Public Schools of North Carolina
State Board of Education | Department of Public Instruction

Algebra I Curriculum Crosswalk

The following document is to be used to compare the 2003 North Carolina Mathematics Standard Course of Study for Algebra I and the Common Core State Standards for Mathematics Algebra I course.

As noted in the Common Core State Standards for Mathematics document, the high school standards specify the mathematics that all students should study in order to be college and career ready. Mathematics concepts that lay the foundation for more advanced courses are indicated by a plus (+). Specific modeling standards appear throughout the high school Common Core State Standards for Mathematics and are indicated by a star (⬚). The high school standards were developed in conceptual categories that portray a coherent view of high school mathematics that cross a number of course boundaries. These conceptual categories include:

- Number and Quantity
- Algebra
- Functions
- Modeling
- Geometry
- Statistics and Probability

To download the Common Core State Standards, please visit http://www.corestandards.org/the-standards.

Important Note: The current SCoS will continue to be the taught and tested standards in the 2010-11 and 2011-12 school years. We expect the new Common Core standards to be taught and assessed in schools for the first time in the 2012-13 school year. That said, we are providing resources now and over the next two-years so that schools and teachers can get a head start on internalizing and planning to teach the new standards.

NC SCOS			Common Core			Comments
Strand	Objective	Text of objective	Domain	Standard	**Cluster** Text of objective	
Numbers & Operations	1.01	Write equivalent forms of algebraic expressions to solve problems. a) Apply the laws of exponents	The Real Number System	N.RN.2	**Extend the properties of exponents to rational exponents.** Rewrite expressions involving radicals and rational exponents using the properties of exponents.	Applying the laws of exponents using numerical bases and integer exponents is in 8th grade CCSS. This is an extension of applying the laws of exponents. At this level, address these laws using rational exponents focusing on using fractional exponents with a numerator or 1.
		b) Operate with polynomials	Arithmetic with Polynomials and Rational Expressions	A.APR.1	**Perform arithmetic operations on polynomials** 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.	Division of polynomials is not addressed in the CCSS. At this level, limit to addition and subtraction of quadratics and multiplication of linear expressions. The Closure Property is new.
		c) Factor polynomials	Seeing Structure in Expressions	A.SSE.2	**Interpret the structure of expressions** 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 $(x^2 - y^2)(x^2 + y^2)$.*	
				A.SSE.3	**Write expressions in equivalent forms to solve problems** Choose and produce an equivalent form of an expression to reveal and explain properties of the quantity represented by the expression. **a.** Factor a quadratic expression to reveal the zeros of the function it defines.	At this level, the limit is quadratic expressions of the form $ax^2 + bx + c$. Factoring to reveal the zeros of a function is an explicit connection made in the CCSS.
	1.0	Use formulas and algebraic expressions, including iterative and	Creating Equations A-CED		**Create equations that describe numbers or relationships**	At this level, limit to formulas that are linear in the variable of

			recursive forms, to model and solve problems.	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.*	interest, or to formulas involving squared or cubed variables.
	Building Functions	F.BF.2	**Build a function that models a relationship between two quantities** Write arithmetic and geometric sequences both recursively and with an explicit formula, use them to model situations, and translate between the two forms.	At this level, formal recursive notation is not used. Instead, use of informal recursive notation is intended.
1.03	Model and solve problems using direct variation.				Moved to 7th grade CCSS.
		The Real Number System	N.RN.1	**Extend the properties of exponents to rational exponents.** 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 $5^{1/3}$ to be the cube root of 5 because we want $(5^{1/3})^3 = 5^{(1/3)3}$ to hold, so $(5^{1/3})^3$ must equal 5.*	At this level, address these laws using rational exponents focusing on fractional exponents with a numerator or 1.
		Quantities	N.Q.1	**Reason quantitatively and use units to solve problems.** 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	**Reason quantitatively and use units to solve problems.** Define appropriate quantities for the purpose of descriptive modeling.	
			N.Q.3	**Reason quantitatively and use units to solve problems.** Choose a level of accuracy appropriate to limitations on measurement when reporting quantities.	
		Interpreting Functions	F.IF.3	**Understand the concept of a function and use function notation** 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*	

Page 3 of 14

					≥ *1*.	
Geometry & Measurement	2.01	Find the lengths and midpoints of segments to solve problems.	Expressing Geometric Properties with Equations	G.GPE.6	**Use coordinates to prove simple geometric theorems algebraically.** Find the point on a directed line segment between two given points that partitions the segment in a given ratio.	At this level, focus on finding the midpoint of a segment. Finding the length of a segment is in the 8th grade CCSS. At this level in G.GPE.7, finding the length of a segment is extended to finding perimeter and area of a polygon graphed in the coordinate plane.
	2.02	Use the parallelism or perpendicularity of lines and segments to solve problems.	Expressing Geometric Properties with Equations	G.GPE.5	**Use coordinates to prove simple geometric theorems algebraically.** Prove the slope criteria for parallel and perpendicular lines and use them to solve geometric problems (e.g., find the equation of a line parallel or perpendicular to a given line that passes through a given point).	The intent of the CCSS is conceptually more complex than the expectation outlined in the 2003 SCoS (e.g. students are asked to prove).
			Congruence	G.CO.1	**Experiment with transformations in the plane** Know precise definitions of angle, circle, perpendicular line, parallel line, and line segment, based on the undefined notions of point, line, distance along a line, and distance around a circular arc.	At this level, distance around a circular arc is not addressed.
			Expressing Geometric Properties with Equations	G.GPE.4	**Use coordinates to prove simple geometric theorems algebraically.** Use coordinates to prove simple geometric theorems algebraically. For example, prove or disprove that a figure defined by four given points in the coordinate plane is a rectangle; prove or disprove that the point $(1, \sqrt{3})$ lies on the circle centered at the origin and containing the point (0,2).	
				G.GPE.7	**Use coordinates to prove simple geometric theorems algebraically.** Use coordinates to compute perimeters of polygons and areas of triangles and rectangles, e.g., using the distance	

11-22-11

		Geometric Measurement and Dimension	G.GMD.1	**Explain volume formulas and use them to solve problems.** Give and informal argument for the formulas for the circumference of a circle, area of a circle, volume of a cylinder, pyramid, and cone. Use dissection arguments, Cavalieri's principle, and informal limit arguments.	The application of these formulas is first covered in the 8th grade CCSS. Here students informally derive the formulas. Informal limit arguments are not the intent at this level.
			G.GMD.3	**Explain volume formulas and use them to solve problems.** Use volume formulas for cylinders, pyramids, cones, and spheres to solve problems.	At this level, formulas for pyramids, cones and spheres will be given.
Data Analysis and Probability	3.01	Use matrices to display and interpret data.			Plus Standard Level
	3.02	Operate (addition, subtraction, scalar multiplication) with matrices to solve problems.			Plus Standard Level
	3.03	Create linear models for sets of data to solve problems. a) Interpret constants and coefficients in the context of the data. b) Check the model for goodness-of-fit and use the model, where appropriate, to draw conclusions or make predictions.	Interpreting Categorical and Quantitative Data	S.ID.6	**Summarize, represent, and interpret data on two categorical and quantitative variables** 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.	Fitting an exponential model to data is new.
					Summarize, represent, and interpret data on two categorical and quantitative variables Represent data on two quantitative variables on a scatter plot, and describe how the variables are related. b. Informally assess the fit of a function by plotting and analyzing residuals.	At this level focus on linear models. Residual plots are new.
					Summarize, represent, and interpret data on two categorical and quantitative variables Represent data on two quantitative variables on a scatter	

11-22-11

		S.ID.7	plot, and describe how the variables are related. c. Fit a linear function for a scatter plot that suggests a linear association. **Interpret linear models** Interpret the slope (rate of change) and the intercept (constant term) of a linear model in the context of the data.	
		S. ID.1	**Summarize, represent, and interpret data on a single count or measurement variable** Represent data with plots on the real number line (dot plots, histograms, and box plots).	
		S.ID.2	**Summarize, represent, and interpret data on a single count or measurement variable** 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.3	**Summarize, represent, and interpret data on a single count or measurement variable** 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.5	**Summarize, represent, and interpret data on two categorical and quantitative variables** 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.8	**Interpret linear models** Compute (using technology) and interpret the correlation coefficient of a linear fit.	
		S.ID 9	**Interpret linear models** Distinguish between correlation and causation.	
Page	4	A equ m g	Use linear functions or inequalities	**Create equations that describe numbers or**	At this level, focus on linear and

11-22-11

to model and solve problems; justify results. a) Solve using tables, graphs, and algebraic properties. b) Interpret constants and coefficients in the context of the problem.			**relationships**	exponential functions.
			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.	Creating and solving linear equations and inequalities in one-variable are not explicitly stated in the 2003 SCoS. Creating and solving exponential equations and inequalities, in one-variable or two, is not addressed in the 2003 SCoS.
		A.CED.2	**Create equations that describe numbers or relationships**	At this level, focus on linear, exponential and quadratic. Limit to situations that involve evaluating exponential functions for integer inputs. Creating equations and inequalities in two-variables are not explicitly stated in the 2003 SCoS.
			Create equations in two or more variables to represent relationships between quantities; graph equations on coordinate axes with labels and scales.	
	Reasoning with Equations and Inequalities	A.REI.3	**Solve equations and inequalities in one variable**	Solving equations and inequalities in one-variable are not explicitly stated in the 2003 SCoS.
			Solve linear equations and inequalities in one variable, including equations with coefficients represented by letters.	
		A.REI.10	**Represent and solve equations and inequalities graphically**	At this level, focus on linear and exponential equations.
			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).	
	Interpreting Functions	F.IF.1	**Understand the concept of a function and use function notation**	
			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	

11-22-11

				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.2	**Understand the concept of a function and use function notation**	At this level, the focus is linear and exponential functions.
				Use function notation, evaluate functions for inputs in their domains, and interpret statements that use function notation in terms of a context.	Function notation is not explicitly stated in the 2003 SCoS.
			F.IF.7	**Analyze functions using different representations**	
				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.	
		Building Functions	F.BF.1	**Build a function that models a relationship between two quantities**	Writing a function rule from a contextual relationship is new.
				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.	
		Linear, Quadratic, and Exponential Models	F.LE.2	**Construct and compare linear and exponential models and solve problems**	
				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).	
			F.LE.5	**Interpret expressions for functions in terms of the situation they model**	Interpreting parameters for exponential functions is new.
				Interpret the parameters in a linear or exponential function in terms of a context.	
4.0	Graph, factor, and evaluate quadratic functions to solve	Structure in Ex	A.	**Write expressions in equivalent forms to solve problems.**	At this level, the limit is quadratic expressions of the form

11-22-11

problems.			Choose and produce an equivalent form of an expression to reveal and explain properties of the quantity represented by the expression. a. Factor a quadratic expression to reveal the zeros of the function it defines.	$ax^2 + bx + c$. Factoring to reveal the zeros of a function is an explicit connection made in the CCSS.
	Interpreting Functions	F.IF.7	**Analyze functions using different representations**	
			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.	
		F.IF.8	**Analyze functions using different representations**	At this level, only factoring expressions of the form $ax^2 + bx + c$, is expected. Completing the square is not addressed at this level.
			Write a function defined by an expression in different but equivalent forms to reveal and explain different properties of the function. a. 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.	
4.03	Use systems of linear equations or inequalities in two variables to model and solve problems. Solve using tables, graphs, and algebraic properties; justify results.	Creating Equations[ ]	A.CED.3	**Create equations that describe numbers or relationships**	At this level, limit to linear equations and inequalities.
			Represent constraints by equations or inequalities, and by systems of equations and/or inequalities, and interpret solutions as viable or non- viable options in a modeling context. *For example, represent inequalities describing nutritional and cost constraints on combinations of different foods.*	
		A.REI.6	**Solve systems of equations**	
			Solve systems of linear equations exactly and approximately (e.g., with graphs), focusing on pairs of linear equations in two variables.	
		A.REI.12	**Represent and solve equations and inequalities graphically**	
			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	

11-22-11

				of linear inequalities in two variables as the intersection of the corresponding half-planes.	
4.04	Graph and evaluate exponential functions to solve problems.	Interpreting Functions	F.IF.7	**Analyze functions using different representations** Graph functions expressed symbolically and show key features of the graph, by hand in simple cases and using technology for more complicated cases. 　e.　Graph exponential and logarithmic functions, showing intercepts and end behavior, and trigonometric functions, showing period, midline, and amplitude.	At this level, focus on exponential functions only.
			F.IF.8	**Analyze functions using different representations** Write a function defined by an expression in different but equivalent forms to reveal and explain different properties of the function. 　b.　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.*	Identifying and classifying rates of growth or decay are not explicitly stated in the 2003 SCoS.
			F.LE.2	**Construct and compare linear and exponential models and solve problems** 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).	Constructing exponential functions is not addressed in the 2003 SCoS.
		Seeing Structure in Expressions	A.SSE.1	**Interpret the structure of expressions** Interpret expressions that represent a quantity in terms of its context. 　a.　Interpret parts of an expression, such as terms, factors, and coefficients.	At this level, limit to linear expressions, exponential expressions with integer exponents and quadratic expressions.
				Interpret the structure of expressions	At this level, limit to linear

11-22-11

			Interpret expressions that represent a quantity in terms of its context. **b.** 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.*	expressions, exponential expressions with integer exponents and quadratic expressions.
	Reasoning with Equations and Inequalities	A.REI.1	**Understand solving equations as a process of reasoning and explain the reasoning**	
			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.5	**Solve systems of equations**	
			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.11	**Represent and solve equations and inequalities graphically**	At this level, focus on linear and exponential functions.
			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.	
		F.IF.4	**Interpret functions that arise in applications in terms of the context**	At this level, focus on linear, exponential and quadratic functions; no end behavior or periodicity.
			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*	

11-22-11

			behavior; and periodicity.	
		F.IF.5	**Interpret functions that arise in applications in terms of the context**	At this level, focus on linear and exponential functions.
			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.6	**Interpret functions that arise in applications in terms of the context**	At this level, focus on linear functions and exponential functions whose domain is a subset of the integers.
			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.9	**Analyze functions using different representations**	At this level, focus on linear, exponential, and quadratic functions.
			Compare properties of two functions each represented in a different way (algebraically, graphically, numerically in tables, or by verbal descriptions). *For example, given a graph of one quadratic function and an algebraic expression for another, say which has the larger maximum.*	
	Building Functions	F.BF.1	**Build a function that models a relationship between two quantities**	At this level, limit to addition or subtraction of constant to linear, exponential or quadratic functions or addition of linear functions to linear or quadratic functions.
			Write a function that describes a relationship between two quantities. b. 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	**Build new functions from existing functions**	At this level, limit to vertical and

				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.	horizontal translations of linear and exponential functions. Even and odd functions are not addressed.
		Linear, Quadratic & Exponential Models[]	F.LE.1	**Construct and compare linear and exponential models and solve problems**	
				Distinguish between situations that can be modeled with linear functions and with exponential functions a. Prove that linear functions grow by equal differences over equal intervals, and that exponential functions grow by equal factors over equal intervals.	
				Construct and compare linear and exponential models and solve problems	
				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.	
				Construct and compare linear and exponential models and solve problems	
				Distinguish between situations that can be modeled with linear functions and with exponential functions c. Recognize situations in which a quantity grows or decays by a constant percent rate per unit interval relative to another.	
			F.LE.3	**Construct and compare linear, quadratic, and exponential models and solve problems**	At this level, limit to linear, exponential, and quadratic functions; general polynomial functions are not addressed.
				Observe using graphs and tables that a quantity increasing exponentially eventually exceeds a quantity increasing linearly, quadratically, or (more generally) as a polynomial function.	

11-22-11

11-22-11