**Liberal Arts 2**

**Instructional Plan 2014-2015**

**Mathematics Instructional Plan Writing Committee**

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| |  |  |  |  | | --- | --- | --- | --- | | **School Board Members:**  Karen Almond  Tina Calderone, Ed.D.  Amy Lockhart  Dede Schaffner  **Superintendent:**  Dr. Walt Griffin  **Deputy Superintendent:**  Dr. Anna-Marie Cote  **Secondary Executive Directors:**  Dr. Michael Blasewitz  Dr. Robin Dehlinger  **Department of Teaching and Learning**  Dr. Corbet Wilson  Diana Barnett | **Middle School Contributors:**  Sandy Baldorossi – TWMS  Jennifer Bennett – MKMS  Patty Bouington – SMS  Allison Child – SMS  Diane Firios – SSMS  Mary Ellen Freeman – MMMS  Sara Gibbs – MWMS  Kelly Goodearl – ITMS  Kim Hamilton – ITMS  LeeAnn Heldmyer – TWMS  Joni Hudson – SMS  Stephanie Johnson – MMMS  Beth Karnes – ITMS  Adam Kiefer – SSMS  Elena Lugo – RLMS  Jennifer Manwaring – TWMS  Stuart Milchman – MMMS  Lisa Morris – MMMS  Michelle Mouton – JHMS  Misty Naran – LCMS | Triscia Panarello – SMS  Sabrina Robinson – MWMS  Robyn Smith – MKMS  Erica Sowpel – SMS  Kristen Springfield – MKMS  Jennifer Stickle – MMMS  Deborah Velez – LCMS  Dennis Whalen – ITMS  Barbie Wigen – MMMS  Agnes Wong – SMS | **High School Contributors:**  Ryan Beasley – LMHS  Susan Brown – LHS  Brittany Campbell – HHS  Aglaia Christodoulides - HHS  Katie Donoghue - LMHS  Lauren Fedi - OHS  Matt Guglielmello – OHS  David Hiller – LMHS  Saida Hussien – OHS  Amy Jones – LBHS  Mia Keyeser – LMHS  Angela-Mia Kilmer – OHS  Jeffrey Miller – LBHS  Karen Neukamm – LBHS  Laura Pollard – LHS  Jonathan Rodriguez – HHS  Kristina Rudich – LMHS  Lesley Schmidt – WSHS  Erica Segrest – OHS  Sharon Shyrock – LHS  Lynn Webb – LHHS  Betty Westhelle – OHS | |  |  |  |

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 Next Generation Sunshine State Standards (NGSSS) while using the Springboard Course 1 Textbook. 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. Pearson Geometry and Algebra 2 student workbooks will be provide for each student for the 2014-2015 school year and a class set of Pearson Algebra 2 student textbooks will be provide for each teacher for the 2014-2015 school year.

**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.
* **Each unit will include at least one learning goal listed under the unit heading. These are suggested learning goals and scales that teachers can use when implementing learning scales in their classes. The learning goals 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.**

**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.

**2. (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? |
| **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? |
| **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...? |
| **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? |
| **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? |
| **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** |
| Geometry in the Coordinate Plane |  | 9 |
| Quadratic Functions |  | 13 |
| Quadratic Functions, including irrational and complex solutions |  | 17 |
| 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** |
| Polynomial Functions |  | 18 |
| Rational Functions |  | 7 |
| Rational Exponents |  | 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** |
| Sequences and Series |  | 15 |
| Exponential Functions |  | 12 |
| Logarithmic Functions |  | 15 |
| District Assessment (1 day); FSA/PLA Writing (1 day); 9 Weeks Exams (2 days) |  | 4 |
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| **FOURTH QUARTER (March 23 – May 27)** | | **46 DAYS** |
| **Topic/Assessment** | **Dates Covered** | **Topic/Assessment** |
| Probability |  | 15 |
| Inferential Statistics |  | 20 |
| District Assessment (1 day); FSA Tests (7 days) 9 Weeks Exams (3 days) |  | 11 |

*\*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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| **Unit 1: Geometry in the Coordinate Plane** | | | | | | | |
| **Code** | **Mathematics Florida Standard** | | | | | | **SMP** |
| [A-SSE.1.1](http://www.cpalms.org/Public/PreviewStandard/Preview/5543)  [A-CED.1.2](http://www.cpalms.org/Public/PreviewStandard/Preview/5555)  [F-IF.2.4](http://www.cpalms.org/Public/PreviewStandard/Preview/5573) | 2.4: More About Linear Equations  (Algebra 2 Text)  Teachers are encouraged to address point slope form in terms of transformations of graphs. | | | | | | 2 |
| [G-GPE.2.5](http://www.cpalms.org/Public/PreviewStandard/Preview/5631) | Prove the slope criteria for parallel and perpendicular lines and use them to solve geometric problems. | | | | | | 2, 4 |
| [G-GPE.2.4](http://www.cpalms.org/Public/PreviewStandard/Preview/5631) | Use coordinates to prove simple geometric theorems algebraically. | | | | | | 2, 4 |
| **Learning Goal and Scale** | | | | **Instructional Strategies & Misconceptions** | | | |
| [**L201:** Derive the equation of a parabola and a circle on a coordinate plane and use coordinates to prove simple geometric theorems algebraically.](http://scpsmath.weebly.com/uploads/2/9/1/7/29174797/l201.docx) | | | | Review the point-slope, slope-intercept and standard forms for equations of lines. Investigate pairs of lines that are known to be parallel or perpendicular to each other and discover that their slopes are either equal or have a product of –1, respectively. Pay special attention to the slope of a line and its applications in analyzing properties of lines.  A misconception may be that students recognize that the slopes of two perpendicular lines have opposite signs or are reciprocals of each other but not both. | | | |
| **Math Practices for Unit** | | | **Unit Connections** | | **Instructional Resources** | | |
| 1. Make sense of problems and persevere in solving them. | | 5. Use appropriate tools strategically. | Students will use previous knowledge of graphing linear equations and slope in their study of parallel and perpendicular lines. They will expand this knowledge to prove simple geometric theorems algebraically and to evaluate the equations of nonlinear equations. Student will subsequently use this information when graphing three dimensional geometric figures. | |  |  | |
| 2. Reason abstractly and quantitatively. | | 6. Attend to precision. |
| 3. Construct viable arguments & critique reasoning of others. | | 7. Look for and make use of structure. |
| 4. Model with mathematics. | | 8. Look for and express regularity in repeated reasoning. |

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| **FIRST QUARTER** | | | | | | |
| **Unit 1: Geometry in the Coordinate Plane** | | | | | | |
| **Learning Goal** | [**L201:** Derive the equation of a parabola and a circle on a coordinate plane and use coordinates to prove simple geometric theorems algebraically.](http://scpsmath.weebly.com/uploads/2/9/1/7/29174797/l201.docx) | | | | **Suggested # of Days** | **9** |
| **Approx. # of Day(s)** | **MAFS** | **Lesson Objective (Instructional Resources)** | **Suggested Assignments/Assessments** | **Ancillary Materials** | | |
| 2 | [A-SSE.1.1](http://www.cpalms.org/Public/PreviewStandard/Preview/5543)  [A-CED.1.2](http://www.cpalms.org/Public/PreviewStandard/Preview/5555)  [F-IF.2.4](http://www.cpalms.org/Public/PreviewStandard/Preview/5573) | 2.4: More About Linear Equations  (Algebra 2 Text)  Teachers are encouraged to address point slope form in terms of transformations of graphs. |  |  | | |
| 2 | [G-GPE.2.5](http://www.cpalms.org/Public/PreviewStandard/Preview/5631) | 3.8: Slopes of Parallel and Perpendicular Lines (Geometry Text) |  |  | | |
| 3 | [G-GPE.2.4](http://www.cpalms.org/Public/PreviewStandard/Preview/5630) | 6.7: Polygons in the Coordinate Plane  (Geometry Text) |  |  | | |
| 2 |  | Review and Tests |  |  | | |

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| **Unit 2: Quadratic Functions** | | | | | | | |
| **Code** | **Mathematics Florida Standard** | | | | | | **SMP** |
| [N-CN.1.1](http://www.cpalms.org/Public/PreviewStandard/Preview/5522) | Know there is a complex number i such that i² = –1, and every complex number has the form a + bi with a and b real. | | | | | | 2, 7 |
| [N-CN.1.2](http://www.cpalms.org/Public/PreviewStandard/Preview/5523) | Use the relation i² = –1 and the commutative, associative, and distributive properties to add, subtract, and multiply complex numbers. | | | | | | 2, 7 |
| [F-IF.3.7](http://www.cpalms.org/Public/PreviewStandard/Preview/5576) | Graph functions expressed symbolically and show key features of the graph, by hand in simple cases and using technology for more complicated cases.  Graph linear and quadratic functions and show intercepts, maxima, and minima. | | | | | | 4, 5, 6 |
| [F-IF.3.8](http://www.cpalms.org/Public/PreviewStandard/Preview/5577) | Write a function defined by an expression in different but equivalent forms to reveal and explain different properties of the function.  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. | | | | | | 1, 7 |
| [A-SSE.2.3](http://www.cpalms.org/Public/PreviewStandard/Preview/5545) | Choose and produce an equivalent form of an expression to reveal and explain properties of the quantity represented by the expression.  Factor a quadratic expression to reveal the zeros of the function it defines. | | | | | | 1, 6, 7 |
| [A-REI.2.4](http://www.cpalms.org/Public/PreviewStandard/Preview/5561) | Solve quadratic equations in one variable.   1. 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. | | | | | | 1, 6 |
| **Learning Goal and Scale** | | | | **Instructional Strategies & Misconceptions** | | | |
| [L204: Choose and produce an equivalent form of an expression by using the structure to identify ways to rewrite it.](http://scpsmath.weebly.com/uploads/2/9/1/7/29174797/l204.docx)  [L208: Graph and write equivalent forms of functions by hand and using technology, and compare functions in different representations.](http://scpsmath.weebly.com/uploads/2/9/1/7/29174797/l208.docx)  [L209: Derive solutions from quadratic functions, including complex, and perform operations on complex numbers.](http://scpsmath.weebly.com/uploads/2/9/1/7/29174797/l209.docx) | | | | Graphing utilities on a calculator and/or computer can be used to demonstrate the changes in behavior of a function as various parameters are varied.  Real-world problems, such as maximizing the area of a region bound by a fixed perimeter fence, can help to illustrate applied uses of families of functions.  A misconception may be that students believe that each family of functions (e.g., quadratic, square root, etc.) is independent of the others, so they may not recognize commonalities among all functions and their graphs. | | | |
| **Math Practices for Unit** | | | **Unit Connections** | | **Instructional Resources** | | |
| 1. Make sense of problems and persevere in solving them. | | 5. Use appropriate tools strategically. | Students will use previous knowledge of graphing linear equations and factoring quadratic equations. They will expand this knowledge to include evaluating and graphing quadratic equations. Student will subsequently use this information when working with quadratic equations including irrational and complex solutions. | |  |  | |
| 2. Reason abstractly and quantitatively. | | 6. Attend to precision. |
| 3. Construct viable arguments & critique reasoning of others. | | 7. Look for and make use of structure. |
| 4. Model with mathematics. | | 8. Look for and express regularity in repeated reasoning. |

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| **FIRST QUARTER** | | | | | | |
| **Unit 2: Quadratic Functions** | | | | | | |
| **Learning Goal** | [L204: Choose and produce an equivalent form of an expression by using the structure to identify ways to rewrite it.](http://scpsmath.weebly.com/uploads/2/9/1/7/29174797/l204.docx)  [L208: Graph and write equivalent forms of functions by hand and using technology, and compare functions in different representations.](http://scpsmath.weebly.com/uploads/2/9/1/7/29174797/l208.docx)  [L209: Derive solutions from quadratic functions, including complex, and perform operations on complex numbers.](http://scpsmath.weebly.com/uploads/2/9/1/7/29174797/l209.docx) | | | | **Suggested # of Days** | **13** |
| **Approx. # of Day(s)** | **MAFS** | **Lesson Objective (Instructional Resources)** | **Suggested Assignments/Assessments** | **Ancillary Materials** | | |
| 2 | [F-IF.3.7](http://www.cpalms.org/Public/PreviewStandard/Preview/5576) | 4.1: Quadratic Functions and Transformations  (The Algebra 2 Text will be used from this point on). |  |  | | |
| 2 | [F-IF.3.7](http://www.cpalms.org/Public/PreviewStandard/Preview/5576) | 4.2 Part 1: Quadratic Functions in Standard Form |  |  | | |
| 3 | [A-SSE.2.3](http://www.cpalms.org/Public/PreviewStandard/Preview/5545) | 4.4: Factoring Quadratic Expressions |  |  | | |
| 2 | [N-CN.1.1](http://www.cpalms.org/Public/PreviewStandard/Preview/5522)  [N-CN.1.2](http://www.cpalms.org/Public/PreviewStandard/Preview/5523) | 4.8 Part 1: Complex Numbers  (At this stage, students should focus on simplifying, adding, subtracting, and multiplying complex numbers. Part 2 will be covered in unit 3). |  |  | | |
| 2 | [A-REI.2.4](http://www.cpalms.org/Public/PreviewStandard/Preview/5561)  [F-IF.3.8](http://www.cpalms.org/Public/PreviewStandard/Preview/5577) | 4.5 Part 1: Solving Quadratic Equations  (Students should solve quadratic equations with rational solutions. Build upon the fact that there are some types that are not solvable with this method. Part 2 will be covered in unit 3). |  |  | | |
| 2 |  | Review and Tests |  |  | | |

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| **Unit 3: Quadratic Functions, including irrational and complex solutions** | | | | | | | |
| **Code** | **Mathematics Florida Standard** | | | | | | **SMP** |
| [N-CN.1.1](http://www.cpalms.org/Public/PreviewStandard/Preview/5522) | Know there is a complex number i such that i² = –1, and every complex number has the form a + bi with a and b real. | | | | | | 2, 7 |
| [N-CN.1.2](http://www.cpalms.org/Public/PreviewStandard/Preview/5523) | Use the relation i² = –1 and the commutative, associative, and distributive properties to add, subtract, and multiply complex numbers. | | | | | | 2, 7 |
| [N-CN.3.7](http://www.cpalms.org/Public/PreviewStandard/Preview/5528) | Solve quadratic equations with real coefficients that have complex solutions. | | | | | | 1, 6 |
| [F-IF.3.7](http://www.cpalms.org/Public/PreviewStandard/Preview/5576) | Graph functions expressed symbolically and show key features of the graph, by hand in simple cases and using technology for more complicated cases.  Graph linear and quadratic functions and show intercepts, maxima, and minima. | | | | | | 4, 5, 6 |
| [F-IF.3.8](http://www.cpalms.org/Public/PreviewStandard/Preview/5577) | Write a function defined by an expression in different but equivalent forms to reveal and explain different properties of the function.  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. | | | | | | 1, 7 |
| [A-SSE.2.3](http://www.cpalms.org/Public/PreviewStandard/Preview/5545) | 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. | | | | | | 1, 6, 7 |
| [A-REI.2.4](http://www.cpalms.org/Public/PreviewStandard/Preview/5561) | 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. | | | | | | 1, 6 |
| [A-REI.3.7](http://www.cpalms.org/Public/PreviewStandard/Preview/5564) | Solve a simple system consisting of a linear equation and a quadratic equation in two variables algebraically and graphically. *For example, find the points of intersection between the line y = –3x and the circle x² + y² = 3.* | | | | | | 1, 5, 6 |
| [G-GPE.1.1](http://www.cpalms.org/Public/PreviewStandard/Preview/5627) | Derive the equation of a circle of given center and radius using the Pythagorean Theorem; complete the square to find the center and radius of a circle given by an equation. | | | | | | 3, 6 |
| [G-GPE.1.2](http://www.cpalms.org/Public/PreviewStandard/Preview/5628) | Derive the equation of a parabola given a focus and directrix. | | | | | | 3, 6 |
| **Learning Goal and Scale** | | | | **Instructional Strategies & Misconceptions** | | | |
| [L201: Derive the equation of a parabola and a circle on a coordinate plane and use coordinates to prove simple geometric theorems algebraically.](http://scpsmath.weebly.com/uploads/2/9/1/7/29174797/l201.docx)  [L204: Choose and produce an equivalent form of an expression by using the structure to identify ways to rewrite it.](http://scpsmath.weebly.com/uploads/2/9/1/7/29174797/l204.docx)  [L205: Solve quadratic equations in one variable. Solve systems of linear and quadratic equations (including 3x3 systems)](http://scpsmath.weebly.com/uploads/2/9/1/7/29174797/l205.docx)  [L208: Graph and write equivalent forms of functions by hand and using technology, and compare functions in different representations.](http://scpsmath.weebly.com/uploads/2/9/1/7/29174797/l208.docx)  [L209: Derive solutions from quadratic functions, including complex, and perform operations on complex numbers.](http://scpsmath.weebly.com/uploads/2/9/1/7/29174797/l209.docx) | | | | Define a parabola as a set of points satisfying the condition that their distance from a fixed point (focus) equals their distance from a fixed line (directrix). Start with a horizontal directrix and a focus on the y-axis, and use the distance formula to obtain an equation of the resulting parabola in terms of y and x2. Next use a vertical directrix and a focus on the x-axis to obtain an equation of a parabola in terms of x and y2. Make generalizations in which the focus may be any point, but the directrix is still either horizontal or vertical. Allow sufficient time for students to become familiar with new vocabulary and notation.  Because new vocabulary is being introduced in this unit, remembering the names of the conic sections can be problematic for some students. | | | |
| **Math Practices for Unit** | | | **Unit Connections** | | **Instructional Resources** | | |
| 1. Make sense of problems and persevere in solving them. | | 5. Use appropriate tools strategically. | Students will build their algebraic solution methods to be able to solve all quadratic equations, even if solutions are irrational or complex. Much of the work here will be extended in the next unit when finding roots of factorable polynomials. | |  |  | |
| 2. Reason abstractly and quantitatively. | | 6. Attend to precision. |
| 3. Construct viable arguments & critique reasoning of others. | | 7. Look for and make use of structure. |
| 4. Model with mathematics. | | 8. Look for and express regularity in repeated reasoning. |

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| **FIRST QUARTER** | | | | | | |
| **Unit 3: Quadratic Functions, including irrational and complex solutions** | | | | | | |
| **Learning Goal** | [L201: Derive the equation of a parabola and a circle on a coordinate plane and use coordinates to prove simple geometric theorems algebraically.](http://scpsmath.weebly.com/uploads/2/9/1/7/29174797/l201.docx)  [L204: Choose and produce an equivalent form of an expression by using the structure to identify ways to rewrite it.](http://scpsmath.weebly.com/uploads/2/9/1/7/29174797/l204.docx)  [L205: Solve quadratic equations in one variable. Solve systems of linear and quadratic equations (including 3x3 systems)](http://scpsmath.weebly.com/uploads/2/9/1/7/29174797/l205.docx)  [L208: Graph and write equivalent forms of functions by hand and using technology, and compare functions in different representations.](http://scpsmath.weebly.com/uploads/2/9/1/7/29174797/l208.docx)  [L209: Derive solutions from quadratic functions, including complex, and perform operations on complex numbers.](http://scpsmath.weebly.com/uploads/2/9/1/7/29174797/l209.docx) | | | | **Suggested # of Days** | **17**  **(3)** |
| **Approx. # of Day(s)** | **MAFS** | **Lesson Objective (Instructional Resources)** | **Suggested Assignments/Assessments** | **Ancillary Materials** | | |
| 3 | [A-REI.2.4](http://www.cpalms.org/Public/PreviewStandard/Preview/5561)  [A-SSE.2.3](http://www.cpalms.org/Public/PreviewStandard/Preview/5545)  [F-IF.3.8](http://www.cpalms.org/Public/PreviewStandard/Preview/5577) | 4.6: Completing the Square |  |  | | |
| 2 | [A-REI.2.4](http://www.cpalms.org/Public/PreviewStandard/Preview/5561) | 4.7: Quadratic Formula |  |  | | |
| 2 | [F-IF.3.7](http://www.cpalms.org/Public/PreviewStandard/Preview/5576) | 4.5 Part 2: Solving Quadratic Equations  (Students should be able to solve all types of quadratic equations at this stage, though the next section will focus on solutions of the complex variety). |  |  | | |
| 2 | [N-CN.3.7](http://www.cpalms.org/Public/PreviewStandard/Preview/5528) | 4.8 Part 2: Complex Numbers |  |  | | |
| 2 | [A-REI.3.7](http://www.cpalms.org/Public/PreviewStandard/Preview/5564) | 4.9: Solving Systems of Quadratic Equations |  |  | | |
| 2 | [G-GPE.1.2](http://www.cpalms.org/Public/PreviewStandard/Preview/5628) | 10.2: Parabolas |  |  | | |
| 2 | [G-GPE.1.1](http://www.cpalms.org/Public/PreviewStandard/Preview/5627) | 10.3: Circles |  |  | | |
| 2 |  | Review and Tests |  |  | | |
| **3** |  | District Assessment (1 day), 9 Weeks Exams (2 days) |  |  | | |

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| **Unit 4: Polynomial Functions** | | | | | | | |
| **Code** | **Mathematics Florida Standard** | | | | | | **SMP** |
| [F-IF.3.7](http://www.cpalms.org/Public/PreviewStandard/Preview/5576) | 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 polynomial functions, identifying zeros when suitable factorizations are available, and showing end behavior. 2. Graph rational functions, identifying zeros and asymptotes when suitable factorizations are available, and showing end behavior. | | | | | | 4, 5, 6 |
| [F-IF.3.9](http://www.cpalms.org/Public/PreviewStandard/Preview/5578) | Compare properties of two functions each represented in a different way (algebraically, graphically, numerically in tables, or by verbal descriptions)*.* | | | | | | 6 |
| [A-APR.2.2](http://www.cpalms.org/Public/PreviewStandard/Preview/5548) | Know and apply the Remainder Theorem: For a polynomial p(x) and a number a, the remainder on division by x – a is p(a), so p(a) = 0 if and only if (x – a) is a factor of p(x). | | | | | | 7, 8 |
| [A-APR.2.3](http://www.cpalms.org/Public/PreviewStandard/Preview/5549) | 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. | | | | | | 4, 5, 6, 7 |
| [A-APR.3.4](http://www.cpalms.org/Public/PreviewStandard/Preview/5550) | Prove polynomial identities and use them to describe numerical relationships. For example, the polynomial identity (x² + y²)² = (x² – y²)² + (2xy)² can be used to generate Pythagorean triples. | | | | | | 3, 6 |
| [A-APR.4.6](http://www.cpalms.org/Public/PreviewStandard/Preview/5552) | Rewrite simple rational expressions in different forms; write a(x)/b(x) in the form q(x) + r(x)/b(x), where a(x), b(x), q(x), and r(x) are polynomials with the degree of r(x) less than the degree of b(x), using inspection, long division, or, for the more complicated examples, a computer algebra system. | | | | | | 5 |
| [A-SSE.1.2](http://www.cpalms.org/Public/PreviewStandard/Preview/5544) | 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).* | | | | | | 7, 8 |
| **Learning Goal and Scale** | | | | **Instructional Strategies & Misconceptions** | | | |
| [L202: Rewrite simple rational expressions using various methods.](http://scpsmath.weebly.com/uploads/2/9/1/7/29174797/l202.docx)  [L204: Choose and produce an equivalent form of an expression by using the structure to identify ways to rewrite it.](http://scpsmath.weebly.com/uploads/2/9/1/7/29174797/l204.docx)  [L208: Graph and write equivalent forms of functions by hand and using technology, and compare functions in different representations.](http://scpsmath.weebly.com/uploads/2/9/1/7/29174797/l208.docx) | | | |  | | | |
| **Math Practices for Unit** | | | **Unit Connections** | | **Instructional Resources** | | |
| 1. Make sense of problems and persevere in solving them. | | 5. Use appropriate tools strategically. | Students will build upon the previous unit, allowing them to find factorizations of polynomials of degree 3 and above, as long as the factorization exists. This should build towards graphing polynomials during the unit, and will be extended when graphing rational functions. | |  |  | |
| 2. Reason abstractly and quantitatively. | | 6. Attend to precision. |
| 3. Construct viable arguments & critique reasoning of others. | | 7. Look for and make use of structure. |
| 4. Model with mathematics. | | 8. Look for and express regularity in repeated reasoning. |

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| **SECOND QUARTER** | | | | | | |
| **Unit 4: Polynomial Functions** | | | | | | |
| **Learning Goal** | [L202: Rewrite simple rational expressions using various methods.](http://scpsmath.weebly.com/uploads/2/9/1/7/29174797/l202.docx)  [L204: Choose and produce an equivalent form of an expression by using the structure to identify ways to rewrite it.](http://scpsmath.weebly.com/uploads/2/9/1/7/29174797/l204.docx)  [L208: Graph and write equivalent forms of functions by hand and using technology, and compare functions in different representations.](http://scpsmath.weebly.com/uploads/2/9/1/7/29174797/l208.docx) | | | | **Suggested # of Days** | **18** |
| **Approx. # of Day(s)** | **MAFS** | **Lesson Objective (Instructional Resources)** | **Suggested Assignments/Assessments** | **Ancillary Materials** | | |
| 2 | [F-IF.3.7](http://www.cpalms.org/Public/PreviewStandard/Preview/5576)  [F-IF.3.9](http://www.cpalms.org/Public/PreviewStandard/Preview/5578) | 5.1: Polynomial Functions |  |  | | |
| 4 | [F-IF.3.7](http://www.cpalms.org/Public/PreviewStandard/Preview/5576)  [F-IF.3.9](http://www.cpalms.org/Public/PreviewStandard/Preview/5578) | 5.2: Polynomials, Linear Factors, and Zeros |  |  | | |
| 4 | [A-APR.2.3](http://www.cpalms.org/Public/PreviewStandard/Preview/5549)  [A-SSE.1.2](http://www.cpalms.org/Public/PreviewStandard/Preview/5544)  [A-APR.3.4](http://www.cpalms.org/Public/PreviewStandard/Preview/5550) | 5.3: Solving Polynomial Equations |  |  | | |
| 2 | [A-APR.4.6](http://www.cpalms.org/Public/PreviewStandard/Preview/5552) | 5.4 Part 1: Dividing Polynomials  (Focus on using this as a method to rewrite expressions and view a rational function in another form). |  |  | | |
| 3 | [A-APR.2.2](http://www.cpalms.org/Public/PreviewStandard/Preview/5548)  [A-APR.4.6](http://www.cpalms.org/Public/PreviewStandard/Preview/5552)  [F-IF.3.7](http://www.cpalms.org/Public/PreviewStandard/Preview/5576)  [F-IF.3.9](http://www.cpalms.org/Public/PreviewStandard/Preview/5578) | 5.4 Part 2: Dividing Polynomials  (Make sure to show the remainder theorem, as well as graphing when given a root of the graph). |  |  | | |
| 3 |  | Review and Assessment |  |  | | |

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| **Unit 5: Rational Functions** | | | | | | | |
| **Code** | **Mathematics Florida Standard** | | | | | | **SMP** |
| [F-IF.3.7](http://www.cpalms.org/Public/PreviewStandard/Preview/5576) | Graph rational functions, identifying zeros and asymptotes when suitable factorizations are available, and showing end behavior. | | | | | | 4, 5, 6, 7 |
| **Learning Goal and Scale** | | | | **Instructional Strategies & Misconceptions** | | | |
| [L208: Graph and write equivalent forms of functions by hand and using technology, and compare functions in different representations.](http://scpsmath.weebly.com/uploads/2/9/1/7/29174797/l208.docx) | | | |  | | | |
| **Math Practices for Unit** | | | **Unit Connections** | | **Instructional Resources** | | |
| 1. Make sense of problems and persevere in solving them. | | 5. Use appropriate tools strategically. | Students will extend factoring methods and what they’ve learned with polynomial graphing to this unit, where they will make connections to the existence of asymptotes and removable discontinuities. | |  |  | |
| 2. Reason abstractly and quantitatively. | | 6. Attend to precision. |
| 3. Construct viable arguments & critique reasoning of others. | | 7. Look for and make use of structure. |
| 4. Model with mathematics. | | 8. Look for and express regularity in repeated reasoning. |

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| **SECOND QUARTER** | | | | | | |
| **Unit 5: Rational Functions** | | | | | | |
| **Learning Goal** | [L208: Graph and write equivalent forms of functions by hand and using technology, and compare functions in different representations.](http://scpsmath.weebly.com/uploads/2/9/1/7/29174797/l208.docx) | | | | **Suggested # of Days** | **7** |
| **Approx. # of Day(s)** | **MAFS** | **Lesson Objective (Instructional Resources)** | **Suggested Assignments/Assessments** | **Ancillary Materials** | | |
| 5 | [F-IF.3.7](http://www.cpalms.org/Public/PreviewStandard/Preview/5576) | 8.3: Rational Functions and Their Graphs |  |  | | |
| 2 |  | Review and Assessment |  |  | | |

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| **Unit 6 Rational Exponents** | | | | | | | |
| **Code** | **Mathematics Florida Standard** | | | | | | **SMP** |
| [N-RN.1.1](http://www.cpalms.org/Public/PreviewStandard/Preview/5516) | 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. | | | | | | 3, 6 |
| [N-RN.1.2](http://www.cpalms.org/Public/PreviewStandard/Preview/5517) | Rewrite expressions involving radicals and rational exponents using the properties of exponents. | | | | | | 1, 7 |
| [N-RN.2.3](http://www.cpalms.org/Public/PreviewStandard/Preview/5518) | 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. | | | | | | 3, 6 |
| [F-IF.3.7](http://www.cpalms.org/Public/PreviewStandard/Preview/5576) | Graph functions expressed symbolically and show key features of the graph, by hand in simple cases and using technology for more complicated cases.  Graph square root, cube root, and piecewise-defined functions, including step functions and absolute value functions. | | | | | | 4, 5, 6 |
| **Learning Goal and Scale** | | | | **Instructional Strategies & Misconceptions** | | | |
| [L207: Explain whether the sum or product of two rational and/or irrational numbers would be rational or irrational.](http://scpsmath.weebly.com/uploads/2/9/1/7/29174797/l207.docx)  [L208: Graph and write equivalent forms of functions by hand and using technology, and compare functions in different representations.](http://scpsmath.weebly.com/uploads/2/9/1/7/29174797/l208.docx)  [L210: Construct, compare and interpret exponential and logarithmic models, utilizing rational exponents and radicals.](http://scpsmath.weebly.com/uploads/2/9/1/7/29174797/l210.docx) | | | |  | | | |
| **Math Practices for Unit** | | | **Unit Connections** | | **Instructional Resources** | | |
| 1. Make sense of problems and persevere in solving them. | | 5. Use appropriate tools strategically. | This unit picks up where algebra 1 left off in the study of rational exponents. This unit will help students build towards work with logarithms. | |  |  | |
| 2. Reason abstractly and quantitatively. | | 6. Attend to precision. |
| 3. Construct viable arguments & critique reasoning of others. | | 7. Look for and make use of structure. |
| 4. Model with mathematics. | | 8. Look for and express regularity in repeated reasoning. |

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| **SECOND QUARTER** | | | | | | |
| **Unit 6: Rational Exponents** | | | | | | |
| **Learning Goal** | [L207: Explain whether the sum or product of two rational and/or irrational numbers would be rational or irrational.](http://scpsmath.weebly.com/uploads/2/9/1/7/29174797/l207.docx)  [L208: Graph and write equivalent forms of functions by hand and using technology, and compare functions in different representations.](http://scpsmath.weebly.com/uploads/2/9/1/7/29174797/l208.docx)  [L210: Construct, compare and interpret exponential and logarithmic models, utilizing rational exponents and radicals.](http://scpsmath.weebly.com/uploads/2/9/1/7/29174797/l210.docx) | | | | **Suggested # of Days** | **17**  **(4)** |
| **Approx. # of Day(s)** | **MAFS** | **Lesson Objective (Instructional Resources)** | **Suggested Assignments/Assessments** | **Ancillary Materials** | | |
| 2 | [N-RN.2.3](http://www.cpalms.org/Public/PreviewStandard/Preview/5518) | Rational/Irrational Numbers |  | [CPALMS Rational/Irrational Numbers](http://www.cpalms.org/uploads/Resources/final/42118/Document/7764/macc912nrn23_operations_rational_irration_numbers.pdf) | | |
| 1 | [N-RN.1.1](http://www.cpalms.org/Public/PreviewStandard/Preview/5516)  [N-RN.1.2](http://www.cpalms.org/Public/PreviewStandard/Preview/5517) | 6.1: Concept Byte: Properties of Exponents |  |  | | |
| 2 | [N-RN.1.1](http://www.cpalms.org/Public/PreviewStandard/Preview/5516)  [N-RN.1.2](http://www.cpalms.org/Public/PreviewStandard/Preview/5517) | 6.1: Roots and Radical Expressions |  |  | | |
| 6 | [N-RN.1.1](http://www.cpalms.org/Public/PreviewStandard/Preview/5516)  [N-RN.1.2](http://www.cpalms.org/Public/PreviewStandard/Preview/5517) | 6.4: Rational Exponents |  |  | | |
| 3 | [F-IF.3.7](http://www.cpalms.org/Public/PreviewStandard/Preview/5576) | 6.8: Graphing Radical Functions |  |  | | |
| 3 |  | Review and Assessment |  |  | | |
| **4** |  | District Assessment (1 day); 9 Weeks Exams (3 days) |  |  | | |

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| **Unit 7: Sequences and Series** | | | | | | | |
| **Code** | **Mathematics Florida Standard** | | | | | | **SMP** |
| [F-LE.1.1](http://www.cpalms.org/Public/PreviewStandard/Preview/5584) | 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. | | | | | | 3, 6 |
| [F-LE.1.2](http://www.cpalms.org/Public/PreviewStandard/Preview/5585) | 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). | | | | | | 2, 4 |
| [F-LE.1.3](http://www.cpalms.org/Public/PreviewStandard/Preview/5586) | Observe using graphs and tables that a quantity increasing exponentially eventually exceeds a quantity increasing linearly, quadratically, or (more generally) as a polynomial function. | | | | | | 8 |
| [F-IF.3.9](http://www.cpalms.org/Public/PreviewStandard/Preview/5578) | Compare properties of two functions each represented in a different way (algebraically, graphically, numerically in tables, or by verbal descriptions)*.* | | | | | | 3, 6 |
| [A-SSE.2.4](http://www.cpalms.org/Public/PreviewStandard/Preview/5546) | Derive the formula for the sum of a finite geometric series (when the common ratio is not 1), and use the formula to solve problems. | | | | | | 3, 6 |
| **Learning Goal and Scale** | | | | **Instructional Strategies & Misconceptions** | | | |
| [L203: Construct and compare linear, quadratic, and exponential models and interpret parameters in context.](http://scpsmath.weebly.com/uploads/2/9/1/7/29174797/l203.docx)  [L206: Derive the formula for the sum of a finite geometric series (when the common ratio is not 1) and use the formula to solve problems.](http://scpsmath.weebly.com/uploads/2/9/1/7/29174797/l206.docx)  [L208: Graph and write equivalent forms of functions by hand and using technology, and compare functions in different representations.](http://scpsmath.weebly.com/uploads/2/9/1/7/29174797/l208.docx) | | | |  | | | |
| **Math Practices for Unit** | | | **Unit Connections** | | **Instructional Resources** | | |
| 1. Make sense of problems and persevere in solving them. | | 5. Use appropriate tools strategically. | Students will pick up work that they started with in algebra 1 with linear functions. The geometric sequences will move towards the next unit which is exponential functions. | |  |  | |
| 2. Reason abstractly and quantitatively. | | 6. Attend to precision. |
| 3. Construct viable arguments & critique reasoning of others. | | 7. Look for and make use of structure. |
| 4. Model with mathematics. | | 8. Look for and express regularity in repeated reasoning. |

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| **THIRD QUARTER** | | | | | | |
| **Unit 7: Sequences and Series** | | | | | | |
| **Learning Goal** | [L203: Construct and compare linear, quadratic, and exponential models and interpret parameters in context.](http://scpsmath.weebly.com/uploads/2/9/1/7/29174797/l203.docx)  [L206: Derive the formula for the sum of a finite geometric series (when the common ratio is not 1) and use the formula to solve problems.](http://scpsmath.weebly.com/uploads/2/9/1/7/29174797/l206.docx)  [L208: Graph and write equivalent forms of functions by hand and using technology, and compare functions in different representations.](http://scpsmath.weebly.com/uploads/2/9/1/7/29174797/l208.docx) | | | | **Suggested # of Days** | **15** |
| **Approx. # of Day(s)** | **MAFS** | **Lesson Objective (Instructional Resources)** | **Suggested Assignments/Assessments** | **Ancillary Materials** | | |
| 4 | [F-LE.1.1](http://www.cpalms.org/Public/PreviewStandard/Preview/5584)  [F-LE.1.2](http://www.cpalms.org/Public/PreviewStandard/Preview/5585)  [F-LE.1.3](http://www.cpalms.org/Public/PreviewStandard/Preview/5586)  [F-IF.3.9](http://www.cpalms.org/Public/PreviewStandard/Preview/5578) | 9.2: Arithmetic Sequences |  |  | | |
| 4 | [F-LE.1.1](http://www.cpalms.org/Public/PreviewStandard/Preview/5584)  [F-LE.1.2](http://www.cpalms.org/Public/PreviewStandard/Preview/5585)  [F-LE.1.3](http://www.cpalms.org/Public/PreviewStandard/Preview/5586)  [F-IF.3.9](http://www.cpalms.org/Public/PreviewStandard/Preview/5578) | 9.3: Geometric Sequences |  |  | | |
| 4 | [A-SSE.2.4](http://www.cpalms.org/Public/PreviewStandard/Preview/5546) | 9.5: Geometric Series |  |  | | |
| 3 |  | Review and Assessment |  |  | | |

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| **Unit 8: Exponential Functions** | | | | | | | |
| **Code** | **Mathematics Florida Standard** | | | | | | **SMP** |
| [A-SSE.2.3](http://www.cpalms.org/Public/PreviewStandard/Preview/5545) | Choose and produce an equivalent form of an expression to reveal and explain properties of the quantity represented by the expression.  Use the properties of exponents to transform expressions for exponential functions. | | | | | | 2, 3, 6, 7 |
| [F-IF.3.7](http://www.cpalms.org/Public/PreviewStandard/Preview/5576) | Graph functions expressed symbolically and show key features of the graph, by hand in simple cases and using technology for more complicated cases.  Graph exponential and logarithmic functions, showing intercepts and end behavior, and trigonometric functions, showing period, midline, and amplitude, and using phase shift. | | | | | | 4, 5, 6, 7 |
| [F-IF.3.8](http://www.cpalms.org/Public/PreviewStandard/Preview/5577) | Write a function defined by an expression in different but equivalent forms to reveal and explain different properties of the function.  Use the properties of exponents to interpret expressions for exponential functions. | | | | | | 2, 4 |
| [F-LE.2.5](http://www.cpalms.org/Public/PreviewStandard/Preview/5588) | Interpret the parameters in a linear or exponential function in terms of a context. | | | | | | 3, 6 |
| **Learning Goal and Scale** | | | | **Instructional Strategies & Misconceptions** | | | |
| [L203: Construct and compare linear and quadratic models and interpret parameters in context.](http://scpsmath.weebly.com/uploads/2/9/1/7/29174797/l203.docx)  [L204: Choose and produce an equivalent form of an expression by using the structure to identify ways to rewrite it.](http://scpsmath.weebly.com/uploads/2/9/1/7/29174797/l204.docx)  [L208: Graph and write equivalent forms of functions by hand and using technology, and compare functions in different representations.](http://scpsmath.weebly.com/uploads/2/9/1/7/29174797/l208.docx) | | | |  | | | |
| **Math Practices for Unit** | | | **Unit Connections** | | **Instructional Resources** | | |
| 1. Make sense of problems and persevere in solving them. | | 5. Use appropriate tools strategically. | Students will build on what they learned with geometric sequences to explore the exponential family of functions. This will lead to work in the next unit with logarithms. | |  |  | |
| 2. Reason abstractly and quantitatively. | | 6. Attend to precision. |
| 3. Construct viable arguments & critique reasoning of others. | | 7. Look for and make use of structure. |
| 4. Model with mathematics. | | 8. Look for and express regularity in repeated reasoning. |

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| **THIRD QUARTER** | | | | | | |
| **Unit 8: Exponential Functions** | | | | | | |
| **Learning Goal** | [L203: Construct and compare linear and quadratic models and interpret parameters in context.](http://scpsmath.weebly.com/uploads/2/9/1/7/29174797/l203.docx)  [L204: Choose and produce an equivalent form of an expression by using the structure to identify ways to rewrite it.](http://scpsmath.weebly.com/uploads/2/9/1/7/29174797/l204.docx)  [L208: Graph and write equivalent forms of functions by hand and using technology, and compare functions in different representations.](http://scpsmath.weebly.com/uploads/2/9/1/7/29174797/l208.docx) | | | | **Suggested # of Days** | **12** |
| **Approx. # of Day(s)** | **MAFS** | **Lesson Objective (Instructional Resources)** | **Suggested Assignments/Assessments** | **Ancillary Materials** | | |
| 5 | [A-SSE.2.3](http://www.cpalms.org/Public/PreviewStandard/Preview/5545)  [F-IF.3.8](http://www.cpalms.org/Public/PreviewStandard/Preview/5577)  [F-LE.2.5](http://www.cpalms.org/Public/PreviewStandard/Preview/5588)  [F-IF.3.7](http://www.cpalms.org/Public/PreviewStandard/Preview/5576) | 7.1: Exploring Exponential Models |  |  | | |
| 4 | [F-IF.3.7](http://www.cpalms.org/Public/PreviewStandard/Preview/5576) | 7.2: Properties of Exponential Functions |  |  | | |
| 3 |  | Review and Assessment |  |  | | |

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| **Unit 9 Logarithmic Functions** | | | | | | | |
| **Code** | **Mathematics Florida Standard** | | | | | | **SMP** |
| [F-LE.1.4](http://www.cpalms.org/Public/PreviewStandard/Preview/5587) | For exponential models, express as a logarithm the solution to http://www.cpalms.org/Uploads/Benchmark/5587/img/Capture1.PNG = d where a, c, and d are numbers and the base b is 2, 10, or e; evaluate the logarithm using technology. | | | | | | 5, 8 |
| [F-IF.3.7](http://www.cpalms.org/Public/PreviewStandard/Preview/5576) | Graph functions expressed symbolically and show key features of the graph, by hand in simple cases and using technology for more complicated cases.  Graph exponential and logarithmic functions, showing intercepts and end behavior, and trigonometric functions, showing period, midline, and amplitude, and using phase shift. | | | | | | 4, 5, 6, 7 |
| **Learning Goal and Scale** | | | | **Instructional Strategies & Misconceptions** | | | |
| [L208: Graph and write equivalent forms of functions by hand and using technology, and compare functions in different representations](http://scpsmath.weebly.com/uploads/2/9/1/7/29174797/l208.docx).  [L210: Construct, compare and interpret exponential and logarithmic models, utilizing rational exponents and radicals.](http://scpsmath.weebly.com/uploads/2/9/1/7/29174797/l210.docx) | | | |  | | | |
| **Math Practices for Unit** | | | **Unit Connections** | | **Instructional Resources** | | |
| 1. Make sense of problems and persevere in solving them. | | 5. Use appropriate tools strategically. | Students will extend their algebraic thinking in how to solve a new type of equation, the exponential equation, which they have been studying in previous units. This should give them a more formal method to approach a solution, and will also introduce them to the formal notation of the inverse of an exponential function, the logarithm. They will also determine how to graph a logarithmic function. | |  |  | |
| 2. Reason abstractly and quantitatively. | | 6. Attend to precision. |
| 3. Construct viable arguments & critique reasoning of others. | | 7. Look for and make use of structure. |
| 4. Model with mathematics. | | 8. Look for and express regularity in repeated reasoning. |

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| **THIRD QUARTER** | | | | | | |
| **Unit 9: Logarithmic Functions** | | | | | | |
| **Learning Goal** | [L208: Graph and write equivalent forms of functions by hand and using technology, and compare functions in different representations](http://scpsmath.weebly.com/uploads/2/9/1/7/29174797/l208.docx).  [L210: Construct, compare and interpret exponential and logarithmic models, utilizing rational exponents and radicals.](http://scpsmath.weebly.com/uploads/2/9/1/7/29174797/l210.docx) | | | | **Suggested # of Days** | **15**  **(4)** |
| **Approx. # of Day(s)** | **MAFS** | **Lesson Objective (Instructional Resources)** | **Suggested Assignments/Assessments** | **Ancillary Materials** | | |
| 5 | [F-IF.3.7](http://www.cpalms.org/Public/PreviewStandard/Preview/5576) | 7.3: Logarithmic Functions as Inverses |  |  | | |
| 3 | [F-LE.1.4](http://www.cpalms.org/Public/PreviewStandard/Preview/5587) | 7.4: Change of Base Only |  |  | | |
| 4 | [F-LE.1.4](http://www.cpalms.org/Public/PreviewStandard/Preview/5587) | 7.5 Part 1: Solving Exponential and Logarithmic Equations |  |  | | |
| 3 |  | Review and Assessment |  |  | | |
| **4** |  | District Assessment (1 day); FSA/PLA Writing (1 day); 9 Weeks Exams (2 days) |  |  | | |

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| **Unit 10: Probability** | | | | | | | |
| **Code** | **Mathematics Florida Standard** | | | | | | **SMP** |
| [S-IC.2.5](http://www.cpalms.org/Public/PreviewStandard/Preview/5654) | Use data from a randomized experiment to compare two treatments; use simulations to decide if differences between parameters are significant. | | | | | | 3, 4, 5 |
| [S-CP.1.4](http://www.cpalms.org/Public/PreviewStandard/Preview/5659) | Construct and interpret two-way frequency tables of data when two categories are associated with each object being classified. Use the two-way table as a sample space to decide if events are independent and to approximate conditional probabilities. | | | | | | 4, 5 |
| [S-CP.1.5](http://www.cpalms.org/Public/PreviewStandard/Preview/5660) | Recognize and explain the concepts of conditional probability and independence in everyday language and everyday situations. | | | | | | 3, 6 |
| **Learning Goal and Scale** | | | | **Instructional Strategies & Misconceptions** | | | |
| [L211: Understand independence and conditional probability and use the rules of probability to compute and interpret data in a probability model.](http://scpsmath.weebly.com/uploads/2/9/1/7/29174797/l211.docx)  [L212: Use surveys, experiments and observational studies to summarize data, make inferences and justify statistical conclusions.](http://scpsmath.weebly.com/uploads/2/9/1/7/29174797/l212.docx) | | | |  | | | |
| **Math Practices for Unit** | | | **Unit Connections** | | **Instructional Resources** | | |
| 1. Make sense of problems and persevere in solving them. | | 5. Use appropriate tools strategically. | Students will build upon what they have learned about probability to understand and apply conditional probability. | |  |  | |
| 2. Reason abstractly and quantitatively. | | 6. Attend to precision. |
| 3. Construct viable arguments & critique reasoning of others. | | 7. Look for and make use of structure. |
| 4. Model with mathematics. | | 8. Look for and express regularity in repeated reasoning. |

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| **FOURTH QUARTER** | | | | | | |
| **Unit 10: Probability** | | | | | | |
| **Learning Goal** | [L211: Understand independence and conditional probability and use the rules of probability to compute and interpret data in a probability model.](http://scpsmath.weebly.com/uploads/2/9/1/7/29174797/l211.docx)  [L212: Use surveys, experiments and observational studies to summarize data, make inferences and justify statistical conclusions.](http://scpsmath.weebly.com/uploads/2/9/1/7/29174797/l212.docx) | | | | **Suggested # of Days** | **15** |
| **Approx. # of Day(s)** | **MAFS** | **Lesson Objective (Instructional Resources)** | **Suggested Assignments/Assessments** | **Ancillary Materials** | | |
| 3 | [S-CP.1.4](http://www.cpalms.org/Public/PreviewStandard/Preview/5659) | CC-12: Experimental and Theoretical Probability |  |  | | |
| 3 | [S-CP.1.4](http://www.cpalms.org/Public/PreviewStandard/Preview/5659)  [S-CP.1.5](http://www.cpalms.org/Public/PreviewStandard/Preview/5660) | CC-13: Probability of Compound Events |  |  | | |
| 4 | [S-CP.1.4](http://www.cpalms.org/Public/PreviewStandard/Preview/5659)  [S-CP.1.5](http://www.cpalms.org/Public/PreviewStandard/Preview/5660) | CC-15: Conditional Probability |  |  | | |
| 3 | [S-IC.2.5](http://www.cpalms.org/Public/PreviewStandard/Preview/5654) | CC-16: Probability Models |  |  | | |
| 2 |  | Review and Assessment |  |  | | |

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| **Unit 11: Inferential Statistics** | | | | | | |
| **Code** | **Mathematics Florida Standard** | | | | | **SMP** |
| [S-IC.1.1](http://www.cpalms.org/Public/PreviewStandard/Preview/5650) | Understand statistics as a process for making inferences about population parameters based on a random sample from that population. | | | | | 6 |
| [S-IC.1.2](http://www.cpalms.org/Public/PreviewStandard/Preview/5651) | Decide if a specified model is consistent with results from a given data-generating process, e.g., using simulation. | | | | | 1, 2 |
| [S-IC.2.3](http://www.cpalms.org/Public/PreviewStandard/Preview/5652) | Recognize the purposes of and differences among sample surveys, experiments, and observational studies; explain how randomization relates to each. | | | | | 6 |
| [S-IC.2.4](http://www.cpalms.org/Public/PreviewStandard/Preview/5653) | Use data from a sample survey to estimate a population mean or proportion; develop a margin of error through the use of simulation models for random sampling. | | | | | 3, 4, 5 |
| [S-IC.2.5](http://www.cpalms.org/Public/PreviewStandard/Preview/5654) | Use data from a randomized experiment to compare two treatments; use simulations to decide if differences between parameters are significant. | | | | | 3, 4, 5 |
| [S-IC.2.6](http://www.cpalms.org/Public/PreviewStandard/Preview/5655) | Evaluate reports based on data. | | | | | 3, 6 |
| **Learning Goal and Scale** | | | | **Instructional Strategies & Misconceptions** | | |
| [L212: Use surveys, experiments and observational studies to summarize data, make inferences and justify statistical conclusions.](http://scpsmath.weebly.com/uploads/2/9/1/7/29174797/l212.docx) | | | |  | | |
| **Math Practices for Unit** | | | **Unit Connections** | | **Instructional Resources** | |
| 1. Make sense of problems and persevere in solving them. | | 5. Use appropriate tools strategically. | Students may be new to this material at this stage, though it should be building based on their work with statistics in Algebra 1. In this section, students will start by determining the different ways to gather information, as well as what the strengths and weaknesses of each are. Then, they will be be using normal distributions to draw conclusions. Each section will build upon the last and will lead to their work in Algebra 2, where they will extend what they learn in this unit. | | Pearson Website: Common Core Lessons | |
| 2. Reason abstractly and quantitatively. | | 6. Attend to precision. |
| 3. Construct viable arguments & critique reasoning of others. | | 7. Look for and make use of structure. |
| 4. Model with mathematics. | | 8. Look for and express regularity in repeated reasoning. |

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| **FOURTH QUARTER** | | | | | | |
| **Unit 11: Inferential Statistics** | | | | | | |
| **Learning Goal** | [L212: Use surveys, experiments and observational studies to summarize data, make inferences and justify statistical conclusions.](http://scpsmath.weebly.com/uploads/2/9/1/7/29174797/l212.docx) | | | | **Suggested # of Days** | **20**  **(11)** |
| **Approx. # of Day(s)** | **MAFS** | **Lesson Objective (Instructional Resources)** | **Suggested Assignments/Assessments** | **Ancillary Materials** | | |
| 3 | [S-IC.1.1](http://www.cpalms.org/Public/PreviewStandard/Preview/5650)  [S-IC.2.3](http://www.cpalms.org/Public/PreviewStandard/Preview/5652)  [S-IC.2.4](http://www.cpalms.org/Public/PreviewStandard/Preview/5653)  [S-IC.2.6](http://www.cpalms.org/Public/PreviewStandard/Preview/5655) | [CC-18: Samples and Surveys](http://scpsmath.weebly.com/uploads/2/9/1/7/29174797/cc-18.pdf) |  |  | | |
| 3 | [S-IC.1.2](http://www.cpalms.org/Public/PreviewStandard/Preview/5651) | [Sarah the Chimpanzee](http://www.cpalms.org/uploads/Resources/final/44657/Document/10169/macc912sic12_sarah_the_chimpanzee.pdf) |  | [CC-14: Probability Distributions, Question 8](http://scpsmath.weebly.com/uploads/2/9/1/7/29174797/cc-14.pdf) | | |
| 4 | [S-IC.2.4](http://www.cpalms.org/Public/PreviewStandard/Preview/5653)  [S-IC.2.5](http://www.cpalms.org/Public/PreviewStandard/Preview/5654) | [CC-19: Normal Distributions](http://scpsmath.weebly.com/uploads/2/9/1/7/29174797/cc-19.pdf) |  |  | | |
| 4 | [S-IC.2.4](http://www.cpalms.org/Public/PreviewStandard/Preview/5653) | [CC-20: Margin of Error](http://scpsmath.weebly.com/uploads/2/9/1/7/29174797/cc-20.pdf) |  |  | | |
| 4 | [S-IC.2.5](http://www.cpalms.org/Public/PreviewStandard/Preview/5654) | [CC-21: Drawing Conclusions from Samples](http://scpsmath.weebly.com/uploads/2/9/1/7/29174797/cc-21.pdf) |  |  | | |
| 2 |  | Review and Assessment |  |  | | |
| **11** |  | District Assessment (1 day); FSA Tests (7 days);  9 Weeks Exams (3 days) |  |  | | |