CARNEGIE LEARNING

National HSMS Algebra 1
2019-2020 MATHia Enhancements Release Notes

	Module	Topic	MATHia Unit	Workspace	Description	Enhancement
1	Searching for Patterns	Quantities and Relationships	Function Overview	Identifying Parts of Complex Algebraic Expressions	Students identify the parts of complex algebraic expressions, including terms, coefficients, sums, factors, products, differences, and quotients.	NEW: This is a new Concept Builder workspace.
2	Exploring Constant Change	Linear Functions	Modeling with Linear Functions	Multiple Representations of Linear Functions	Students represent scenarios with linear expressions. They compare multiple representations of linear functions and determine whether a table, graph, or equation match a given scenario. Students match graphed lines and equations to given scenarios.	NEW: This is a new Concept Builder workspace. NEW UNIT: This unit was created by workspaces from different units.
		Systems of Equations and Inequalities	Linear Inequalities in Two Variables	Exploring Linear Inequalities	Students model solution sets of inequalities in two variables as half-planes on the coordinate plane. They are introduced to cases where a point is included and excluded from the solution set of an inequality. Students connect graphical solutions with algebraic solutions.	NEW: This is a new Concept Builder workspace.
		Functions Derived from Linear Relationships	Absolute Value Equations	NEW WORKSPACE Building Absolute Value Functions	Students watch an animation showing how taking the absolute value of a number reflects that number across 0, or across the x-axis. Students use reflections to create the basic absolute value function from the functions f(x) = x and f(x) = -x. They show that the two functions f(x) = $\|x\|$ and f(x) = $\|-x\|$ are equivalent.	NEW: This is a new Concept Builder workspace.
5	Maximizing and Minimizing	Introduction to Quadratic Functions	Modeling Quadratic Functions	Modeling Area as Product of Monomial	Students complete a table of values and graph from a scenario represented by a quadratic model. Students construct the quadratic function for the scenario as a product of a	NEW UNIT NAME: Previously, **Quadratic Models in Factored Form**

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			and Binomial	monomial and a binomial.	
			Modeling Projectile Motion	Students use quadratic functions to model projectile motion, and use the solver and the graphs to answer questions.	NEW LOCATION: Previously in the **Modeling Projectile Motion** unit.
			Recognizing Key Features of Vertical Motion Graphs	Students use an interactive Explore Tool to investigate how a vertical motion graph changes when the different values in the vertex, factored, and general form of the quadratic function change. They then use vertical motion graphs to identify the maximum, x-intercepts, y-intercept, domain, and range of a quadratic function. Finally, students use a vertical motion graph to determine the axis of symmetry and vertex of a quadratic function.	NEW LOCATION: Previously in the **Modeling Projectile Motion** unit.
		Linear and Quadratic Transformations	Shifting Horizontally	Students horizontally shift graphs of linear and quadratic functions. Students use verbal descriptions, graphs, and algebraic representations.	NEW LOCATION: **Shifting Horizontally** and **Reflecting and Dilating Using Graphs** have been transposed.
		Properties of Quadratic Functions	Identifying Properties of Quadratic Functions	Students differentiate among general form, factored form, and vertex form of a quadratic function. They learn the characteristics of the graph that are visible from each form: y-intercept from general form, x-intercepts from factored form, and vertex from vertex form, and practice identifying these characteristics from the algebraic representations. The axis of	NEW UNIT

NEW LOCATION: Previously in **Forms of Quadratics** unit |

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				symmetry is introduced as an aid in graphing, and students determine the vertex and axis of symmetry from the vertex form and factored form of a quadratic function. They use the concept of symmetry to determine an additional point that lies on a parabola. Lastly, students identify whether a parabola is concave up or down based upon the sign of the x-squared term when the function is written in any form.	
			Sketching Quadratic Functions	Sketch a quadratic function given factored, standard or vertex form	NEW LOCATION: Previously in **Forms of Quadratics** unit
3	Determining Unknown Quantities	Expressions	Comparing Quadratic Functions in Different Forms	Given two quadratic functions in different representations -- equation, graph, table, or description -- with a contextual or non-contextual scenario, students compare the functions' y-intercepts, zeros, absolute maximums/minimums, or rates of change over a specific interval.	NEW LOCATION: Previously in **Forms of Quadratics** unit
		Solving Quadratic Equations	Polynomial Operations	Operating with Functions on the Coordinate Plane	Students watch an animation about operating with functions on the coordinate plane before examining adding and subtracting constant functions, linear functions, and a linear and a quadratic function.	NEW LOCATION: Previously in **Function Operations** unit
			Using a Factor Table to Multiply Binomials	Students use factor tables to multiply linear expressions. Students combine like terms.	NEW LOCATION: Previously in **Quadratic Expression Factoring**

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					unit
			Multiplying Binomials	Students determine which factor table is appropriate for a given problem, set up the table, and then use the table to multiply linear expressions.	NEW LOCATION: Previously in **Quadratic Expression Factoring** unit
		Quadratic Equation Solving	Making Sense of Roots and Zeros	Students experiment with patterns relating two lines and the parabola that is generated by the product of their two linear functions. The first pattern solidifies the fact that the two expressions are factors of the quadratic function. The second pattern guides students to the Zero Product Property, an underpinning for determining the zeros of a quadratic function written in factored form.	NEW UNIT: Combines **Quadratic Expression Factoring** and **Quadratic Equation Solving**
			Problem Solving Using Factoring		NEW: This is a new Concept Builder workspace.
			Problem Solving Using Completing the Square		NEW: This is a new Concept Builder workspace.
			Deriving the Quadratic Formula	Students use the completing the square method to determine the roots of a given quadratic equation. They then analyze the method of completing the square for any quadratic equation in general form from which the Quadratic Formula is derived. They practice using the Quadratic Formula to calculate the	NEW: This is a new Concept Builder workspace.

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				roots of quadratic equations in general form.	
		Forms of Quadratics	Converting Quadratics to General Form	Students convert quadratic equations to general form from either factored form or vertex form.	UNIT RESTRUCTURE: Only 3 of the original workspaces remain. **Identifying Properties of Quadratics**, **Sketching Quadratic Functions**, and **Comparing Quadratic Functions in Different Forms** were moved to create the new **Properties of Quadratic Functions** unit.
	Applications of Quadratics	Applications of Quadratics	Using Regression Models	Students use equations of quadratic regression models, the solver, and graphs to answer questions.	NEW UNIT NAME: Previously **Quadratic Regressions**