**Algebra 1 CPM**

**Instructional Plan 2014-2015**

**Mathematics Instructional Plan Writing Committee**

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We would like to express our appreciation for the time, effort and expertise contributed to the writing of the secondary Mathematics Instructional Plans by our team of Seminole County math teachers.

**Purpose:**

The purpose of the Seminole County Public Schools Instructional Plan is to present an organized, responsible strategy of Benchmark presentation that incorporates Mathematics Formal Standards (MAFS) standards. This document will serve as a guide for teachers of mathematics. Latitude in the execution of this document shall be determined by a school rather than by an individual teacher.

**Goals:**

* To establish a classroom environment that values mathematical student discourse
* To engage students in cognitively challenging mathematical tasks
* To promote discussions that focus on student thinking, reasoning, problem solving and student presentation
* To build on student thinking while ensuring the discussion remains focused on the mathematical ideas of the lesson
* Employ questioning techniques that require students to justify, defend and support their ideas

**Instructional Plan Caveats:**

* Suggested practice corresponds to the associated lesson and left at the discretion of the instructor to be used as additional practice or assignment. Problems within the suggested pages may be exhausted or selected for targeted skills.
* Descriptions of the Mathematical Practices can be found on pages 3 – 4. Teachers are encouraged to embed the Questions to Develop Mathematical Thinking on pages 5 – 6 in their daily lessons.
* Learning goals and scales can be accessed through the hyperlinks within the Instructional Plan.
* Each learning scale will include links for formative assessment tasks that teachers are encouraged to use while students are progressing through the learning scale.
* Teachers are encouraged to use appropriate questioning strategies to fully address the instructional standards and expectations, by paying attention to the recommended caveats included throughout the IP to include discussion that may not be included as part of the textbook.
* Please look ahead and plan accordingly for time and copy needs that may arise throughout this year so that all MAFS standards are thoroughly addressed.
* Due to the fact that we do not have Test Item Specifications at this time the targeted Mathematical Practices for each unit are a projection.
* **Common Assessments need to be readdressed by PLCs to fit the new units and fully address the standards.**
* **Each unit will include at least one learning goal listed under the unit heading. The learning goals and scales correspond to the grade/level specific clusters as defined by the MAFS.**
* **The learning goals and scales are a work in progress and may be modified as needed. They are meant to be a starting point for PLCs to use as they customize the learning goals and scales to best demonstrate student learning.**

**Test Items Specifications:** [fsassessments.org](http://fsassessments.org/)

**STANDARDS FOR MATHEMATICAL PRACTICE**

1. **(MAFS.K12.MP.1.1) Make sense of problems and persevere in solving them.**

Mathematically proficient students start by explaining to themselves the meaning of a problem and looking for entry points to its solution. They analyze givens, constraints, relationships, and goals. They make conjectures about the form and meaning of the solution and plan a solution pathway rather than simply jumping into a solution attempt. They consider analogous problems, and try special cases and simpler forms of the original problem in order to gain insight into its solution. They monitor and evaluate their progress and change course if necessary. Older students might, depending on the context of the problem, transform algebraic expressions or change the viewing window on their graphing calculator to get the information they need. Mathematically proficient students can explain correspondences between equations, verbal descriptions, tables, and graphs or draw diagrams of important features and relationships, graph data, and search for regularity or trends. Younger students might rely on using concrete objects or pictures to help conceptualize and solve a problem. Mathematically proficient students check their answers to problems using a different method, and they continually ask themselves, “Does this make sense?” They can understand the approaches of others to solving complex problems and identify correspondences between different approaches.

1. **(MAFS.K12.MP.2.1) Reason abstractly and quantitatively.**

Mathematically proficient students make sense of quantities and their relationships in problem situations. They bring two complementary abilities to bear on problems involving quantitative relationships: the ability to *decontextualize*—to abstract a given situation and represent it symbolically and manipulate the representing symbols as if they have a life of their own, without necessarily attending to their referents—and the ability to *contextualize*, to pause as needed during the manipulation process in order to probe into the referents for the symbols involved. Quantitative reasoning entails habits of creating a coherent representation of the problem at hand; considering the units involved; attending to the meaning of quantities, not just how to compute them; and knowing and flexibly using different properties of operations and objects.

**3. (MAFS.K12.MP.3.1) Construct viable arguments and critique the reasoning of others.**

Mathematically proficient students understand and use stated assumptions, definitions, and previously established results in constructing arguments. They make conjectures and build a logical progression of statements to explore the truth of their conjectures. They are able to analyze situations by breaking them into cases, and can recognize and use counterexamples. They justify their conclusions, communicate them to others, and respond to the arguments of others. They reason inductively about data, making plausible arguments that take into account the context from which the data arose. Mathematically proficient students are also able to compare the effectiveness of two plausible arguments, distinguish correct logic or reasoning from that which is flawed, and—if there is a flaw in an argument—explain what it is. Elementary students can construct arguments using concrete referents such as objects, drawings, diagrams, and actions. Such arguments can make sense and be correct, even though they are not generalized or made formal until later grades. Later, students learn to determine domains to which an argument applies. Students at all grades can listen or read the arguments of others, decide whether they make sense, and ask useful questions to clarify or improve the arguments.

**4. (MAFS.K12.MP.4.1) Model with mathematics.**

Mathematically proficient students can apply the mathematics they know to solve problems arising in everyday life, society, and the workplace. In early grades, this might be as simple as writing an addition equation to describe a situation. In middle grades, a student might apply proportional reasoning to plan a school event or analyze a problem in the community. By high school, a student might use geometry to solve a design problem or use a function to describe how one quantity of interest depends on another. Mathematically proficient students who can apply what they know are comfortable making assumptions and approximations to simplify a complicated situation, realizing that these may need revision later. They are able to identify important quantities in a practical situation and map their relationships using such tools as diagrams, two-way tables, graphs, flowcharts and formulas. They can analyze those relationships mathematically to draw conclusions. They routinely interpret their mathematical results in the context of the situation and reflect on whether the results make sense, possibly improving the model if it has not served its purpose.

**5. (MAFS.K12.MP.5.1) Use appropriate tools strategically.**

Mathematically proficient students consider the available tools when solving a mathematical problem. These tools might include pencil and paper, concrete models, a ruler, a protractor, a calculator, a spreadsheet, a computer algebra system, a statistical package, or dynamic geometry software. Proficient students are sufficiently familiar with tools appropriate for their grade or course to make sound decisions about when each of these tools might be helpful, recognizing both the insight to be gained and their limitations. For example, mathematically proficient high school students analyze graphs of functions and solutions generated using a graphing calculator. They detect possible errors by strategically using estimation and other mathematical knowledge. When making mathematical models, they know that technology can enable them to visualize the results of varying assumptions, explore consequences, and compare predictions with data. Mathematically proficient students at various grade levels are able to identify relevant external mathematical resources, such as digital content located on a website, and use them to pose or solve problems. They are able to use technological tools to explore and deepen their understanding of concepts.

**6. (MAFS.K12.MP.6.1) Attend to precision.**

Mathematically proficient students try to communicate precisely to others. They try to use clear definitions in discussion with others and in their own reasoning. They state the meaning of the symbols they choose, including using the equal sign consistently and appropriately. They are careful about specifying units of measure, and labeling axes to clarify the correspondence with quantities in a problem. They calculate accurately and efficiently, express numerical answers with a degree of precision appropriate for the problem context. In the elementary grades, student’s give carefully formulated explanations to each other. By the time they reach high school they have learned to examine claims and make explicit use of definitions.

**7. (MAFS.K12.MP.7.1) Look for and make use of structure.**

Mathematically proficient students look closely to discern a pattern or structure. Young students, for example, might notice that three and seven more is the same amount as seven and three more, or they may sort a collection of shapes according to how many sides the shapes have. Later, students will see 7 × 8 equals the well-remembered 7 × 5 + 7 × 3, in preparation for learning about the distributive property. In the expression *x*2 + 9*x* + 14, older students can see the 14 as 2 × 7 and the 9 as 2 + 7. They recognize the significance of an existing line in a geometric figure and can use the strategy of drawing an auxiliary line for solving problems. They also can step back for an overview and shift perspective. They can see complicated things, such as some algebraic expressions, as single objects or as being composed of several objects. For example, they can see 5 – 3(*x* – *y*) 2 as 5 minus a positive number times a square and use that to realize that its value cannot be more than 5 for any real numbers *x* and *y*.

**8. (MAFS.K12.MP.8.1) Look for and express regularity in repeated reasoning.**

Mathematically proficient students notice if calculations are repeated, and look both for general methods and for shortcuts. Upper elementary students might notice when dividing 25 by 11 that they are repeating the same calculations over and over again, and conclude they have a repeating decimal. By paying attention to the calculation of slope as they repeatedly check whether points are on the line through (1, 2) with slope 3, middle school students might abstract the equation (*y* – 2)/(*x* – 1) = 3. Noticing the regularity in the way terms cancel when expanding (*x* – 1)(*x* + 1), (*x* – 1)(*x*2 + *x* + 1), and (*x* – 1)(*x*3 + *x*2 + *x* + 1) might lead them to the general formula for the sum of a geometric series. As they work to solve a problem, mathematically proficient students maintain oversight of the process, while attending to the details. They continually evaluate the reasonableness of their intermediate results.

| **Summary of Standards for Mathematical Practice** | **Questions to Develop Mathematical Thinking** |
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| **1. Make sense of problems and persevere in solving them.** |
| * Interpret and make meaning of the problem to find a starting point. Analyze what is given in order to explain to them the meaning of the problem.
* Plan a solution pathway instead of jumping to a solution.
* Monitor their progress and change the approach if necessary.
* See relationships between various representations.
* Relate current situations to concepts or skills previously learned and connect mathematical ideas to one another.
* Continually ask them, “Does this make sense?” Can understand various approaches to solutions.
 | * How would you describe the problem in your own words?
* How would you describe what you are trying to find?
* What do you notice about...?
* What information is given in the problem?
* Describe the relationship between the quantities.
* Describe what you have already tried. What might you change?
* Talk me through the steps you’ve used to this point.
* What steps in the process are you most confident about?
* What are some other strategies you might try?
* What are some other problems that are similar to this one?
* How might you use one of your previous problems to help you begin?
* How else might you organize...represent... show...?
 |
| **2. Reason abstractly and quantitatively.** |
| * Make sense of quantities and their relationships.
* Decontextualize (represent a situation symbolically and manipulate the symbols) and contextualize (make meaning of the symbols in a problem) quantitative relationships.
* Understand the meaning of quantities and are flexible in the use of operations and their properties.
* Create a logical representation of the problem.
* Attends to the meaning of quantities, not just how to compute them.
 | * What do the numbers used in the problem represent?
* What is the relationship of the quantities?
* How is \_\_\_\_\_\_\_ related to \_\_\_\_\_\_\_\_?
* What is the relationship between \_\_\_\_\_\_and \_\_\_\_\_\_?
* What does\_\_\_\_\_\_\_mean to you? (e.g. symbol, quantity, diagram)
* What properties might we use to find a solution?
* How did you decide in this task that you needed to use...?
* Could we have used another operation or property to solve this task? Why or why not?
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| **3. Construct viable arguments and critique the reasoning of others.** |
| * Analyze problems and use stated mathematical assumptions, definitions, and established results in constructing arguments.
* Justify conclusions with mathematical ideas.
* Listen to the arguments of others and ask useful questions to determine if an argument makes sense.
* Ask clarifying questions or suggest ideas to improve/revise the argument.
* Compare two arguments and determine correct or flawed logic.
 | * What mathematical evidence would support your solution?
* How can we be sure that...? / How could you prove that...?
* Will it still work if...?
* What were you considering when...?
* How did you decide to try that strategy?
* How did you test whether your approach worked?
* How did you decide what the problem was asking you to find? (What was unknown?)
* Did you try a method that did not work? Why didn’t it work? Would it ever work? Why or why not?
* What is the same and what is different about...?
* How could you demonstrate a counter-example?
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| **4. Model with mathematics.** |
| * Understand this is a way to reason quantitatively and abstractly (able to decontextualize and contextualize).
* Apply the mathematics they know to solve everyday problems.
* Are able to simplify a complex problem and identify important quantities to look at relationships.
* Represent mathematics to describe a situation either with an equation or a diagram and interpret the results of a mathematical situation.
* Reflect on whether the results make sense, possibly improving/revising the model.
* Ask them, “How can I represent this mathematically?”
 | * What number model could you construct to represent the problem?
* What are some ways to represent the quantities?
* What is an equation or expression that matches the diagram, number line..., chart..., table..?
* Where did you see one of the quantities in the task in your equation or expression?
* How would it help to create a diagram, graph, and table...?
* What are some ways to visually represent...?
* What formula might apply in this situation?
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| **5. Use appropriate tools strategically.** |
| * Use available tools recognizing the strengths and limitations of each Unit
* Use estimation and other mathematical knowledge to detect possible errors.
* Identify relevant external mathematical resources to pose and solve problems.
* Use technological tools to deepen their understanding of mathematics.
 | * What mathematical tools could we use to visualize and represent the situation?
* What information do you have?
* What do you know that is not stated in the problem?
* What approach are you considering trying first?
* What estimate did you make for the solution?
* In this situation would it be helpful to use...a graph..., number line..., ruler..., diagram..., calculator..., manipulative?
* Why was it helpful to use...?
* What can using a \_\_\_\_\_\_ show us that \_\_\_\_\_may not?
* In what situations might it be more informative or helpful to use...?
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| **6. Attend to precision.** |
| * Communicate precisely with others and try to use clear mathematical language when discussing their reasoning.
* Understand the meanings of symbols used in mathematics and can label quantities appropriately.
* Express numerical answers with a degree of precision appropriate for the problem context.
* Calculate efficiently and accurately.
 | * What mathematical terms apply in this situation?
* How did you know your solution was reasonable?
* Explain how you might show that your solution answers the problem.
* What would be a more efficient strategy?
* How are you showing the meaning of the quantities?
* What symbols or mathematical notations are important in this problem?
* What mathematical language...,definitions..., properties can you use to explain...?
* How could you test your solution to see if it answers the problem?
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| **7. Look for and make use of structure.** |
| * Apply general mathematical rules to specific situations.
* Look for the overall structure and patterns in mathematics.
* See complicated things as single objects or as being composed of several objects.
 | * What observations do you make about...?
* What do you notice when...?
* What parts of the problem might you eliminate.., simplify..?
* What patterns do you find in...?
* How do you know if something is a pattern?
* What ideas that we have learned before were useful in solving this problem?
* What are some other problems that are similar to this one?
* How does this relate to...?
* In what ways does this problem connect to other mathematical concepts?
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| **8. Look for and express regularity in repeated reasoning.** |
| * See repeated calculations and look for generalizations and shortcuts.
* See the overall process of the problem and still attend to the details.
* Understand the broader application of patterns and see the structure in similar situations.
* Continually evaluate the reasonableness of their intermediate results
 | * Explain how this strategy works in other situations?
* Is this always true, sometimes true or never true?
* How would we prove that...?
* What do you notice about...?
* What is happening in this situation?
* What would happen if...?
* Is there a mathematical rule for...?
* What predictions or generalizations can this pattern support?
* What mathematical consistencies do you notice?
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| **FIRST QUARTER (August 11 – October 9)**  | **42 DAYS** |
| **Topic/Assessment** | **Dates Covered** | **Topic/Assessment** |
| Unit 1:Collecting and Analyzing Data |  | 3 |
| Unit 2:Solving Linear Equations and Inequalities |  | 8 |
| Unit 3:Graphing Functions and Solving Equations |  | 11 |
| Unit 4:Graphing Linear Equations |  | 7 |
| Unit 5: Multiplying Polynomials |  | 10 |
| District Assessment (1 day), 9 Weeks Exams (2 days) |  | 3 |
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| **SECOND QUARTER (October 13 – December 18)**  | **46 DAYS** |
| **Topic/Assessment** | **Dates Covered** | **Topic/Assessment** |
| Unit 6: Solving Systems of Equations |  | 9 |
| Unit 7: Linear Relationships |  | 16 |
| Unit 8: Quadratic Relationships |  | 17 |
| District Assessment (1 day); 9 Weeks Exams (3 days) |  | 4 |
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| **THIRD QUARTER (January 6 – March 12)** | **46 DAYS** |
| **Topic/Assessment** | **Dates Covered** | **Topic/Assessment** |
| Unit 9: Inequalities |  | 8 |
| Unit 10: Rewriting and Solving Linear and Non Linear Equations |  | 11 |
| Unit 11: Functions and Relations |  | 11 |
| Unit 12: Equivalent Expressions |  | 7 |
| Unit 13: Modeling One Variable Data |  | 6 |
| District Assessment (1 day); 9 Weeks Exams (2 days) |  | 3 |
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| **FOURTH QUARTER (March 23 – May 27)**  | **46 DAYS** |
| **Topic/Assessment** | **Dates Covered** | **Topic/Assessment** |
| Unit 14: Modeling Two Variable Data |  | 9 |
| Unit 15: Arithmetic and Geometric Sequences |  | 11 |
| Unit 16: Putting it all together |  | 16 |
| FSA Tests (7 days); 9 Weeks Exams (3 days) |  | 10 |

*\*Please note that the suggested number of instructional days per unit and quarter are designed to be a guide. Teachers are encouraged to work within their schools and their PLCs to make the most appropriate timing decisions for their students.\**

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| **FIRST QUARTER** |
| **Unit 1: Collecting and Analyzing Data** |
| **Learning Goal** | A111: Use properties of rational exponents and apply properties of numbers to rational and irrational numbers. | **# Days** | **3** |
| **Standards** | *FL Coding* | *Standards* |
| N-Q.1.1 | 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. |
|  | N-Q.1.2 | Define appropriate quantities for the purpose of descriptive modeling. |
|  | N-Q.1.3 | Choose a level of accuracy appropriate to limitations on measurement when reporting quantities. |
| *Mathematical Practices* |
| 1. Make sense of problems and persevere in solving them. | 2. Reason abstractly and quantitatively. | 3. Construct viable arguments and critique the reasoning of others. | 4. Model with mathematics  | 5. Use appropriate tools strategically. | 6. Attend to precision. | 7. Look for and make use of structure. | 8. Look for and express regularity in repeated reasoning. |
| **Suggested Days** | **Lesson Objective (Instructional Resources)** | **Suggested Assignments/Assessments** | **Supplementary Materials****Use Algebra 1 Standard Textbook (HMH)** |
| 1 | 1.1.1: Interpreting Graphs |  |  |
| 1 | 1.1.3: Collecting, Organizing, and Analyzing Data |  |  |
| 1 | Review/Assessment |  |  |

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| **FIRST QUARTER** |
| **Unit 2: Solving Linear Equations and Inequalities**  |
| **Learning Goal** | A103: Solve equations and inequalities in one variable, and justify reasoning.A102: Perform arithmetic operations on polynomials and find factors and zeros of polynomials. | **# Days** | **8** |
| **Standards** | **FL Coding** | **Standards** |
| A-APR.1.1 | 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. |
|  | A-REI.1.1 | 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. |
|  | A-REI.2.3 | Solve linear equations and inequalities in one variable, including equations with coefficients represented by letters. |
|  | A-SSE.1.1 | Interpret expressions that represent a quantity in terms of its context. 1. Interpret parts of an expression, such as terms, factors, and coefficients.
2. Interpret complicated expressions by viewing one or more of their parts as a single entity. For example, interpret $P(1+r)^{n}$ as the product of P and a factor not depending on P.
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| **Mathematical Practices** |
| 1. Make sense of problems and persevere in solving them. | 2. Reason abstractly and quantitatively. | 3. Construct viable arguments and critique the reasoning of others. | 4. Model with mathematics.  | 5. Use appropriate tools strategically. | 6. Attend to precision. | 7. Look for and make use of structure. | 8. Look for and express regularity in repeated reasoning. |
| **Suggested Days** | **Lesson Objective (Instructional Resources)** | **Suggested Assignments/Assessments** | **Supplementary Materials** |
| For supplemental material, student text can be found here: <http://www.cpm.org/pdfs/standards/CCSS/CCSS%20AC%20student%20V1.1.pdf>For supplemental material, teacher text can be found here: <http://www.cpm.org/pdfs/standards/CCSS/CCSS%20AC%20teacher%20V1.1.pdf>The resources are also available on Blackboard. Go to Blackboard, SCPS High School Math Teachers, 2013-2014 Resources, Algebra 1 |
| 1 | 2.1.1: Exploring Variables and Combining Like Terms |  | ACE Module 3.1 (p. 51-56) |
|  | 2.1.2: Simplifying Expressions by Combining Like Terms |  |  |
| 1 | 2.1.3: Writing Algebraic Expressions |  | ACE Modules 3.2 – 3.3 (p. 57 – 73) |
| 1 | 2.1.4: Using Zero to Simplify Algebraic Expressions |  |  |
|  | 2.1.5: Using Algebra Tiles to Simplify Algebraic Expressions |  |  |
| 1 | 2.1.6: Using Algebra Tiles to Compare Expressions |  |  |
| 1 | 2.1.7: Simplifying and Recording Work  |  | ACE Module 4.1 ( p. 89 - 96) |
|  | 2.1.8: Using Algebra Tiles to Solve for x |  |  |
| 1 | AC CCSS Supplement: Justifications for solving equations. | Student Supplement: Pg. 6-7 |  |
|  | 2.1.9: More Solving Equations |  |  |
| 2 | Review and Assessment |  |  |

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| **FIRST QUARTER** |
| **Unit 3: Graphing Functions and Solving Equations** |
| **Learning Goal** | A103: Solve equations and inequalities in one variable, and justify reasoning. | **# Days** | **11** |
| **Standards** | **FL Coding** | **Standards** |
| A-CED.1.1 | Create equations and inequalities in one variable and use them to solve problems. Include equations arising from linear and quadratic functions, and simple rational and exponential functions.  |
|  | A-REI.2.3 | Solve linear equations and inequalities in one variable, including equations with coefficients represented by letters. |
|  | A-REI.4.10 | 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). |
|  | F-IF.3.7 | Graph functions expressed symbolically and show key features of the graph, by hand in simple cases and using technology for more complicated cases. 1. Graph linear and quadratic functions and show intercepts, maxima, and minima.
2. Graph square root, cube root, and piecewise-defined functions, including step functions and absolute value functions.
3. Graph polynomial functions, identifying zeros when suitable factorizations are available, and showing end behavior.
4. Graph exponential and logarithmic functions, showing intercepts and end behavior, and trigonometric functions, showing period, midline, and amplitude.
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| **Mathematical Practices** |
| 1. Make sense of problems and persevere in solving them. | 2. Reason abstractly and quantitatively. | 3. Construct viable arguments and critique the reasoning of others. | 4. Model with mathematics.  | 5. Use appropriate tools strategically. | 6. Attend to precision. | 7. Look for and make use of structure. | 8. Look for and express regularity in repeated reasoning. |
| **Suggested Days** | **Lesson Objective (Instructional Resources)** | **Suggested Assignments/Assessments** | **Supplementary Materials** |
| 1 | 3.1.1: Extending Patterns and Finding Rules |  |  |
| 1 | 3.1.2: Using Tables, Graphs, and Rules to Make Predictions |  |  |
| 1 | 3.1.3: Using the Graphing Calculator and Identifying Solutions |  |  |
| 1 | 3.1.4: Completing Tables and Drawing Graphs |  |   |
|  | 3.1.5: Graphs, Tables, and Rules |  |  |
| 1 | 3.1.6: Complete Graphs3.1.7: Identifying Common Graphing Errors |  |  |
| 1 | 3.2.1: Solving Equations and Testing the Solutions |  | ACE Modules 4.1 -4.3 (p. 89 – 107) |
| 1 | 3.2.2: Determining the Number of Solutions |  |  |
| 1 | 3.2.3: Solving Equations to Solve Problems |  |  |
|  | 3.2.4: More Solving Equations to Solve Problems |  |  |
| 3 | Review/Assessment |  |  |

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| **FIRST QUARTER** |
| **Unit 4: Graphing Linear Equations** |
| **Learning Goal** | A108: Compare and analyze functions using multiple representations, such as tables, graphs, equations, and verbal descriptions.A110: Construct and compare linear and quadratic models and interpret parameters in context. | **# Days** | **7** |
| **Standards** | **FL Coding** | **Standards** |
| A-CED.1.2 | Create equations in two or more variables to represent relationships between quantities; graph equations on coordinate axes with labels and scales.  |
|  | A-REI.4.11 | Explain why the x-coordinates of the points where the graphs of the equations y = f(x) and y = g(x) intersect are the solutions of the equation f(x) = g(x); find the solutions approximately, e.g., using technology to graph the functions, make tables of values, or find successive approximations. Include cases where f(x) and/or g(x) are linear, polynomial, rational, absolute value, exponential, and logarithmic functions.  |
|  | A-SSE.1.1 | Interpret expressions that represent a quantity in terms of its context. 1. Interpret parts of an expression, such as terms, factors, and coefficients.
2. Interpret complicated expressions by viewing one or more of their parts as a single entity. For example, interpret $P(1+r)^{n}$ as the product of P and a factor not depending on P.
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|  | F-BF.1.1 | Write a function that describes a relationship between two quantities. 1. Determine an explicit expression, a recursive process, or steps for calculation from a context.
2. Combine standard function types using arithmetic operations. For example, build a function that models the temperature of a cooling body by adding a constant function to a decaying exponential, and relate these functions to the model.
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|  | F-IF.3.7 | Graph functions expressed symbolically and show key features of the graph, by hand in simple cases and using technology for more complicated cases. 1. Graph linear and quadratic functions and show intercepts, maxima, and minima.
2. Graph square root, cube root, and piecewise-defined functions, including step functions and absolute value functions.
3. Graph polynomial functions, identifying zeros when suitable factorizations are available, and showing end behavior.
4. Graph exponential and logarithmic functions, showing intercepts and end behavior, and trigonometric functions, showing period, midline, and amplitude.
 |
|  | F-IF.3.9 | Compare properties of two function each represented in a different way (algebraically, graphically, numerically in tables, or by verbal description). For example, given a graph of one quadratic function and an algebraic expression for another, say which has the larger minimum. |
|  | F-LE.1.1 | Distinguish between situations that can be modeled with linear functions and with exponential functions. 1. Prove that linear functions grow by equal differences over equal intervals, and that exponential functions grow by equal factors over equal intervals.
2. Recognize situations in which one quantity changes at a constant rate per unit interval relative to another.
3. Recognize situations in which a quantity grows or decays by a constant percent rate per unit interval relative to another.
 |
|  | F-LE.1.2 | Construct linear and exponential function, including arithmetic and geometric sequences, given a graph, a description of a relationship, or two input/output pairs (include reading these from a table). |
|  | F-LE.2.5 | Interpret the parameters in a linear or exponential function in terms of a context. |
| **Mathematical Practices** |
| 1. Make sense of problems and persevere in solving them. | 2. Reason abstractly and quantitatively. | 3. Construct viable arguments and critique the reasoning of others. | 4. Model with mathematics.  | 5. Use appropriate tools strategically. | 6. Attend to precision. | 7. Look for and make use of structure. | 8. Look for and express regularity in repeated reasoning. |
| **Suggested Days** | **Lesson Objective (Instructional Resources)** | **Suggested Assignments/Assessments** | **Supplementary Materials** |
| 1 | 4.1.1: Finding Connections Between Representations |  |  |
| 1 | 4.1.2: Seeing Growth in Different Representations |  |  |
|  | 4.1.3: Connecting Linear Rules and Graphs |  | ACE Modules 6.1 – 6.7 (p. 155-206) |
| 1 | 4.1.4: Linear Equations and Slope Intercept Form |  |  |
| 1 | 4.1.5: Checking the Connections |  |  |
| 1 | 4.1.6: Graphing Without a Table of Values |  |  |
|  | 4.1.7: Connecting the Web |  |  |
| 2 | Review/Assessment |  |  |

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| **FIRST QUARTER** |
| **Unit 5: Multiplying Polynomials** |
| **Learning Goal** | A101: Create equations that describe numbers or relationships. | **# Days** | **10 (3)** |
| **Standards** | **FL Coding** | **Standards** |
| A-APR.1.1 | 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. |
|  | A-CED.1.1 | Create equations and inequalities in one variable and use them to solve problems. Include equations arising from linear and quadratic functions, and simple rational and exponential functions.  |
|  | A-CED.1.4 | Rearrange formulas to highlight a quantity of interest, using the same reasoning as in solving equations.For example, rearrange Ohm’s law V = IR to highlight resistance R.  |
|  | A-REI.2.3 | Solve linear equations and inequalities in one variable, including equations with coefficients represented by letters. |
|  | A-SSE.1.1 | Interpret expressions that represent a quantity in terms of its context. 1. Interpret parts of an expression, such as terms, factors, and coefficients.
2. Interpret complicated expressions by viewing one or more of their parts as a single entity. For example, interpret $P(1+r)^{n}$ as the product of P and a factor not depending on P.
 |
|  | N-Q.1.2 | Define appropriate quantities for the purpose of descriptive modeling. |
|  | N-Q.1.3 | Choose a level of accuracy appropriate to limitations on measurement when reporting quantities. |
| **Mathematical Practices** |
| 1. Make sense of problems and persevere in solving them. | 2. Reason abstractly and quantitatively. | 3. Construct viable arguments and critique the reasoning of others. | 4. Model with mathematics. | 5. Use appropriate tools strategically. | 6. Attend to precision. | 7. Look for and make use of structure. | 8. Look for and express regularity in repeated reasoning. |
| **Suggested Days** | **Lesson Objective (Instructional Resources)** | **Suggested Assignments/Assessments** | **Supplementary Materials** |
| For supplemental material, student text can be found here: <http://www.cpm.org/pdfs/standards/CCSS/CCSS%20AC%20student%20V1.1.pdf>For supplemental material, teacher text can be found here: <http://www.cpm.org/pdfs/standards/CCSS/CCSS%20AC%20teacher%20V1.1.pdf>The resources are also available on Blackboard. Go to Blackboard, SCPS High School Math Teachers, 2013-2014 Resources, Algebra 1 |
| 1 | 5.1.1: Exploring an Area Model |  |  |
|  | 5.1.2: Multiplying Binomials and the Distributive Property |  |  |
| 1 | 5.1.3: Using Generic Rectangles to Multiply |  | ACE Modules 14.3 – 14.4 (p. 501 – 516) |
| 1 | 5.1.4: Solving Equations with Multiplication |  |  |
|  | 5.1.5: Working with Multi-Variable Equations |  |  |
| 2 | 5.1.6: Solving Equations without Manipulatives |  |  |
| 1 | 5.2.1: Setting up and Solving Proportions |  |  |
| 1 | 5.2.2: Practice with Proportions |  |  |
|  | 5.2.3: Applying Proportions |  |  |
| 3 | Review/Assessment |  |  |
|  | **District Assessment** (1 day) |
|  | **9 Week Review/Assessment** (2 days) |

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| **SECOND QUARTER** |
| **Unit 6: Solving Systems of Equations** |
| **Learning Goal** | A104: Solve systems of linear equations and inequalities, algebraically and graphically | **# Days** | **9** |
| **Standards** | **FL Coding** | **Standards** |
| A-CED.1.1 | Create equations and inequalities in one variable and use them to solve problems. Include equations arising from linear and quadratic functions, and simple rational and exponential functions.  |
|  | A-REI.3.5 | 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. |
|  | A-REI.3.6 | Solve systems of linear equations exactly and approximately (e.g., with graphs), focusing on pairs of linear equations in two variables. |
|  | N-Q.1.1 | 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. |
| **Mathematical Practices** |
| 1. Make sense of problems and persevere in solving them. | 2. Reason abstractly and quantitatively. | 3. Construct viable arguments and critique the reasoning of others. | 4. Model with mathematics.  | 5. Use appropriate tools strategically. | 6. Attend to precision. | 7. Look for and make use of structure. | 8. Look for and express regularity in repeated reasoning. |
| **Suggested Days** | **Lesson Objective (Instructional Resources)** | **Suggested Assignments/Assessments** | **Supplementary Materials** |
| 1 | 6.1.1: Mathematical Sentences |  |  |
|  | 6.1.2: Solving Word Problems by Writing Equations |  |  |
| 1 | 6.1.3: Solving Problems by Writing Equations |  |  |
| 1 | 4.2.1: Introduction to Systems of Equations |  | ACE Module 9.1 (p. 277 – 284) |
| 1 | 6.2.1: Solving Systems of Equations Using Substitution |  | ACE Module 9.2 (p. 285 – 292) |
|  | 6.2.2: Making Connections: Systems, Solutions, and Graphs |  |  |
| 1 | 6.2.3: Solving Systems of Equations Using Elimination |  | CCSS Student Supp.: Pg. 6-7ACE Modules 9.3 – 9.4 (293 -310) |
|  | 6.2.4: More Elimination |  |  |
| 1 | 6.2.5: Choosing a Strategy for Solving Systems |  |  |
| 3 | Review/Assessment |  |  |

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| **SECOND QUARTER** |
| **Unit 7: Linear Relationships**  |
| **Learning Goal** | A107: Build a function that models a relationship between two quantities using function transformations. | **# Days** | **16** |
| **Standards** | **FL Coding** | **Standards** |
| A-CED.1.2 | Create equations in two or more variables to represent relationships between quantities; graph equations on coordinate axes with labels and scales.  |
|  | F-BF.1.1 | Write a function that describes a relationship between two quantities. 1. Determine an explicit expression, a recursive process, or steps for calculation from a context.
2. Combine standard function types using arithmetic operations. For example, build a function that models the temperature of a cooling body by adding a constant function to a decaying exponential, and relate these functions to the model.
 |
|  | F-IF.2.6 | 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.  |
|  | F-IF.3.7 | Graph functions expressed symbolically and show key features of the graph, by hand in simple cases and using technology for more complicated cases. 1. Graph linear and quadratic functions and show intercepts, maxima, and minima.
2. Graph square root, cube root, and piecewise-defined functions, including step functions and absolute value functions.
3. Graph polynomial functions, identifying zeros when suitable factorizations are available, and showing end behavior.
4. Graph exponential and logarithmic functions, showing intercepts and end behavior, and trigonometric functions, showing period, midline, and amplitude.
 |
|  | F-LE.2.5 | Interpret the parameters in a linear or exponential function in terms of a context. |
|  | N-Q.1.1 | 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. |
|  | N-Q.1.3 | Choose a level of accuracy appropriate to limitations on measurement when reporting quantities. |
|  | S-ID.2.6 | Represent data on two quantitative variables on a scatter plot, and describe how the variables are related. 1. Fit a function to the data; use functions fitted to data to solve problems in the context of the data.Use given functions or choose a function suggested by the context. Emphasize linear, quadratic, and exponential models.
2. Informally assess the fit of a function by plotting and analyzing residuals.
3. Fit a linear function for a scatter plot that suggests a linear association.
 |
| **Mathematical Practices** |
| 1. Make sense of problems and persevere in solving them. | 2. Reason abstractly and quantitatively. | 3. Construct viable arguments and critique the reasoning of others. | 4. Model with mathematics.  | 5. Use appropriate tools strategically. | 6. Attend to precision. | 7. Look for and make use of structure. | 8. Look for and express regularity in repeated reasoning. |
| **Suggested Days** | **Lesson Objective (Instructional Resources)** | **Suggested Assignments/Assessments** | **Supplementary Materials** |
| 1 | 7.1.1: Slope |  | ACE Modules 6.1 - 6.7  |
| 1 | 7.1.2: Using Equations to Make Predictions  |  |  |
| 1 | 7.1.3: Measuring Steepness: An Introduction to Slope |  |  |
|  | 7.1.4: Comparing the Vertical and Horizontal Change |  |  |
| 1 | 7.1.5: More Slope |  |  |
| 1 | 7.2.1: Equation of a Line in Context |  |  |
|  | 7.2.2: Slope as a Measurement of Rate |  |  |
| 1 | 7.2.3: Rates of Change |  |  |
| 2 | 7.3.1: Finding an Equation Given a Slope and a Point |  |  |
|  | 7.3.2: Slopes of Parallel and Perpendicular Lines  |  |  |
| 1 | 7.3.3: Finding the Equation of a Line Through Two Points |  |  |
| 1 | 7.3.4: Finding the Slope Intercept Form of a Line from their Graphs |  |  |
| 1 | 3-5: Working with Sets**\*\*\*Complement noted by BOTH ~ and ‘ symbols** |  |  |
| 1 | 3-8 Unions and Intersection of Sets**\*\*\*Cross Products \*\*\*** |  |  |
| 4 | Review/Assessment |  |  |

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| **SECOND QUARTER** |
| **Unit 8: Quadratic Relationships** |
| **Learning Goal** | A105: Use patterns and structure to rewrite expressions in equivalent forms to solve problems.A102: Perform arithmetic operations on polynomials and find factors and zeros of polynomials. | **# Days** | **17 (4)** |
| **Standards** | **FL Coding** | **Standards** |
| A-APR.2.3 | Identify zeros of polynomials when suitable factorizations are available, and use the zeros to construct a rough graph of the function defined by the polynomial. |
|  | A-CED.1.1 | Create equations and inequalities in one variable and use them to solve problems. Include equations arising from linear and quadratic functions, and simple rational and exponential functions. |
|  | A-REI.2.4 | Solve quadratic equations in one variable. 1. Use the method of completing the square to transform any quadratic equation in x into an equation of the form (x – p)² = q that has the same solutions. Derive the quadratic formula from this form.
2. Solve quadratic equations by inspection (e.g., for x² = 49), 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 *a ± bi* for real numbers a and b.
 |
|  | A-SSE.1.1 | Interpret expressions that represent a quantity in terms of its context. 1. Interpret parts of an expression, such as terms, factors, and coefficients.
2. Interpret complicated expressions by viewing one or more of their parts as a single entity. For example, interpret $P(1+r)^{n}$ as the product of P and a factor not depending on P.
 |
|  | A-SSE.2.3 | Choose and produce an equivalent form of an expression to reveal and explain properties of the quantity represented by the expression. 1. Factor a quadratic expression to reveal the zeros of the function it defines.
2. Complete the square in a quadratic expression to reveal the maximum or minimum value of the function it defines.
3. Use the properties of exponents to transform expressions for exponential functions. For example the expression  1.15t can be rewritten as (1.151/12)12t ≈ 1.01212t to reveal the approximate equivalent monthly interest rate if the annual rate is 15%.
 |
|  | F-IF.3.7 | Graph functions expressed symbolically and show key features of the graph, by hand in simple cases and using technology for more complicated cases. 1. Graph linear and quadratic functions and show intercepts, maxima, and minima.
2. Graph square root, cube root, and piecewise-defined functions, including step functions and absolute value functions.
3. Graph polynomial functions, identifying zeros when suitable factorizations are available, and showing end behavior.
4. Graph exponential and logarithmic functions, showing intercepts and end behavior, and trigonometric functions, showing period, midline, and amplitude.
 |
|  | F-IF.3.8 | Write a function defined by an expression in different but equivalent forms to reveal and explain different properties of the function. 1. 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.
2. Use the properties of exponents to interpret expressions for exponential functions. For example, identify percent rate of change in functions such as y = (1.02)t, y = (0.97)t, y = (1.01)12t, y = (1.2)t/10, and classify them as representing exponential growth or decay.
 |
|  | N-RN.2.3 | 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. |
| **Mathematical Practices** |
| 1. Make sense of problems and persevere in solving them. | 2. Reason abstractly and quantitatively. | 3. Construct viable arguments and critique the reasoning of others. | 4. Model with mathematics.  | 5. Use appropriate tools strategically. | 6. Attend to precision. | 7. Look for and make use of structure. | 8. Look for and express regularity in repeated reasoning. |

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| **Suggested Days** | **Lesson Objective (Instructional Resources)** | **Suggested Assignments/Assessment** | **Supplementary Materials** |
| For supplemental material, student text can be found here: <http://www.cpm.org/pdfs/standards/CCSS/CCSS%20AC%20student%20V1.1.pdf>For supplemental material, teacher text can be found here: <http://www.cpm.org/pdfs/standards/CCSS/CCSS%20AC%20teacher%20V1.1.pdf>* The resources are also available on Blackboard. Go to Blackboard, SCPS High School Math Teachers, 2013-2014 Resources, Algebra 1
 |
| 1 | 8.1.1: Introduction to Factoring Quadratics |  | ACE Modules 15.1 – 15.3 (p. 523 – 548) |
| 1 | 8.1.2: Factoring with Generic Rectangles |  |  |
| 1 | 8.1.3: Factoring with Special Cases |  | ACE Module 15.4 (p. 549 – 556) |
| 1 | 8.1.4: Factoring Completely |  |  |
| 1 | 8.2.1: Investigating a Parabola |  | ACE Module 17.4 (p. 659 – 668) |
| 1 | 8.2.2: Multiple Representations for Quadratics |  |  |
| 1 | 8.2.3: Zero Product Property |  |  |
| 1 | 8.2.4: Solving Quadratic Equations by Factoring |  | ACE Modules 16.2 – 16.3 (p. 571 – 586) |
| 1 | 8.2.5: Completing the Quadratic Web |  |  |
| 1 | AC CCSS Supplement: Real Numbers | Student Supp.: Pg. 8-9 |  |
| 1 | 8.3.1: Introduction to the Quadratic Formula |  | ACE Module 16.6 (p.603 -610)  |
| 1 | 8.3.2: More Solving Quadratic Equations |  |  |
| 1 | 8.3.3: Choosing a Strategy |  |  |
| 4 | Review/Assessment. |  |  |
|  | **District Assessment** (1 day) |
|  | **9 Week Review/Assessment** (3 days) |

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| **THIRD QUARTER** |
| **Unit 9: Inequalities**  |
| **Learning Goal** | A101: Create equations that describe numbers or relationships. | **# Days** | **8** |
| **Standards** | **FL Coding** | **Standards** |
| A-CED.1.1 | Create equations and inequalities in one variable and use them to solve problems. Include equations arising from linear and quadratic functions, and simple rational and exponential functions.  |
|  | A-CED.1.3 | Represent constraints by equations or inequalities, and by systems of equations and/or inequalities, and interpret solutions as viable or nonviable options in a modeling context. For example, represent inequalities describing nutritional and cost constraints on combinations of different foods.  |
|  | A-REI.2.3 | Solve linear equations and inequalities in one variable, including equations with coefficients represented by letters. |
|  | A-REI.4.12 | 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. |
|  | F-IF.3.7 | Graph functions expressed symbolically and show key features of the graph, by hand in simple cases and using technology for more complicated cases. 1. Graph linear and quadratic functions and show intercepts, maxima, and minima.
2. Graph square root, cube root, and piecewise-defined functions, including step functions and absolute value functions.
3. Graph polynomial functions, identifying zeros when suitable factorizations are available, and showing end behavior.
4. Graph exponential and logarithmic functions, showing intercepts and end behavior, and trigonometric functions, showing period, midline, and amplitude.
 |
| **Mathematical Practices** |
| 1. Make sense of problems and persevere in solving them. | 2. Reason abstractly and quantitatively. | 3. Construct viable arguments and critique the reasoning of others. | 4. Model with mathematics.  | 5. Use appropriate tools strategically. | 6. Attend to precision. | 7. Look for and make use of structure. | 8. Look for and express regularity in repeated reasoning. |
| **Suggested Days** | **Lesson Objective (Instructional Resources)** | **Suggested Assignments/Assessments** | **Supplementary Materials** |
| 1 | 9.1.1: Solving Linear, One-Variable Inequalities |  | ACE Module 4.2 (p. 97-106) |
|  | 9.1.2: More Solving Inequalities |  |  |
| 1 | 9.2.1: Graphing Two-Variable Inequalities |  | ACE Module 9.5 (p. 311-328) |
| 1 | 9.2.2: Graphing Linear and Non-Linear Inequalities |  |  |
| 1 | 9.2.3: Introduction to Absolute Value  |  | ACE Module 18.2 (p. 701 – 708) |
| 1 | 9.3.1: Systems of Inequalities |  | ACE Module 9.5 (p. 311-328) |
|  | 9.3.2: More Systems of Inequalities |  |  |
| 1 | 9.3.3: Applying Inequalities to Solve Problems |  |  |
| 2 | Review/Assessment |  |  |

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| **THIRD QUARTER** |
| **Unit 10: Rewriting and Solving Linear and Non Linear Equations** |
| **Learning Goal** | A111: Use properties of rational exponents and apply properties of numbers to rational and irrational numbers. | **# Days** | **11** |
| **Standards** | **FL Coding** | **Standards** |
| A-REI.2.4 | Solve quadratic equations in one variable. 1. Use the method of completing the square to transform any quadratic equation in x into an equation of the form (x – p)² = q that has the same solutions. Derive the quadratic formula from this form.
2. Solve quadratic equations by inspection (e.g., for x² = 49), 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 *a ± bi* for real numbers a and b.
 |
|  | A-SSE.2.3 | Choose and produce an equivalent form of an expression to reveal and explain properties of the quantity represented by the expression. 1. Factor a quadratic expression to reveal the zeros of the function it defines.
2. Complete the square in a quadratic expression to reveal the maximum or minimum value of the function it defines.
3. Use the properties of exponents to transform expressions for exponential functions. For example the expression  1.15t can be rewritten as (1.151/12)12t ≈ 1.01212t to reveal the approximate equivalent monthly interest rate if the annual rate is 15%.
 |
|  | F-IF.3.8 | Write a function defined by an expression in different but equivalent forms to reveal and explain different properties of the function. 1. 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.
2. Use the properties of exponents to interpret expressions for exponential functions. For example, identify percent rate of change in functions such as y = (1.02)t, y = (0.97)t, y = (1.01)12t, y = (1.2)t/10, and classify them as representing exponential growth or decay.
 |
|  | N-RN.1.1 | 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.For example, we define 5t/3 to be the cube root of 5 because we want (51/3)3 = 5(t/3)3 to hold, so (5t/3)3 must equal 5. |
|  | N-RN.1.2 | Rewrite expressions involving radicals and rational exponents using the properties of exponents. |
| **Mathematical Practices** |
| 1. Make sense of problems and persevere in solving them. | 2. Reason abstractly and quantitatively. | 3. Construct viable arguments and critique the reasoning of others. | 4. Model with mathematics. | 5. Use appropriate tools strategically. | 6. Attend to precision. | 7. Look for and make use of structure. | 8. Look for and express regularity in repeated reasoning. |
| **Suggested Days** | **Lesson Objective (Instructional Resources)** | **Suggested Assignments/Assessments** | **Supplementary Materials** |
| For supplemental material, student text can be found here: <http://www.cpm.org/pdfs/standards/CCSS/CCSS%20AC%20student%20V1.1.pdf>For supplemental material, teacher text can be found here: <http://www.cpm.org/pdfs/standards/CCSS/CCSS%20AC%20teacher%20V1.1.pdf>The resources are also available on Blackboard. Go to Blackboard, SCPS High School Math Teachers, 2013-2014 Resources, Algebra 1 |
| 1 | 10.1.3: Solving by Rewriting |  | ACE Module 4.3 (p. 107 - 113) |
| 1 | 10.1.4: Fraction Busters |  |  |
| 1 | 10.2.1: Multiple Methods for Solving Equations |  |  |
| 1 | 10.2.2: Determining the Number of Solutions |  |  |
|  | 10.2.3: More Solving and an Application |  |  |
| 1 | 10-2 Simplifying Radicals | Pg. 613 #28-31 (Algebra 1 Std) |  |
| 1 | 10.3.1: Completing the Square |  | CCSS Student Supp.: Pg. 10-17ACE Modules 16.4 – 16.5 ( 587-595) |
| 1 | 10.3.2: More Completing the Square |  |  |
| 1 | 10.4.1: Simplifying Exponential Expressions |  | ACE Module 2.1 (p. 29-36) |
|  | 10.4.2: Zero and Negative Exponents |  |  |
| 1 | 10.4.3: Rational Exponents and Scientific Notation |  |  |
| 2 | Review/Assessment |  |  |

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| **THIRD QUARTER** |
| **Unit 11: Functions and Relations** |
| **Learning Goal** | A106: Understand the concept of a function and use function notation.A109: Interpret functions that arise in applications in terms of the context. | **# Days** | **11** |
| **Standards** | **FL Coding** | **Standards** |
| A-APR.2.3 | Identify zeros of polynomials when suitable factorizations are available, and use the zeros to construct a rough graph of the function defined by the polynomial. |
|  | A-REI.3.6 | Solve systems of linear equations exactly and approximately (e.g., with graphs), focusing on pairs of linear equations in two variables. |
|  | A-SSE.1.1 | Interpret expressions that represent a quantity in terms of its context. 1. Interpret parts of an expression, such as terms, factors, and coefficients.
2. Interpret complicated expressions by viewing one or more of their parts as a single entity. For example, interpret $P(1+r)^{n}$ as the product of P and a factor not depending on P.
 |
|  | F-BF.1.1 | Write a function that describes a relationship between two quantities. 1. Determine an explicit expression, a recursive process, or steps for calculation from a context.
2. Combine standard function types using arithmetic operations. For example, build a function that models the temperature of a cooling body by adding a constant function to a decaying exponential, and relate these functions to the model.
 |
|  | F-BF.2.3 | Identify the effect on the graph of replacing f(x) by f(x) + k, k f(x), f(kx), and f(x + k) for specific values of k (both positive and negative); find the value of k given the graphs. Experiment with cases and illustrate an explanation of the effects on the graph using technology. Include recognizing even and odd functions from their graphs and algebraic expressions for them. |
|  | F-IF.1.1 | 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 f is a function and x is an element of its domain, then f(x) denotes the output of f corresponding to the input x. The graph of f is the graph of the equation y = f(x). |
|  | F-IF.1.2 | Use function notation, evaluate functions for inputs in their domains, and interpret statements that use function notation in terms of a context. |
|  | F-IF.2.4 | 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. Key features include: intercepts; intervals where the function is increasing, decreasing, positive, or negative; relative maximums and minimums; symmetries; end behavior; and periodicity.  |
|  | F-IF.2.5 | Relate the domain of a function to its graph and, where applicable, to the quantitative relationship it describes. For example, if the function h(n) gives the number of person-hours it takes to assemble n engines in a factory, then the positive integers would be an appropriate domain for the function.  |
|  | F-IF.3.7 | Graph functions expressed symbolically and show key features of the graph, by hand in simple cases and using technology for more complicated cases.1. Graph linear and quadratic functions and show intercepts, maxima, and minima.
2. Graph square root, cube root, and piecewise-defined functions, including step functions and absolute value functions.
3. Graph polynomial functions, identifying zeros when suitable factorizations are available, and showing end behavior.
4. Graph exponential and logarithmic functions, showing intercepts and end behavior, and trigonometric functions, showing period, midline, and amplitude.
 |
|  | F-LE.1.1 | Distinguish between situations that can be modeled with linear functions and with exponential functions.1. Prove that linear functions grow by equal differences over equal intervals, and that exponential functions grow by equal factors over equal intervals.
2. Recognize situations in which one quantity changes at a constant rate per unit interval relative to another.
3. Recognize situations in which a quantity grows or decays by a constant percent rate per unit interval relative to another.
 |
| **Mathematical Practices** |
| 1. Make sense of problems and persevere in solving them. | 2. Reason abstractly and quantitatively. | 3. Construct viable arguments and critique the reasoning of others. | 4. Model with mathematics.  | 5. Use appropriate tools strategically. | 6. Attend to precision. | 7. Look for and make use of structure. | 8. Look for and express regularity in repeated reasoning. |
| **Suggested Days** | **Lesson Objective (Instructional Resources)** | **Suggested Assignments/Assessments** | **Supplementary Materials** |
| For supplemental material, student text can be found here: <http://www.cpm.org/pdfs/standards/CCSS/CCSS%20AC%20student%20V1.1.pdf>For supplemental material, teacher text can be found here: <http://www.cpm.org/pdfs/standards/CCSS/CCSS%20AC%20teacher%20V1.1.pdf>The resources are also available on Blackboard. Go to Blackboard, SCPS High School Math Teachers, 2013-2014 Resources, Algebra 1 |
| 1 | 11.1.1: Describing a Graph |  |  |
| 1 | 11.1.2: Relation Machines |  | CCSS Student Supp.: Pg. 21 |
| 1 | 11.1.3: Functions |  | ACE Module 5.2 (p. 125-132) |
|  | 11.1.4: Domain and Range |  |  |
| 2 | 11.1.6: Transformation of a Function |  | CCSS Student Supp.: Pg. 40-64 and Pg. 83-86 |
| 1 | AC CCSS Supplement: Graphing Step Functions | Student Supplement: Pg. 20 |  |
| 1 | 11.2.1: Intercepts and Intersections |  |  |
|  | 11.2.2: Pulling it all Together |  |  |
| 1 | 11.3.1: Treasure Hunt |  |  |
| 3 | Review/Assessment |  |  |

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| **THIRD QUARTER** |
| **Unit 12: Equivalent Expressions** |
| **Learning Goal** | A105: Use patterns and structure to rewrite expressions in equivalent forms to solve problems. | **# Days** | **7** |
| **Standards** | **FL Coding** | **Standards** |
| A-CED.1.1 | Create equations and inequalities in one variable and use them to solve problems. Include equations arising from linear and quadratic functions, and simple rational and exponential functions. |
|  | A-REI.2.4 | Solve quadratic equations in one variable. 1. Use the method of completing the square to transform any quadratic equation in x into an equation of the form (x – p)² = q that has the same solutions. Derive the quadratic formula from this form.
2. Solve quadratic equations by inspection (e.g., for x² = 49), 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 *a ± bi* for real numbers a and b.
 |
|  | A-SSE.1.2 | Use the structure of an expression to identify ways to rewrite it. For example, see x4- y4 as (x²)² – (y²)², thus recognizing it as a difference of squares that can be factored as (x² – y²)(x² + y²). |
| **Mathematical Practices** |
| 1. Make sense of problems and persevere in solving them. | 2. Reason abstractly and quantitatively. | 3. Construct viable arguments and critique the reasoning of others. | 4. Model with mathematics.  | 5. Use appropriate tools strategically. | 6. Attend to precision. | 7. Look for and make use of structure. | 8. Look for and express regularity in repeated reasoning. |
| **Suggested Days** | **Lesson Objective (Instructional Resources)** | **Suggested Assignments/Assessments** | **Supplementary Materials** |
| For supplemental material, student text can be found here: <http://www.cpm.org/pdfs/standards/CCSS/CCSS%20AC%20student%20V1.1.pdf>For supplemental material, teacher text can be found here: <http://www.cpm.org/pdfs/standards/CCSS/CCSS%20AC%20teacher%20V1.1.pdf>The resources are also available on Blackboard. Go to Blackboard, SCPS High School Math Teachers, 2013-2014 Resources, Algebra 1 |
| 1 | 12.1.1: Factoring Shortcuts |  |  |
| 1 | AC CCSS Supplement: Rewriting Expressions. | Student Supplement: Pg. 32-37 |  |
| 1 | AC CCSS Supplement: Rewriting Expressions. | Student Supplement: Pg. 38-39 |  |
| 1 | 12.2.1: Solving Work Problems |  |  |
| 1 | 12.2.2: Solving Percent Mixture Problems |  |  |
| 2 | Review/Assessment |  |  |

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| **THIRD QUARTER** |
| **Unit 13: Modeling One Variable Data** |
| **Learning Goal** | A112: Summarize, represent, and interpret data on a single count or measurement variable. | **# Days** | **6 (3)** |
| **Standards** | **FL Coding** | **Standards** |
| S-ID.1.1 | Represent data with plots on the real number line (dot plots, histograms, and box plots). |
|  | S-ID.1.2 | 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. |
|  | S-ID.1.3 | Interpret differences in shape, center, and spread in the context of the data sets, accounting for possible effects of extreme data points (outliers). |
|  | S-ID.2.5 | 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. |
|  | S-ID.3.9 | Distinguish between correlation and causation. |
| **Mathematical Practices** |
| 1. Make sense of problems and persevere in solving them. | 2. Reason abstractly and quantitatively. | 3. Construct viable arguments and critique the reasoning of others. | 4. Model with mathematics. | 5. Use appropriate tools strategically. | 6. Attend to precision. | 7. Look for and make use of structure. | 8. Look for and express regularity in repeated reasoning. |
| **Suggested Days** | **Lesson Objective (Instructional Resources)** | **Suggested Assignments/Assessments** | **Supplementary Materials** |
| For supplemental material, student text can be found here: <http://www.cpm.org/pdfs/standards/CCSS/CCSS%20AC%20student%20V1.1.pdf>For supplemental material, teacher text can be found here: <http://www.cpm.org/pdfs/standards/CCSS/CCSS%20AC%20teacher%20V1.1.pdf>The resources are also available on Blackboard. Go to Blackboard, SCPS High School Math Teachers, 2013-2014 Resources, Algebra 1 |
| 1 | 5.1.1: Closest to the pin lab | Student Supp: Pg. 94-97Teacher Supp: Pg. 154-159 |  |
| 1 | 5.1.2: Histograms and Dot Plots | Student Supp: Pg. 98-102Teacher Supp: Pg. 160-167 | ACE Module 12.2 (p. 417-424)ACE Module 13.3 (p. 447 – 454) |
|  | 5.1.3: Comparing Data: Box Plots | Student Supp: Pg. 103-107Teacher Supp: Pg. 168-176 | ACE Module 13.4 (p. 455 – 460) |
| 1 | 5.2.1: Standard Deviation | Student Supp: Pg. 108-110Teacher Supp: Pg. 179-182 |  |
|  | 5.2.2: Sample Standard Deviation and Data Transformations | Student Supp: Pg. 111-114Teacher Supp: Pg. 183-187 | ACE Modules 13.1-13.2 (p. 431 – 446) |
| 1 | 6.2.1: Association is not Causation | Student Supp: Pg. 115-118Teacher Supp: Pg. 188-193 | ACE Module 8.1 (p. 247 – 254) |
| 2 | Review/Assessment |  |  |
|  | **District Assessment** (1 day) |
|  | **9 Week Review/Assessment** (2 days) |

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| **FOURTH QUARTER** |
| **Unit 14: Modeling with Two Variable Data** |
| **Learning Goal** | A113: Summarize, represent and interpret data on two categorical and quantitative variables.A114: Interpret linear models using linear regression in real-world context. | **# Days** | **9** |
| **Standards** | **FL Coding** | **Standards** |
| S-ID.2.6 | Represent data on two quantitative variables on a scatter plot, and describe how the variables are related. 1. Fit a function to the data; use functions fitted to data to solve problems in the context of the data.Use given functions or choose a function suggested by the context. Emphasize linear, quadratic, and exponential models.
2. Informally assess the fit of a function by plotting and analyzing residuals.
3. Fit a linear function for a scatter plot that suggests a linear association.
 |
|  | S-ID.3.7 | Interpret the slope (rate of change) and the intercept (constant term) of a linear model in the context of the data. |
|  | S-ID.3.8 | Compute (using technology) and interpret the correlation coefficient of a linear fit. |
| **Mathematical Practices** |
| 1. Make sense of problems and persevere in solving them. | 2. Reason abstractly and quantitatively. | 3. Construct viable arguments and critique the reasoning of others. | 4. Model with mathematics. | 5. Use appropriate tools strategically. | 6. Attend to precision. | 7. Look for and make use of structure. | 8. Look for and express regularity in repeated reasoning. |
| **Suggested Days** | **Lesson Objective (Instructional Resources)** | **Suggested Assignments/Assessments** | **Supplementary Materials** |
| For supplemental material, student text can be found here: <http://www.cpm.org/pdfs/standards/CCSS/CCSS%20AC%20student%20V1.1.pdf>For supplemental material, teacher text can be found here: <http://www.cpm.org/pdfs/standards/CCSS/CCSS%20AC%20teacher%20V1.1.pdf>The resources are also available on Blackboard. Go to Blackboard, SCPS High School Math Teachers, 2013-2014 Resources, Algebra 1 |
| 1 | 7.1.1: Line of Best Fit | Student Supp: Pg. 119-123Teacher Supp: Pg. 194-201 | ACE Module 8.2 (p. 255 – 262) |
|  | 7.1.2: Residuals | Student Supp: Pg. 124-129Teacher Supp: Pg. 202-208 |  |
| 1 | 7.1.3: Upper and Lower Bounds | Student Supp: Pg. 130-133Teacher Supp: Pg. 209-214 |  |
| 1 | 7.1.4: Least Squares Regression Line | Student Supp: Pg. 134-139Teacher Supp: Pg. 215-224 | ACE Module 8.3 (p. 263 – 270) |
| 1 | 7.2.1: Residual Plots | Student Supp: Pg. 140-146Teacher Supp: Pg. 225-234 |  |
|  | 7.2.2: Correlation | Student Supp: Pg. 147-151Teacher Supp: Pg. 235-242 | ACE Module 8.1 (p. 247 – 254) |
| 1 | 7.2.3: Interpreting Correlation in Context | Student Supp: Pg. 152-157Teacher Supp: Pg. 243-251 |  |
| 1 | 7.2.4: Curved Regression Models | Student Supp: Pg. 158-166Teacher Supp: Pg. 252-264 |  |
| 3 | Review/Assessment |  |  |

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| **FOURTH QUARTER** |
| **Unit 15: Arithmetic and Geometric Sequences** |
| **Learning Goal** | A108: Compare and analyze functions using multiple representations, such as tables, graphs, equations, and verbal descriptions.A109: Interpret functions that arise in applications in terms of the context. | **# Days** | **11** |
| **Standards** | **FL Coding** | **Standards** |
| A-SSE.2.3 | Choose and produce an equivalent form of an expression to reveal and explain properties of the quantity represented by the expression. 1. Factor a quadratic expression to reveal the zeros of the function it defines.
2. Complete the square in a quadratic expression to reveal the maximum or minimum value of the function it defines.
3. Use the properties of exponents to transform expressions for exponential functions. For example the expression  1.15t can be rewritten as (1.151/12)12t ≈ 1.01212t to reveal the approximate equivalent monthly interest rate if the annual rate is 15%.
 |
|  | F-IF.1.3 | Recognize that sequences are functions, sometimes defined recursively, whose domain is a subset of the integers. For example, the Fibonacci sequence is defined recursively by f(0) = f(1) = 1, f(n+1) = f(n) + f(n-1) for n ≥ 1. |
|  | F-IF.3.7 | Graph functions expressed symbolically and show key features of the graph, by hand in simple cases and using technology for more complicated cases.1. Graph linear and quadratic functions and show intercepts, maxima, and minima.
2. Graph square root, cube root, and piecewise-defined functions, including step functions and absolute value functions.
3. Graph polynomial functions, identifying zeros when suitable factorizations are available, and showing end behavior.
4. Graph exponential and logarithmic functions, showing intercepts and end behavior, and trigonometric functions, showing period, midline, and amplitude.
 |
|  | F-IF.3.8 | Write a function defined by an expression in different but equivalent forms to reveal and explain different properties of the function. 1. 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.
2. Use the properties of exponents to interpret expressions for exponential functions. For example, identify percent rate of change in functions such as y = (1.02)t, y = (0.97)t, y = (1.01)12t, y = (1.2)t/10, and classify them as representing exponential growth or decay.
 |
|  | F-LE.1.1 | Distinguish between situations that can be modeled with linear functions and with exponential functions. 1. Prove that linear functions grow by equal differences over equal intervals, and that exponential functions grow by equal factors over equal intervals.
2. Recognize situations in which one quantity changes at a constant rate per unit interval relative to another.
3. Recognize situations in which a quantity grows or decays by a constant percent rate per unit interval relative to another.
 |
|  | F-LE.1.2 | Construct linear and exponential function, including arithmetic and geometric sequences, given a graph, a description of a relationship, or two input/output pairs (include reading these from a table). |
|  | F-LE.1.3 | Observe using graphs and tables that a quantity increasing exponentially eventually exceeds a quantity increasing linearly, quadratically, or (more generally) as a polynomial function. |
|  | F-LE.2.5 | Interpret the parameters in a linear or exponential function in terms of a context. |
| **Mathematical Practices** |
| 1. Make sense of problems and persevere in solving them. | 2. Reason abstractly and quantitatively. | 3. Construct viable arguments and critique the reasoning of others. | 4. Model with mathematics.  | 5. Use appropriate tools strategically. | 6. Attend to precision. | 7. Look for and make use of structure. | 8. Look for and express regularity in repeated reasoning. |
| **Suggested Days** | **Lesson Objective (Instructional Resources)** | **Suggested Assignments/Assessments** | **Supplementary Materials** |
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| 2 | CCSS Supplement: Arithmetic Sequences | Student Supp.: Pg. 85-86Teacher Supp.: Pg. 142-143 | ACE Module 5.3 (p. 133-141)ACE Module 7.1 (p. 213 – 218) |
| 2 | CCSS Supplement: Geometric Sequences | Student Supp.: Pg. 87-88Teacher Supp.: Pg. 144-145 | ACE Module 10.3 (p. 353 – 360) |
| 2 | CCSS Supplement: Exponential Growth and Decay | Student Supp.: Pg. 89-91Teacher Supp.: Pg. 147-149 | ACE Module 10.2 (p. 345 – 352) |
| 1 | CCSS Supplement: Transforming Exponential Functions | Student Supp.: Pg. 18-19 | ACE Module 10.4 (361 – 366) |
| 1 | CCSS Supplement: Linear/Quadratic/Exponential Tables | Student Supp.: Pg. 92-93Teacher Supp.: Pg. 151-153 | ACE Modules 11.1-11.2 (p. 381 – 395) |
| 3 | Review and Assessment |  |  |

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| **FOURTH QUARTER** |
| **Unit 16: Putting it all Together** |
| **Learning Goal** |  | **# Days** | **16 (10)** |
| **Suggested Days** | **Lesson Objective (Instructional Resources)** | **Suggested Assignments/Assessments** | **Supplementary Materials** |
| 16 | Review for Algebra 1 End of Course. The materials for this section can be found on Blackboard, SCPS High School Math Teachers, 2013-2014 Resources, Algebra 1, Putting it all together. |
|  | **FSA Tests** (7 days) |
|  | **9 Week Review/Assessment** (3 days) |