p>
<p><b>HSA-SSE.A.1.b</b></p> <p>Interpret complicated expressions by viewing one or more of their parts as a single entity.</p>	<p>A1 M5 Lesson 8: Exponential Functions                      A1 M5 Lesson 16: Exponential Growth                      A1 M5 Lesson 17: Exponential Decay                      A1 M5 Lesson 18: Modeling Populations                      A1 M5 Lesson 23: Modeling the Temperature of Objects Cooling Over Time</p>
<p><b>HSA-SSE.A.2</b></p> <p>Use the structure of an expression to identify ways to rewrite it.</p>	<p>A1 M1 Lesson 1: The Growing Pattern of Ducks                      A1 M1 Lesson 2: The Commutative, Associative, and Distributive Properties                      A1 M1 Lesson 3: Polynomial Expressions                      A1 M4 Lesson 3: Analyzing Functions That Model Projectile Motion                      A1 M4 Topic B: Factoring                      A1 M4 Lesson 14: Solving Quadratic Equations by Completing the Square                      A1 M4 Lesson 15: Deriving the Quadratic Formula                      A1 M5 Lesson 11: Graphing Exponential Functions                      A1 M5 Lesson 12: Using Transformations to Graph Exponential Functions (Bases Greater Than 1)                      A1 M5 Lesson 18: Modeling Populations</p>

## Seeing Structure in Expressions

**HSA-SSE.B** Write expressions in equivalent forms to solve problems.

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<p><b>HSA-SSE.B.3</b></p> <p>Choose and produce an equivalent form of an expression to reveal and explain properties of the quantity represented by the expression.</p>	<p><i>This standard is fully addressed by the lessons aligned to its subsections.</i></p>
<p><b>HSA-SSE.B.3.a</b></p> <p>Factor a quadratic expression to reveal the zeros of the function it defines.</p>	<p>A1 M4 Lesson 10: Zeros of Functions                      A1 M4 Lesson 11: Graphing Quadratic Functions from Factored Form                      A1 M4 Lesson 22: A Summary of Graphing Quadratic Functions</p>
<p><b>HSA-SSE.B.3.b</b></p> <p>Complete the square in a quadratic expression to reveal the maximum or minimum value of the function it defines.</p>	<p>A1 M4 Lesson 21: Completing the Square to Graph Quadratic Functions                      A1 M4 Lesson 22: A Summary of Graphing Quadratic Functions</p>
<p><b>HSA-SSE.B.3.c</b></p> <p>Use the properties of exponents to transform expressions for exponential functions.</p>	<p>A1 M5 Lesson 11: Graphing Exponential Functions                      A1 M5 Lesson 12: Using Transformations to Graph Exponential Functions (Bases Greater Than 1)                      A1 M5 Lesson 18: Modeling Populations</p>

## Building Functions

**HSF-BF.A Build a function that models a relationship between two quantities.**

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### Aligned Components of *Eureka Math*<sup>2</sup>

<p><b>HSF-BF.A.1</b></p> <p>Write a function that describes a relationship between two quantities.</p>	<p>A1 M6 Lesson 5: Solar System Models</p>
<p><b>HSF-BF.A.1.a</b></p> <p>Determine an explicit expression, a recursive process, or steps for calculation from a context.</p>	<p>A1 M3 Lesson 17: Piecewise Linear Functions in Context</p> <p>A1 M4 Lesson 23: Creating Equations of Quadratic Functions to Model Contexts</p> <p>A1 M4 Lesson 25: Maximizing Area</p> <p>A1 M4 Lesson 26: Modeling Data with Quadratic Functions</p> <p>A1 M4 Lesson 27: Search and Rescue Helicopter</p> <p>A1 M5 Topic A: Arithmetic and Geometric Sequences</p> <p>A1 M5 Lesson 8: Exponential Functions</p> <p>A1 M5 Lesson 15: Calculating Interest</p> <p>A1 M6 Topic B: Developing Models for Contexts</p>
<p><b>HSF-BF.A.1.b</b></p> <p>Combine standard function types using arithmetic operations.</p>	<p>A1 M6 Lesson 4: The Deal</p> <p>A1 M6 Lesson 6: Designing a Fundraiser</p> <p>A1 M6 Lesson 7: World Record Doughnut</p>
<p><b>HSF-BF.A.2</b></p> <p>Write arithmetic and geometric sequences both recursively and with an explicit formula, use them to model situations, and translate between the two forms.</p>	<p>A1 M5 Lesson 5: Arithmetic and Geometric Sequences</p> <p>A1 M5 Lesson 6: Representations of Arithmetic and Geometric Sequences</p> <p>A1 M5 Lesson 7: Sierpinski Triangle</p>

## Building Functions

**HSF-BF.B Build new functions from existing functions.**

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<p><b>HSF-BF.B.3</b></p> <p>Identify the effect on the graph of replacing <math>f(x)</math> by <math>f(x) + k</math>, <math>kf(x)</math>, <math>f(kx)</math>, and <math>f(x + k)</math> for specific values of <math>k</math> (both positive and negative); find the value of <math>k</math> given the graphs. Experiment with cases and illustrate an explanation of the effects on the graph using technology.</p>	<p>A1 M3 Topic D: Transformations of Functions</p> <p>A1 M4 Lesson 20: Art with Transformations</p> <p>A1 M5 Lesson 12: Using Transformations to Graph Exponential Functions (Bases Greater Than 1)</p> <p>A1 M5 Lesson 13: Using Transformations to Graph Exponential Functions (Bases Between 0 and 1)</p> <p>A1 M5 Lesson 14: Writing Equations for Exponential Functions from Tables or Graphs</p> <p>A1 M5 Lesson 23: Modeling the Temperature of Objects Cooling Over Time</p>
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## Interpreting Functions

**HSF-IF.A Understand the concept of a function and use function notation.**

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### Aligned Components of *Eureka Math*<sup>2</sup>

<p><b>HSF-IF.A.1</b></p> <p>Understand that a function from one set (called the domain) to another set (called the range) assigns to each element of the domain exactly one element of the range. If <math>f</math> is a function and <math>x</math> is an element of its domain, then <math>f(x)</math> denotes the output of <math>f</math> corresponding to the input <math>x</math>. The graph of <math>f</math> is the graph of the equation <math>y = f(x)</math>.</p>	<p>A1 M3 Topic A: Functions and Their Graphs</p>
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<p><b>HSF-IF.A.2</b></p> <p>Use function notation, evaluate functions for inputs in their domains, and interpret statements that use function notation in terms of a context.</p>	<p>A1 M3 Lesson 1: The Definition of a Function</p> <p>A1 M3 Lesson 2: Representing, Naming, and Evaluating Functions</p> <p>A1 M3 Lesson 6: Representations of Functions</p> <p>A1 M3 Lesson 16: Step Functions</p> <p>A1 M5 Lesson 1: Exploring Patterns</p> <p>A1 M5 Lesson 2: The Recursive Challenge</p> <p>A1 M5 Lesson 3: Recursive Formulas for Sequences</p> <p>A1 M5 Lesson 4: Explicit Formulas for Sequences</p> <p>A1 M5 Lesson 7: Sierpinski Triangle</p>
<p><b>HSF-IF.A.3</b></p> <p>Recognize that sequences are functions, sometimes defined recursively, whose domain is a subset of the integers.</p>	<p>A1 M5 Lesson 1: Exploring Patterns</p> <p>A1 M5 Lesson 2: The Recursive Challenge</p> <p>A1 M5 Lesson 3: Recursive Formulas for Sequences</p> <p>A1 M5 Lesson 4: Explicit Formulas for Sequences</p> <p>A1 M5 Lesson 5: Arithmetic and Geometric Sequences</p> <p>A1 M5 Lesson 6: Representations of Arithmetic and Geometric Sequences</p>

## Interpreting Functions

**HSF-IF.B Interpret functions that arise in applications in terms of the context.**

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<p><b>HSF-IF.B.4</b></p> <p>For a function that models a relationship between two quantities, interpret key features of graphs and tables in terms of the quantities, and sketch graphs showing key features given a verbal description of the relationship.</p>	<p>A1 M3 Lesson 7: Exploring Key Features of a Function and Its Graph</p> <p>A1 M3 Lesson 8: Identifying Key Features of a Function and Its Graph</p> <p>A1 M3 Lesson 9: Representing Functions from Verbal Descriptions</p> <p>A1 M3 Lesson 11: Comparing Functions</p> <p>A1 M3 Lesson 12: Mars Curiosity Rover</p> <p>A1 M3 Lesson 13: Modeling Elevation as a Function of Time</p> <p>A1 M4 Lesson 1: Falling Objects</p> <p>A1 M4 Lesson 2: Projectile Motion</p> <p>A1 M4 Lesson 3: Analyzing Functions That Model Projectile Motion</p> <p>A1 M4 Lesson 11: Graphing Quadratic Functions from Factored Form</p> <p>A1 M4 Lesson 12: Using Symmetry to Graph Quadratic Functions from Standard Form</p> <p>A1 M4 Lesson 21: Completing the Square to Graph Quadratic Functions</p> <p>A1 M4 Lesson 23: Creating Equations of Quadratic Functions to Model Contexts</p> <p>A1 M4 Lesson 25: Maximizing Area</p>
<p><b>HSF-IF.B.5</b></p> <p>Relate the domain of a function to its graph and, where applicable, to the quantitative relationship it describes.</p>	<p>A1 M3 Lesson 3: The Graph of a Function</p> <p>A1 M3 Lesson 13: Modeling Elevation as a Function of Time</p> <p>A1 M3 Lesson 16: Step Functions</p> <p>A1 M4 Lesson 2: Projectile Motion</p> <p>A1 M4 Lesson 3: Analyzing Functions That Model Projectile Motion</p> <p>A1 M4 Lesson 23: Creating Equations of Quadratic Functions to Model Contexts</p>

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<p><b>HSF-IF.B.6</b></p> <p>Calculate and interpret the average rate of change of a function (presented symbolically or as a table) over a specified interval. Estimate the rate of change from a graph.</p>	<p>A1 M4 Lesson 1: Falling Objects</p> <p>A1 M4 Lesson 3: Analyzing Functions That Model Projectile Motion</p> <p>A1 M4 Lesson 12: Using Symmetry to Graph Quadratic Functions from Standard Form</p> <p>A1 M5 Lesson 19: Analyzing Exponential Growth</p> <p>A1 M5 Lesson 20: Comparing Growth of Functions</p> <p>A1 M5 Lesson 24: Modeling an Invasive Species Population</p>
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**Interpreting Functions**

**HSF-IF.C Analyze functions using different representations.**

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<p><b>HSF-IF.C.7</b></p> <p>Graph functions expressed symbolically and show key features of the graph, by hand in simple cases and using technology for more complicated cases.</p>	<p><i>This standard is fully addressed by the lessons aligned to its subsections.</i></p>
<p><b>HSF-IF.C.7.a</b></p> <p>Graph linear and quadratic functions and show intercepts, maxima, and minima.</p>	<p>A1 M3 Lesson 4: The Graph of the Equation <math>y = f(x)</math></p> <p>A1 M3 Lesson 5: Using Pseudocode to Compare Graphs of Functions and Graphs of Equations</p> <p>A1 M3 Lesson 6: Representations of Functions</p> <p>A1 M4 Lesson 4: Graphs of Quadratic Functions</p> <p>A1 M4 Lesson 11: Graphing Quadratic Functions from Factored Form</p> <p>A1 M4 Lesson 12: Using Symmetry to Graph Quadratic Functions from Standard Form</p> <p>A1 M4 Lesson 19: Transforming the Graphs of Quadratic Functions</p> <p>A1 M4 Lesson 23: Creating Equations of Quadratic Functions to Model Contexts</p>

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<p><b>HSF-IF.C.7.b</b></p> <p>Graph square root, cube root, and piecewise-defined functions, including step functions and absolute value functions.</p>	<p>A1 M3 Topic C: Piecewise-Defined Linear Functions</p> <p>A1 M3 Lesson 19: Building New Functions—Translations</p> <p>A1 M3 Lesson 23: A Summary of Transforming the Graph of a Function</p>
<p><b>HSF-IF.C.7.e</b></p> <p>Graph exponential and logarithmic functions, showing intercepts and end behavior, and trigonometric functions, showing period, midline, and amplitude.</p>	<p>A1 M5 Lesson 11: Graphing Exponential Functions</p> <p>A1 M5 Lesson 12: Using Transformations to Graph Exponential Functions (Bases Greater Than 1)</p> <p>A1 M5 Lesson 13: Using Transformations to Graph Exponential Functions (Bases Between 0 and 1)</p>
<p><b>HSF-IF.C.8</b></p> <p>Write a function defined by an expression in different but equivalent forms to reveal and explain different properties of the function.</p>	<p><i>This standard is fully addressed by the lessons aligned to its subsections.</i></p>
<p><b>HSF-IF.C.8.a</b></p> <p>Use the process of factoring and completing the square in a quadratic function to show zeros, extreme values, and symmetry of the graph, and interpret these in terms of a context.</p>	<p>A1 M4 Lesson 10: Zeros of Functions</p> <p>A1 M4 Lesson 11: Graphing Quadratic Functions from Factored Form</p> <p>A1 M4 Lesson 22: A Summary of Graphing Quadratic Functions</p>
<p><b>HSF-IF.C.8.b</b></p> <p>Use the properties of exponents to interpret expressions for exponential functions.</p>	<p>A1 M5 Lesson 11: Graphing Exponential Functions</p> <p>A1 M5 Lesson 12: Using Transformations to Graph Exponential Functions (Bases Greater Than 1)</p> <p>A1 M5 Lesson 18: Modeling Populations</p>



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<p><b>HSF-IF.C.9</b></p> <p>Compare properties of two functions each represented in a different way (algebraically, graphically, numerically in tables, or by verbal descriptions).</p>	<p>A1 M3 Lesson 11: Comparing Functions</p> <p>A1 M4 Lesson 12: Using Symmetry to Graph Quadratic Functions from Standard Form</p> <p>A1 M4 Lesson 21: Completing the Square to Graph Quadratic Functions</p>
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**Linear, Quadratic, and Exponential Models**

**HSF-LE.A Construct and compare linear, quadratic, and exponential models and solve problems.**

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<p><b>HSF-LE.A.1</b></p> <p>Distinguish between situations that can be modeled with linear functions and with exponential functions.</p>	<p>A1 M5 Lesson 15: Calculating Interest</p> <p>A1 M5 Lesson 18: Modeling Populations</p> <p>A1 M5 Lesson 21: World Population Prediction</p> <p>A1 M5 Lesson 22: A Closer Look at Populations</p> <p>A1 M5 Lesson 24: Modeling an Invasive Species Population</p> <p>A1 M6 Topic A: Modeling Bivariate Quantitative Data</p>
<p><b>HSF-LE.A.1.a</b></p> <p>Prove that linear functions grow by equal differences over equal intervals, and that exponential functions grow by equal factors over equal intervals.</p>	<p>A1 M5 Lesson 19: Analyzing Exponential Growth</p>

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<p><b>F-LE.A.1.b</b></p> <p>Recognize situations in which one quantity changes at a constant rate per unit interval relative to another.</p>	<p>A1 M5 Lesson 15: Calculating Interest</p> <p>A1 M5 Lesson 18: Modeling Populations</p> <p>A1 M5 Lesson 21: World Population Prediction</p> <p>A1 M5 Lesson 22: A Closer Look at Populations</p> <p>A1 M5 Lesson 24: Modeling an Invasive Species Population</p>
<p><b>F-LE.A.1.c</b></p> <p>Recognize situations in which a quantity grows or decays by a constant percent rate per unit interval relative to another.</p>	<p>A1 M5 Lesson 15: Calculating Interest</p> <p>A1 M5 Lesson 18: Modeling Populations</p> <p>A1 M5 Lesson 21: World Population Prediction</p> <p>A1 M5 Lesson 22: A Closer Look at Populations</p> <p>A1 M5 Lesson 24: Modeling an Invasive Species Population</p>
<p><b>HSF-LE.A.2</b></p> <p>Construct linear and exponential functions, including arithmetic and geometric sequences, given a graph, a description of a relationship, or two input-output pairs (include reading these from a table).</p>	<p>A1 M5 Lesson 8: Exponential Functions</p> <p>A1 M5 Lesson 14: Writing Equations for Exponential Functions from Tables or Graphs</p> <p>A1 M5 Lesson 16: Exponential Growth</p> <p>A1 M5 Lesson 17: Exponential Decay</p> <p>A1 M5 Topic D: Comparing Linear and Exponential Models</p> <p>A1 M6 Topic B: Developing Models for Contexts</p>
<p><b>HSF-LE.A.3</b></p> <p>Observe using graphs and tables that a quantity increasing exponentially eventually exceeds a quantity increasing linearly, quadratically, or (more generally) as a polynomial function.</p>	<p>A1 M5 Lesson 20: Comparing Growth of Functions</p>

## Linear, Quadratic, and Exponential Models

**HSF-LE.B Interpret expressions for functions in terms of the situation they model.**

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<p><b>HSF-LE.B.5</b></p> <p>Interpret the parameters in a linear or exponential function in terms of a context.</p>	<p>A1 M5 Lesson 18: Modeling Populations</p> <p>A1 M5 Lesson 19: Analyzing Exponential Growth</p> <p>A1 M5 Lesson 23: Modeling the Temperature of Objects Cooling Over Time</p> <p>A1 M5 Lesson 24: Modeling an Invasive Species Population</p>
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## Quantities

**HSN-Q.A Reason quantitatively and use units to solve problems.**

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<p><b>HSN-Q.A.1</b></p> <p>Use units as a way to understand problems and to guide the solution of multi-step problems; choose and interpret units consistently in formulas; choose and interpret the scale and the origin in graphs and data displays.</p>	<p>A1 M6 Lesson 5: Solar System Models</p>
<p><b>HSN-Q.A.2</b></p> <p>Define appropriate quantities for the purpose of descriptive modeling.</p>	<p>A1 M4 Lesson 25: Maximizing Area</p> <p>A1 M6 Lesson 5: Solar System Models</p>
<p><b>HSN-Q.A.3</b></p> <p>Choose a level of accuracy appropriate to limitations on measurement when reporting quantities.</p>	<p>A1 M6 Lesson 5: Solar System Models</p>

## The Real Number System

**HSN-RN.A** Extend the properties of exponents to rational exponents.

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<p><b>HSN-RN.A.1</b></p> <p>Explain how the definition of the meaning of rational exponents follows from extending the properties of integer exponents to those values, allowing for a notation for radicals in terms of rational exponents.</p>	<p>A1 M5 Lesson 9: Unit Fraction Exponents</p> <p>A1 M5 Lesson 10: Rational Exponents</p>
<p><b>HSN-RN.A.2</b></p> <p>Rewrite expressions involving radicals and rational exponents using the properties of exponents.</p>	<p>A1 M5 Lesson 9: Unit Fraction Exponents</p> <p>A1 M5 Lesson 10: Rational Exponents</p>

## The Real Number System

**HSN-RN.B** Use properties of rational and irrational numbers.

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<p><b>HSN-RN.B.3</b></p> <p>Explain why the sum or product of two rational numbers is rational; that the sum of a rational number and an irrational number is irrational; and that the product of a nonzero rational number and an irrational number is irrational.</p>	<p>A1 M4 Lesson 13: Using Square Roots to Solve Quadratic Equations</p> <p>A1 M4 Lesson 17: Rewriting Square Roots</p>

## Interpreting Categorical and Quantitative Data

**HSS-ID.A Summarize, represent, and interpret data on a single count or measurement variable.**

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<p><b>HSS-ID.A.1</b></p> <p>Represent data with plots on the real number line (dot plots, histograms, and box plots).</p>	<p>A1 M1 Lesson 18: Distributions and Their Shapes</p> <p>A1 M1 Lesson 19: Describing the Center of a Distribution</p> <p>A1 M1 Lesson 20: Using Center to Compare Data Distributions</p>
<p><b>HSS-ID.A.2</b></p> <p>Use statistics appropriate to the shape of the data distribution to compare center (median, mean) and spread (interquartile range, standard deviation) of two or more different data sets.</p>	<p>A1 M1 Topic D: Univariate Data</p>
<p><b>HSS-ID.A.3</b></p> <p>Interpret differences in shape, center, and spread in the context of the data sets, accounting for possible effects of extreme data points (outliers).</p>	<p>A1 M1 Topic D: Univariate Data</p>

## Interpreting Categorical and Quantitative Data

**HSS-ID.B Summarize, represent, and interpret data on two categorical and quantitative variables.**

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<p><b>HSS-ID.B.5</b></p> <p>Summarize categorical data for two categories in two-way frequency tables. Interpret relative frequencies in the context of the data (including joint, marginal, and conditional relative frequencies). Recognize possible associations and trends in the data.</p>	<p>A1 M2 Topic D: Categorical Data on Two Variables</p>
<p><b>HSS-ID.B.6</b></p> <p>Represent data on two quantitative variables on a scatter plot, and describe how the variables are related.</p>	<p>A1 M2 Lesson 15: Relationships Between Quantitative Variables</p> <p>A1 M2 Lesson 21: Analyzing Bivariate Quantitative Data</p>
<p><b>HSS-ID.B.6.a</b></p> <p>Fit a function to the data; use functions fitted to data to solve problems in the context of the data.</p>	<p>A1 M2 Lesson 16: Using Lines to Model Bivariate Quantitative Data</p> <p>A1 M2 Lesson 17: Modeling Relationships with a Line</p> <p>A1 M4 Lesson 23: Creating Equations of Quadratic Functions to Model Contexts</p> <p>A1 M4 Lesson 26: Modeling Data with Quadratic Functions</p> <p>A1 M4 Lesson 27: Search and Rescue Helicopter</p> <p>A1 M6 Topic A: Modeling Bivariate Quantitative Data</p>
<p><b>HSS-ID.B.6.b</b></p> <p>Informally assess the fit of a function by plotting and analyzing residuals.</p>	<p>A1 M2 Lesson 18: Calculating and Analyzing Residuals</p> <p>A1 M2 Lesson 19: Analyzing Residuals</p> <p>A1 M6 Topic A: Modeling Bivariate Quantitative Data</p>

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<p><b>HSS-ID.B.6.c</b></p> <p>Fit a linear function for a scatter plot that suggests a linear association.</p>	<p>A1 M2 Lesson 17: Modeling Relationships with a Line</p> <p>A1 M2 Lesson 18: Calculating and Analyzing Residuals</p> <p>A1 M2 Lesson 20: Interpreting Correlation</p> <p>A1 M6 Topic A: Modeling Bivariate Quantitative Data</p>
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**Interpreting Categorical and Quantitative Data**

**HSS-ID.C Interpret linear models.**

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<p><b>HSS-ID.C.7</b></p> <p>Interpret the slope (rate of change) and the intercept (constant term) of a linear model in the context of the data.</p>	<p>A1 M2 Lesson 16: Using Lines to Model Bivariate Quantitative Data</p> <p>A1 M2 Lesson 21: Analyzing Bivariate Quantitative Data</p>
<p><b>HSS-ID.C.8</b></p> <p>Compute (using technology) and interpret the correlation coefficient of a linear fit.</p>	<p>A1 M2 Lesson 20: Interpreting Correlation</p> <p>A1 M2 Lesson 21: Analyzing Bivariate Quantitative Data</p>
<p><b>HSS-ID.C.9</b></p> <p>Distinguish between correlation and causation.</p>	<p>A1 M2 Lesson 20: Interpreting Correlation</p> <p>A1 M2 Lesson 21: Analyzing Bivariate Quantitative Data</p>