Algebra 2
Course Information

Course Description:
Students will expand upon mathematical concepts and content learned in Algebra I. Topics will include: functions, systems of equations and inequalities, matrices, quadratic functions, inverse and special functions (i.e., piecewise, absolute value, and recursive), exponents and radicals, exponential and logarithmic functions, polynomials, rational functions, conic sections, sequences and series. Problem solving, reasoning and proof, communication skills (written and verbal), and representations will support students in connecting concepts and skills both in and outside of mathematical contexts.

Textbook: *Algebra 2, Glencoe, 2003*

Credit by Examination and Demonstration

To receive credit for Algebra 2, students must earn a grade of 60% on the course examination. The two hour assessment, consisting of both multiple choice and short/extended response items, will be created by content teachers. The Credit Flexibility Determination Committee will administer and score 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

e	Topic	GLI's	Ohio Grade Level Indicator
Algebra 2 First Nine Weeks			
	Functions	**A:09-B:01**	Defines function with ordered pairs in which each domain element is assigned exactly one range element.
		A:09-C:02, A:02	Translates freely between mapping diagrams, tables, graphs, equations, and lists of ordered pairs.
		A:10-B:01	Defines function formally and with f(x) notation.
		A:09-D:11	Adds, subtracts, multiplies, and divides functions.
		A:11-A:06	Represents the inverse of a function symbolically and graphically as a reflection about *y=x*.
			Represents the domain and range of functions and relations verbally and in interval notation.
			Finds the line of best fit, regression coefficient, and correlation coefficient.
			Defines dependent and independent variables.
			Finds the value of the independent variable, given a function and a function's value (i.e., finds x=7 when f(x)= 2x+3).
			Finds the composition of linear functions.
	Systems of Equations, Systems of Inequalities, and Matrices	**A:10-H:11**	Solves real world problems that can be modeled using systems of linear equations and inequalities.
		A:11-D:09	Solves 3 × 3 systems of linear equations by elimination and using technology, and interprets graphically what the solution means (a point, line, plane, or no solution).
		A:12-D:05	Sets up and solves systems of linear inequalities with and without technology.
		N:11-B:01	Develops an understanding of properties of and representations for addition and multiplication of matrices.
		N:11-D:06	Computes sums, differences, and products of matrices using paper and pencil calculations for simple cases, and technology for more complicated cases.
		N:11-B:01	Determines what properties hold for matrix addition and matrix multiplication (e.g., uses examples to show when addition is commutative and when multiplication is not commutative

		A:11-D:07	Models and solves problems with matrices. Evaluates determinants. Applies algebraic methods to represent and generalize problem situations involving matrices**.**
	Quadratic Functions (Part 1)	**A:09-J:15** **A:09-E:04** **A:09-A:02** **A:09-G:10**	Describes how a change in the value of a constant in a quadratic equation affects the related graphs. Demonstrates the relationship among zeros of a function, roots of equations, and solutions of equations graphically and in words. Generalizes patterns using quadratic functions or relationships, and freely translates among tabular, graphical, and symbolic representation. Solves quadratic equations with real roots by the square root method, factoring, graphing, using the quadratic formula, completing the square, and with technology.

Algebra 2 Second Nine Weeks			
	Quadratic Functions (Part 2)	**N:11-E:03**	Represents complex numbers on the complex plane.
		N:11-E:07	Computes sums, differences, products, and quotients of complex numbers.
		A:11-B:08	Solves quadratic equations over the set of complex numbers.
		A:10-F:10	Solves real-world problems that can be modeled using quadratic functions.
			Investigates rates of change by using 1^{st} and 2^{nd} differences.
			Defines real, imaginary, and complex numbers.
			Uses completing the square to convert from standard form to the vertex form of a quadratic equation. $(f(x) = a(x-h)^2 + k)$.
			Forms the composition of two functions such that the result is a quadratic function that models a real-world situation.
	Inverse and Special Functions	**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:11-A:06	Represents the inverse of a function symbolically and graphically as a reflection about $y = x$.
			Describes how a change in the value of a coefficient affects the graph of an equation.
			Uses function notation to represent and evaluate piecewise and absolute value functions.
			Graphs piecewise and absolute value functions with and without technology.
			Uses inverse and special functions as models for real-world applications, such as, absolute value, piecewise and recursive functions.

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Algebra 2 Third Nine Weeks			
	Exponents and Radicals	**N:11-C:08**	Uses properties of exponents as optional ways of representing and finding solutions for problem situations. (e.g., $27^{2/3} = (27^{1/3})^2 = 9$).
		A:10-F:10	Graphs square root and cube root functions with or without technology.
		A:10-B:02	Identifies the domain, range, and intercepts of square root and cube root functions using tables, algebraic methods, and technology.
		A:11-A:11	Describes how a change in the value of a constant in a radical equation affects the graph of the equation.
		A:10-G:10	Solves real-world problems that can be modeled using square root functions.
	Exponential and Logarithmic Functions	**A:09-E:05**	Describes and compares the characteristics of families of exponential functions (i.e. general shape, asymptotes, intercepts, domain and range.
		A:11-A:11	Describes how a change in the value of a constant in an exponential equation affects the graph of the equation.
		A:11-A:05	Connects the graphs of logarithmic functions as the inverse of exponential functions.
		A:11-A:06	Graphs the logarithmic function as the reflection of an exponential function over the line *y = x*.
		A:11-C:01	Applies exponential equations to real-world situations (e.g., compound interest).
			Identifies the differences between growth and decay graphs.
			Converts between logarithmic and exponential forms.
	Polynomials	**A:09-D:11**	Performs operations on polynomials (addition, subtraction, multiplication, and long division) to simplify expressions.
		A:11-A:03, A:11-A:04	Describes and compares the characteristics of families of polynomials of any degree (i.e., general shape, number of roots, domain, range, maximum, minimum, end behaviors, maximum number of turns, etc.).

			Graphs polynomial functions with and without technology. Uses a variety of factoring methods and patterns (i.e., factoring by grouping, finding the greatest monomial factor, difference of squares, sums and differences of perfect cubes, and perfect square trinomials) to solve polynomial equations. Describes how a change in the value of a constant affects the graph of the polynomial function. Solves polynomial equations that model real-world phenomena with and without technology.

Course	Topic	GLI's	Ohio Grade Level Indicator
Algebra 2 Fourth Nine Weeks			
	Rational Functions	**A:11-A:03**	Describes and compares the characteristics of rational functions (e.g., general shape, rates of change, number of roots, domain and range, asymptotes, and end behavior).
		A:10-D:03	Solves equations and formulas for a specified variable; (e.g., expresses the base of a triangle in terms of the area and height).
		A:09-I:13	Models and solves problems involving direct and inverse variation.
		M:08-D:07	Solves ratio and proportion problems (i.e., lengths of sides in similar triangles, work and rate problems).
			Graphs simple rational functions.
			Adds, subtracts, multiplies, and divides rational expressions, and expresses the answer in simplest form.
			Solves simple rational equations graphically**.**
	Conic Sections	**A:11-A:10**	Describes the characteristics of the graphs of conic sections.
		G:12-H:03	Uses algebraic representations and functions to describe and generalize geometric properties and relationships.
			Graphs conic sections centered at the origin on the Cartesian coordinate plane.
			Identifies the conic section given a graph, an equation, or verbal description.
			Graphs a conic section given its equation in standard form.
			Writes an equation of a conic section that is centered at the origin, given the necessary information.
			Describes how a change in a constant affects the graph of a conic (transformation).
	Sequences and Series	**A:12-A:01**	Analyzes the behavior of arithmetic and geometric sequences and series as the number of terms increases.
		A:12-A:02	Translates between numeric and symbolic forms of a sequence or series.
		A:11-C:02	Translates a recursive function into a closed form expression or formula (explicit formula) for the *n*th term to solve a problem situation involving an iterative process.