2011 – 2012 Algebra 1 EOC Tests 2003 SCOS Objectives.

*** in curriculum goals/objectives are included in CCSS but ***NOT*** required for 2011 – 2012

Subject: Algebra 1 **Grade Level: 8th/9th** **Unit Title: Relations and Functions**	**Timeframe Needed for Completion:** **Grading Period: 2nd 9 weeks (25 Days)**
Big Idea/Theme: What's your malfunction? **Understandings: solve and graph linear equations and inequalities, solve systems of equations using graphing, elimination, and matrices, determine whether lines are parallel or perpendicular, , describe functions and their terms, write and identify direct variation equations.**	
Essential Questions: 1. What are the advantages and disadvantages of using graphs, using equations, and using tables? 2. What are some real world applications which would use quadratic equations? 3. List examples where parallel and perpendicular lines are found in everyday items. 4. Describe situations where systems of equations are applicable to real life situations. 5. Describe some real life examples using direct variation.	**Curriculum Goals/Objectives** (to be assessed at the end of the unit/quarter) **1.** Model and solve problems using direct variation (1.03). **2.** Use the parallelism or perpendicularity of lines and segments to solve problems (2.02). A.CED.1 Create linear equations and inequalities in one variable and use them in a contextual situation to solve problems. A.CED.2 Create equations in two or more variables to represent relationships between quantities. Graph equations in two variables on the coordinate plane and label the axes and scales. (4.01) A.CED.3 Write and use a system of equations and/or inequalities to solve a real world problem. Recognize that the equations and inequalities represent the constraints of the problem. A.REI.5 Solve systems of equations using the elimination method (sometimes called linear combinations), by substitution (solving one variable in the first equation and substitution into the second equation) (4.03) A.REI.6 Solve systems of equations using graphs. (4.03) 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). (4.03) 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. (4.03) A.REI.12 Graph the solutions to a linear inequality in two variables as a half-plane, excluding boundary for non-inclusive inequalities. Graph the solution set to a system of linear inequalities in two variables as the intersection of their corresponding half-planes.(4.03) N.Q.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.2 Define appropriate quantities for the purpose of descriptive modeling. *** N.Q.3 Choose a level of accuracy appropriate to limitations on measurement when reporting quantities. *** A.SSE.1.a Interpret expressions that represent a quantity in terms of its context. a. Interpret parts of an expression, such as terms, factors, and coefficients. *** A.SSE.2 Use the structure of an expression to identify ways to rewrite it. For example, see $x^4 - y^4$ as $(x^2)^2 - (y^2)^2$, thus recognizing it as a difference of squares that can be factored as $(x^2 - y^2)(x^2 + y^2)$. (1.01) F.IF.2 Use function notation, evaluate functions for inputs in their domains, and interpret statements that use function notation in terms of a context. (4.01) F.IF.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. (4.01) F.IF.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.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.7 Graph functions expressed symbolically and show key features of the graph, by hand in simple cases and using technology for more complicated cases. a. Graph linear and quadratic functions and show intercepts, maxima, and minima. b. Graph square root, cube root, and piecewise-defined functions, including step functions and absolute value functions. (4.01) F.IF.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. (1.02) F.IF.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. (4.01) F.BF.1.a Write a function that describes a relationship between two quantities. a. Determine an explicit expression, a recursive process, or steps for calculation from a context. (4.01) F.BF.2 Write arithmetic and geometric sequences both recursively and with an explicit formula, use them to model situations, and translate between the two

	forms. (1.02) F.BF.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.BF.4.a Find inverse functions a. Solve an equation of the form f(x) = c for a simple function f that has an inverse and write an expression for the inverse. For example, f(x) =2 x_3 or f(x) = (x+1)/(x–1) for x 1 *** F.LE.1.b Distinguish between situations that can be modeled with linear functions and with exponential functions b. Recognize situations in which one quantity changes at a constant rate per unit interval relative to another. (4.04) F.LE.2 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). (4.04) F.LE.5 Interpret the parameters in a linear or exponential function in terms of a context. (4.01) S.ID.6 Represent data on two quantitative variables on a scatter plot, and describe how the variables are related. a. 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 and exponential models b. Informally assess the fit of a function by plotting and analyzing residuals c. Fit a linear function for a scatter plot that suggests a linear association (3.03) S.ID.7 Interpret the slope (rate of change) and the intercept (constant term) of a linear model in the context of the data. (3.03)

	S.ID.8 Compute (using technology) and interpret the correlation coefficient of a linear fit. *** S.ID.9 Distinguish between correlation and causation. ***
Essential Skills/Vocabulary: **Vocabulary:** Identity, no solution, inverse operations, solution, linear equation, parallel, perpendicular, slope, slope intercept, point slope, standard, x-intercept, y-intercept, linear, constant of variation. **Essential skills**: 1. determine if a relation is a function, including using the vertical line test 2. find the slope given two points, from a table, from a graph 3. graph linear equations and inequalities from a table, from data contained in a problem 4. write equations in point slope, slope-intercept and standard forms 5. graph equations from point-slope, slope-intercept and standard forms 6. solve systems of equations using graphing, elimination, and matrices 7. solve systems of inequalities, graph the solution 8. understand parallelism and perpendicularity of lines **Guiding Questions**: 1. Given two points on a line, how do you find the slope? 2. What is slope intercept form of a line and how can it be used to draw the line it represents?	**Assessment Tasks:** Quick writes Teacher made tests and quizzes Find the error Foldables Cornell notes Groupwork Projects Graphic organizers Venn Diagrams Anticipation/prediction guides

3. How can I write a linear equation with standard and slope intercept forms of equations? 4. How can you tell if a given equation passes through a given point? 5. How can I write an equation that models given data? 6. How do you determine the y-intercept of an equation in slope-intercept form? In standard form? What do we know about lines that are parallel? Perpendicular? 7. What is the relationship between the domain and range of a function? 8. What is a linear equation? 9. What is the vertical line test for a function? 10. What are two examples of non-linear equations? 11. Given a set of ordered pairs, a graph, or a table, how would you determine if these relations are functions? 12. How are graphing equations similar, and different, from graphing inequalities? 13. How are patterns of change represented in functions? 14. What methods can be used to solve systems of equations? 15. How are systems of equations and inequalities useful?	
Materials Suggestions: **Prentice Hall Mathematics Algebra 1 : Chapters 5, 6, 7** **http://www.thinkfinity.org/math-highlights** **Use applications and open-ended questions throughout topics.** **http://www.doe.virginia.gov/instruction/mathematics/high/index.shtml**