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| **Subject: Integrated Algebra Unit: Three** | |
| **Unit Topic and Length:**  **Linear and Exponential Relationships (20 days)** | |
| **Common Core Learning Standards:**  **A‐REI.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.6** Solve systems of linear equations exactly and approximately (e.g., with graphs), focusing on pairs of linear equations in two variables.  **A‐REI.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).  **A‐REI.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‐REI.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. | |
| **Big Ideas/Enduring Understandings:**  Understanding how we can we use systems of equations to model real world situations.  Understanding how we can use half planes to help us solve linear programming problems.  Understanding the relationship between linear and exponential growth.  Understanding how we can use graphs to model many different types of real problems. | **Essential Questions:**  How many different ways can I solve systems of equations?  When I solve a system of equations what is it that I am actually finding?  How does the graph of an inequality differ for the graph an equation?  How can technology help me with solutions to system of equations problems? |

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| **Content:**  **Solve systems of equations**  **Represent and solve equations and inequalities graphically**  **Graph cases where *f(x)* and/or *g(x)* are linear, polynomial, rational, absolute value, exponential, and logarithmic functions.** | **Skills:**  Ability to use various methods for solving systems of equations algebraically. Ability to identify the mathematical property (addition property of equality, distributive property, etc.) used at each step in the solution process as a means of justifying a step  Ability to extend experiences with solving simultaneous linear equations from 8EE.8 b&c to include more complex situations. Ability to solve systems using the most efficient method  ***Buried Treasure***  ***Engage NY Lesson 22***  ***IMP Page 339 - 342***  Ability to construct an argument as to how the points that make up a curve connect to an algebraic representation of the function that is being represented by the graph .  Ability to show the equality of two functions using multiple representations  Ability to explain why a particular shaded region represents the solution of a given linear inequality or system of linear inequalities  Ability to convey the mathematics behind the dotted versus solid boundary lines used when graphing the solutions to linear inequalities  ***Stain Glass***  ***Engage NY Lesson 21***  ***IMP Page 332***  ***IMP POW #13***  Looking at Absolute value graphs and their properties.  ***Pyramid***  Looking at all the properties of exponential graphs.  ***Paper folding***  ***Chernobyl***  ***Million Dollar Mission*** | **Days:**    **4**  **2**  **2**  **1**  **4**  **2**    **2** |
| **Assessment Evidence and Activities:**  Pre and Post Tests (formative assessment and assessments for evidence of growth)  Quizzes  Questioning and Observations  Do Nows and Exit Slips  Class work and Homework | | |
| **Possible Support Strategies:**  Use of manipulatives  Word Walls and Individual Glossaries  Journals  Back Tracking Technique demonstrated for solving equations | | |
| **Formative Assessment:**  The assessments listed above will be used to identify students’ strengths and weaknesses.  There will be constant adjustments and fine tuning of the curriculum delivery based on this analysis. Sharing student work, sharing best practice and planning next steps will be an integral part of common planning meetings. | | |
| **Final Performance Based Task:**  Students will be able to describe the behavior of different functions depending on their particular parameters. The will know how the absolute value functions will be reflected over the axis but the exponential graphs will be limited to real number values. Part of the expectations is that students will select real world situations to serve as a model. The Egyptian Pyramid outline will serve as a good real world situation to allow students to sort out through all properties for absolute value equations. | | |
| **Extension:**  Differentiated column sheets for order of operations and evaluating like terms.  Table logic for adding and subtracting integers and polynomial expressions.  Differentiated column sheets for solving equations. | | |
| **Learning Plan & Activities:**  The learning plan will incorporate work shop style lessons which will allow for student centered learning. Group work will be incorporated into various concepts with a focus on students learning collaboratively. There will be an emphasis on technique to enable students to solve skills based questions. This will be supported with problem solving exercises for all content to give students a conceptual understanding of the material. | | |
| **Resources:**  Text book : Prentice Hall Mathematics Algebra I  Graphing calculators  Algebra Tiles  Smart Board Demonstrations  Problem solving materials created by teachers | | |