Algebra 1
Course Information

Course Description:
Students will study patterns, relations, and functions, and focus on the use of mathematical models to understand and analyze quantitative relationships. Through the utilization of technology, real world connections, reasoning, mathematical discourse (written and verbal), and inquiry, students will develop an understanding of the skills and concepts central to the study of Algebra. Students will explore and use mathematical representations to analyze and model their thinking and problem situations. This course will include the following topics: variables and expressions; real numbers; linear equations; relations and functions; graphing linear equations; linear inequalities and absolute value; systems of equations and inequalities; polynomials; factoring; quadratics, exponential, and square root functions; radical and rational functions; sampling, collecting, and analyzing data; and probability.

Textbook: *Algebra I, Glencoe, 2005*

Credit by Examination and Demonstration

To receive credit for Algebra 1, the student must earn a grade of 60% on the course examination. The two hour assessment will consist of both multiple choice and short/extended response items. The Credit Determination Committee will administer the exam**.**

Scoring Guidelines for Credit by Examination and Demonstration:

60% is required for a proficient score.

Grading Scale:

90% - 100% = A
80% - 89% = B
70% - 79% = C
60% - 69% = D
Below 60% = F

Course	Topic	Grade Level Indicators	Ohio Grade Level Indicators
Algebra 1 First Nine Weeks			
	Variables and Expressions	**A:08-D:08**	Writes, simplifies and evaluate algebraic expressions (including formulas) to generalize situations and solve problems.
		N:09-C:01	Identifies and justifies whether properties (closure, identity, inverse, commutative, and associative) hold for a given set and operations; e.g., even integers and multiplication.
	Real Numbers	**N:09-E:02**	Compares, orders and determines equivalent forms for rational and irrational numbers
		N:09-I:05	Estimates the solutions for problem situations involving square and cube roots.
		N:08-B:02	Compares, orders, and determines equivalent forms of real numbers.
		N:08-B:03	Describes differences between rational and irrational numbers, e.g., uses technology to show that some numbers (rational) can be expressed as terminating or repeating decimals and others (irrational) as non-terminating and non-repeating decimals.
		N:08-I:03	Applies order of operations to simplify expressions and performs computations.
		N:09-G:04	Demonstrates fluency in computations using real numbers.
	Linear Equations	**A:08-D:07**	Uses symbolic algebra (equations and inequalities), graphs and tables to represent situations and solve problems.
		A:08-F:09	Solves linear equations and inequalities graphically, symbolically and using technology.
		N:08-G:06	Estimates, computes and solves problems involving rational numbers, including ratio, proportion and percent, and judge the reasonableness of solutions.
		M:09-D:02	Uses unit analysis to check computations involving measurements.
		A:08-D:08	Writes, simplifies, and evaluates algebraic expressions (including formulas) to generalize situations and solve problems.

		A:10-D:06	Sets up and solves **equations** and inequalities having rational expressions as coefficients and solutions**.**
		A:10-D:03	Sets up and solves equations and formulas for a specified variable; e.g., express the base of a triangle in terms of the area and height.
		M:08-D:07	Applies proportional reasoning to solve problems involving measurements or rates.
		M:09-D:01	Converts rates within the same measurement system; e.g., miles per hour to feet per second; kilometers per hour to meters per second**.**
	Relations & Functions	**A:09-B:01**	Defines function with ordered pairs in which each domain element is assigned exactly one range element.
		A:08-D:07	Uses symbolic algebra (**equations** and inequalities), graphs and tables to represent situations and solve problems.
		A:09-A:02	Generalizes patterns using functions or relationships (linear, quadratic and exponential), and freely translate among tabular, graphical and symbolic representations.
		A:08-D:04	Extends the use of variables to include covariants where *y* depends on *x.*
		A:10-B:01	Defines function formally and with *f*(*x*) notation.

Course	Topic	Grade Level Indicators	Ohio Grade Level Indicators
Algebra 1 Second Nine Weeks			
	Graphing Linear Equations	**A:08-J:13**	Computes and interprets slope, midpoint and distance given a set of ordered pair.
		A:08-J:15	Describes and compares how changes in an equation affects the related graphs; e.g., for a linear equation changing the coefficient of *x* affects the slope and changing the constant affects the intercepts.
		A:09-F:06	Writes and uses equivalent forms of **equations** and inequalities in problem situations; e.g., changing a linear equation to the slope-intercept form.
		A:09-B:03	Describes problem situations (**linear**, quadratic and exponential) by using tabular, graphical and symbolic representations.
		A:08-E:06	Describes the relationship between the graph of a line and its equation, including being able to explain the meaning of slope as a constant rate of change and *y*-intercept in real-world problems.
		A:10-J:09	Recognizes and explains that the slopes of parallel lines are equal and the slopes of perpendicular lines are negative reciprocals.
		A:09-F:08	Finds linear equations that represent lines that pass through a given set of ordered pairs, and finds linear equations that represent lines parallel or perpendicular to a given line through a specific point.
		A:10-F:10	Solves real-world problems that can be modeled using **linear**, quadratic, exponential, or square root functions**.**
		A:09-E:05	Describes and compares characteristics of linear functions, including *x* and *y* intercepts, domain and range, and rate of change
		D:09-A:02	Creates a scatterplot for a set of bivariate data, sketches the line of best fit, and interprets the slope of the line of best fit.
	Linear Inequalities & Absolute Value	**A:08-F:09**	Solves linear equations and inequalities graphically, symbolically and using technology.

		A:08-D:07 **A:10-D:06** **A:8-10: Benchmark B**	Uses symbolic algebra (equations and inequalities), graphs and tables to represent situations and solve problems. Sets up and solves equations and **inequalities** having rational expressions as coefficients and solutions**.** Identifies and classifies functions as linear or nonlinear, and contrast their properties using tables, graphs or equations. Solves, graphs, and interprets absolute value equations and inequalities on a number line and in a coordinate plane.
	Systems of Equations and Inequalities	**A:09-H:09** **A:08-H:11** **A:10-H:11** **A:10-H:07**	Solves and interprets the meaning of 2 by 2 systems of linear equations graphically, by substitution and by elimination, with and without technology. Interprets the meaning of the solution of a 2 by 2 system of equations; i.e., point, line, no solution. Solves real-world problems that can be modeled, using systems of linear equations and inequalities. Solves systems of linear inequalities. Solves, graphs, and interprets absolute value equations and inequalities on a number line and in a coordinate plane.

Course	Topic	Grade Level Indicators	Ohio Grade Level Indicators
Algebra 1 Third Nine Weeks			
	Polynomials	**N:08-I:03**	Applies order of operations to simplify expressions and perform computations involving integer exponents and radicals.
		N:09-F:03	Explains the effects of operations such as multiplication or division, and of computing powers and roots on the magnitude of quantities.
		A:09-D:11	Adds, subtracts, multiplies and divides monomials and polynomials (division of polynomials by monomials only).
		N:10-I:04	Approximates the n^{th} root of a given number greater than zero between consecutive integers when *n* is an integer; e.g., the fourth root of 50 is between 2 and 3.
		A:08-D:05	Uses physical models to add and subtract monomials and polynomials.
		A:08-D:05	Uses physical models to multiply and divide polynomials.
			Uses concept of exponents to write numbers in alternate forms and performs operations on numbers written in exponential form.
	Factoring	**A:09-G:10**	Solves quadratic equations with real roots by ***factoring***, graphing, using the quadratic formula and with technology.
		A:10-D:05	Solves simple linear and **nonlinear equations** and inequalities **having square roots as** coefficients and **solutions.**
	Quadratic, Exponential, and Square Root Functions	**A:09-G:10**	Solves quadratic equations with real roots by factoring, ***graphing, using the quadratic formula*** and with technology.
		A:09-E:04	Demonstrates the relationship among zeros of a function, roots of equations, and solutions of equations graphically and in words.
		A:09-J:15	Describes how a change in the value of a constant in a linear or quadratic equation affects the related graphs.
		A:08-G:12	Solves simple quadratic equations graphically; e.g., $y = x^2 - 16$.
		A:10-D:05	Describes how a change in the value of a constant in a linear or **quadratic** equation affects the related graphs.

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Algebra 1 Fourth Nine Weeks			
	Quadratic, Exponential, and Square Root Functions	**A:09-E:05**	Describes and compares characteristics of the following families of functions: linear, quadratic, and exponential functions; e.g., general shape, number of roots, domain, range, and rate of change, maximum or minimum.
		A:10-B:02	Describes and compares characteristics of the following families of functions: square root, cubic, absolute value, and basic trigonometric functions; e.g., general shape, possible number of roots, domain and range.
		A:09-C:02	Generalizes patterns using functions or relationships (linear, quadratic, and exponential), and freely translates among tabular, graphical and symbolic representations.
		A:09-B:03	Describes problem situations (linear, quadratic, and exponential) by using tabular, graphical, and symbolic representations.
	Radical and Rational Functions	**N:08-I:03**	Simplifies radical expressions.
		A:10-D:05	Solves simple linear and nonlinear equations and inequalities having square roots as coefficients and solutions.
		A:09-I:13	Models and solves problems involving direct and inverse variation using proportional reasoning.
		A:09-I:14	Describes the relationship between slope and the graph of a direct variation and inverse variation.
		A:08-I:14	Differentiates and explains types of changes in mathematical relationships, such as linear vs. nonlinear, continuous vs. noncontinuous, and direct variation vs. inverse variation.
		A:09-D:12	Simplifies rational expressions by eliminating common factors.
	Sampling, Collecting, and Analyzing Data	**D:09-G:05**	Describes characteristics and limitations of sampling methods, and analyzes the effects of random versus biased sampling; e.g., determines and justifies whether the sample is likely to be representative of the population.
		D:09-E:04	Describes and compares various types of studies (survey, observation, and experiment), and identifies possible misuses of statistical data.
		D:08-E:08	Describes how the relative size of a sample compared to the target population affects the validity of predictions

		D:10-G:05	Provides examples and explains how a statistic may or may not be an attribute of the entire population; e.g., intentional or unintentional bias may be present.
		D:10-A:04	Identifies outliers on a data display, e.g., uses the interquartile range to identify outliers on a box-and-whisker plot.
		D:10-A:06	Interprets the relationship between two variables using multiple graphical displays and statistical measures; e.g., scatterplots, parallel box-and-whisker plots, and measures of center and spread.
		D:09-A:02	Creates a scatterplot for a set of bivariate data, sketches the line of best fit, and interprets the slope of the line of best fit.
		D:10-A:02	Represents and analyzes bivariate data using appropriate graphical displays (scatterplots, parallel box-and-whisker plots, histograms with more than one set of data, tables, charts, and spreadsheets) with and without technology.
		D:10-A:03	Displays bivariate data where at least one variable is categorical.
		D:10-C:01	Describes measures of center and the range verbally, graphically, and algebraically.
		D:09-A:01	Classifies data as univariate (single variable) or bivariate (two variables) and as quantitative (measurement) or qualitative (categorical) data.
		D:09-A:03	Analyzes and interprets frequency distributions based on spread, symmetry, skewness, clusters, and outliers.
		D:09-F:06	Makes inferences about relationships in bivariate data, and recognizes the difference between evidence of relationship (correlation) and causation.
		D:08-F:09	Constructs convincing arguments based on analysis of data and interpretation of graphs.
	Probability	**D:09-I:08**	Describes, creates and analyzes a sample space and uses it to calculate probability.
		D:09-H:07	Uses counting techniques and the Fundamental Counting principle to determine the total number of possible outcomes for mathematical situations.

		D:09-J:09	Identifies situations involving independent and dependent events, and explains differences between and common misconceptions about probabilities associated with those events.
		D:10-K:08	Differentiates and explains the relationships between the probability of an event and the odds of an event, and computes one given the other.
		D:09-K:10	Uses theoretical and experimental probability, including simulations or random numbers, to estimate probabilities and to solve problems dealing with uncertainty (e.g., compound events, independent events, simple dependent events).