

Algebra I: High School Rtl

MATHia Unit	MATHia Workspace	Overview	CCSS	Problem Solving	Animation	Worked Examples	Classification Tools	Explore
Linear Equations with Variables on Both Sides	Solving with Integers (No Type In)	Students will solve equations with variables on both sides of the equals sign.	8.EE.C.7b	●				
	Solving with Integers (Type In)	Students will solve equations with variables on both sides of the equals sign.	8.EE.C.7b	●				
	Solving Equations with One Solution, Infinite, and No Solutions	Students follow worked examples as they learn to identify equations with one solution, no solutions, and infinite solutions. Students also check the solutions to equations.	8.EE.C.7a			●		
	Sorting Equations by Number of Solutions	Students complete sorting activities to practice identifying linear equations with one, no, and infinite solutions.	8.EE.C.7a				●	
Properties of Whole Number Exponents	Using the Product Rule and the Quotient Rule	Students will simplify mathematical expressions using the Product and Quotient Rules.	8.EE.A.1	●				
	Using the Power to a Power Rule	Students will simplify mathematical expressions using the Power to a Power Rule.	8.EE.A.1	●				
	Using the Product to a Power Rule and the Quotient to a Power Rule	Students will simplify mathematical expressions using the Product to a Power and the Quotient to a Power Rules.	8.EE.A.1	●				
	Using Properties of Exponents with Whole Number Powers	Students will use a variety of strategies, including the Power to a Power Rule, the Product to a Power Rule, and the Quotient to a Power Rule to simplify mathematical expressions with exponents.	8.EE.A.1	●				
	Simplifying Expressions with Negative and Zero Exponents	Students will simplify mathematical expressions involving negative exponents and exponents of 0.	8.EE.A.1	●				
Scientific Notation	Using Scientific Notation	Students write numbers in standard form as numbers in scientific notation and write numbers in scientific notation as numbers in standard form.	8.EE.A.4	●				
	Comparing Numbers using Scientific Notation	Students follow worked examples as they learn how to compare numbers written in scientific notation.	8.EE.A.3			●		
Integer Operations	Adding and Subtracting Negative Integers	Students use an interactive number line to add and subtract negative numbers.	7.NS.A.1					●
	Using Number Lines to Add and Subtract Integers	Students practice adding and subtracting on number lines using a similar model to the one they used on the interactive number line.	7.NS.A.1	●				
	Multiplying and Dividing Integers	Students model problems involving the multiplication of integers and use fact families to explore dividing integers.	7.NS.A.2			●		
	Using Order of Operations to Simplify Numeric Expressions (No Type In)	Students practice simplifying a variety of numeric expressions.	7.NS.A.3	●				
	Using Order of Operations to Simplify Numeric Expressions (Type In)	Students practice simplifying a variety of numeric expressions.	7.NS.A.3	●				

*Indicates practice problems

MATHia Unit	MATHia Workspace	Overview	CCSS	Problem Solving	Animation	Worked Examples	Classification Tools	Explore
Solving Two-Step Equations	Checking Solutions to Linear Equations	Students substitute given values into two-step equations to determine the values are solutions to the equations.	7.EE.B.4.a	●				
	Solving with Multiplication (No Type In)	Students solve two-step equations involving multiplication using the solver.	7.EE.B.4.a	●				
	Solving with Multiplication (Type In)	Students solve two-step equations involving multiplication.	7.EE.B.4.a	●				
	Solving with Division (No Type In)	Students solve two-step equations involving division using the solver.	7.EE.B.4.a	●				
	Solving with Division (Type In)	Students solve two-step equations involving division using the solver.	7.EE.B.4.a	●				
	Solving Two-Step Linear Equations	Students solve two-step equations involving all four operations.	7.EE.B.4.a	●				
Solving Two-Step Inequalities	Graphing Inequalities with Rational Numbers	Students graph simple inequalities involving rational numbers on a number line.	7.EE.B.4.b	●				
	Solving Two-Step Linear Inequalities	Students solve two-step linear inequalities.	7.EE.B.4.b	●				
Solving Linear Equations with Similar Terms	Solving by Combining Like Variable Terms and a Constant with Integers (No Type In)	Students combine like terms and then solve for a variable given an equation with integer coefficients and constants.	7.EE.B.4.a	●				
	Solving by Combining Like Variable Terms and a Constant with Integers (Type In)	Students combine like terms and then solve for a variable given an equation with integer coefficients and constants.	7.EE.B.4.a	●				
	Solving by Combining Like Variable Terms and a Constant with Decimals (No Type In)	Students combine like terms and then solve for a variable given an equation with decimal coefficients and constants.	7.EE.B.4.a	●				
	Solving by Combining Like Variable Terms and a Constant with Decimals (Type In)	Students combine like terms and then solve for a variable given an equation with decimal coefficients and constants.	7.EE.B.4.a	●				
Relations and Functions	Exploring Functions	Students use an interactive function machine to explore mystery functions. Students use the function machine and a table to identify functions. They also use the machine along with sorting activities to identify the domain and range of different functions.	8.F.A.1					●
	Exploring Graphs of Functions	Students use an interactive function machine and a graph to identify and analyze function equations and graphs Students identify intercepts of the graphs.	8.F.A.1					●
	Classifying Relations and Functions	Students watch an animation and follow worked examples as they learn how to classify relations as functions or non-functions.	8.F.A.1		●	●		
	Identifying Key Characteristics of Graphs of Functions	Students will identify key characteristics from the graph of a function, such as the intercepts, minimum and maximum x-values, minimum and maximum y-values, domain, and range.	8.F.B.5	●				

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MATHia Unit	MATHia Workspace	Overview	CCSS	Problem Solving	Animation	Worked Examples	Classification Tools	Explore
Linear Models	Graphing Given an Integer Slope and y-Intercept	Students will write the equations of lines given an integer slope and a y-intercept.	8.F.B.4	●				
	Graphing Given a Decimal Slope and y-Intercept	Students will write the equations of lines given a decimal-value slope and a y-intercept.	8.F.B.4	●				
Graphs of Linear Equations in Two Variables	Graphing Linear Equations using a Given Method	Students graph relations given in standard form by applying an indicated method: the slope-intercept method, two-points method, or two-intercepts method.	8.F.B.4	●				
	Graphing Linear Equations using a Chosen Method	Students are given a relation and a choice as to which method to use to graph it. Students are then given information about the line appropriate to the chosen method.	8.F.B.4	●				
Writing Equation of a Line	Modeling Given Slope and a Point	Students graph relations given in standard form by applying an indicated method: the slope-intercept method, two-points method, or two-intercepts method.	8.F.B.4	●				
	Calculating Slopes	Students are given a relation and a choice as to which method to use to graph it. Students are then given information about the line appropriate to the chosen method.	8.F.B.4	●				
	Modeling Given Two Points	Students are given the ordered pairs for two points, either mathematically or in context and are asked to identify the equation of the line that connects the points.	8.F.B.4	●				
	Modeling Given an Initial Point	Students define variables and write expressions and relations to describe linear contexts.	8.F.B.4	●				
	Modeling Linear Functions using Multiple Representations	Students model problems using expressions, tables, and graphs. Students use number properties to evaluate and solve one-step and two-step equations.	8.F.B.4	●				

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Geometry: High School Rtl

MATHia Unit	MATHia Workspace	Overview	CCSS	Problem Solving	Animation	Worked Examples	Classification Tools	Explore
Volume	Calculating Volume of Cylinders	Students will use mathematical and real-world objects to determine the volume of cylinders.	8.G.C.9	●				
	Using Volume of Cylinders	Students will apply the formula for the volume of a cylinder to solve a variety of different problems.	8.G.C.9	●				
	Calculating Volume of Cones	Students will use mathematical and real-world objects to determine the volume of cones.	8.G.C.9	●				
	Using Volume of Cones	Students will apply the formula for the volume of a cone to solve a variety of different problems.	8.G.C.9	●				
	Calculating Volume of Spheres	Students will use mathematical and real-world objects to determine the volume of spheres.	8.G.C.9	●				
	Using Volume of Spheres	Students will apply the formula for the volume of a sphere to solve a variety of different problems.	8.G.C.9	●				
Volume of Pyramids	Calculating Volume of Pyramids	Students calculate the volume of pyramids in mathematical and real-world contexts using given measurements.	7.G.B.6	●				
	Using Volume of Pyramids	Students apply their reasoning to determine volume of pyramids and solve volume problems.	7.G.B.6	●				
Area	Developing Area Formulas	Students watch animations and answer questions to derive the formulas used to calculate the areas of parallelograms, trapezoids, and triangles.	6.G.A.1		●			
	Calculating Area of Various Figures	Students practice calculating the areas of parallelograms, trapezoids, and triangles in mathematical and real-world situations.	6.G.A.1	●				
	Solving Area Problems	Students reason with the formulas for the areas of parallelograms, triangles, and trapezoids to determine the areas of figures in mathematical and real-world situations.	6.G.A.1 7.G.B.6					
	Calculating Area of Composite Figures	Students practice calculating the area of various mathematical and real-world composite figures.	6.G.A.1 7.G.B.6	●				
Angle Properties	Calculating Angles	Students use an interactive circular protractor to measure angles and determine angle sums.	7.G.B.5					●
	Classifying and Determining Angle Measures	Students identify complementary, supplementary, and vertical angles. They write and solve equations to solve for unknown angle measures.	7.G.B.5				●	●

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MATHia Unit	MATHia Workspace	Overview	CCSS	Problem Solving	Animation	Worked Examples	Classification Tools	Explore
Introduction to Probability	Determining Probabilities	Students build probability models and determine probabilities of simple and disjoint events. They use proportions to make predictions based on samples and theoretical probabilities.	7.SP.C.5 7.SP.C.7a				•	
	Comparing Experimental and Theoretical Probabilities	Students examine data from probability experiments and compare with theoretical probabilities. They use results of probability experiments to make conjectures about theoretical probabilities.	7.SP.C.6 7.SP.C.7b			•		
	Calculating Compound Probabilities	Students use simulation, tree diagrams, organized lists, and tables to determine compound probabilities.	7.SP.C.8		•			
The Pythagorean Theorem	Problem Solving using the Pythagorean Theorem	Students solve for an unknown side length of a right triangle in real-world problems by using the Pythagorean Theorem.	8.G.B.7 8.EE.A.2					
	Calculating Distances on the Coordinate Plane	Students determine distances on the coordinate plane using the Pythagorean Theorem.	8.G.B.8 8.EE.A.2					•
Transformation of Figures on the Coordinate Plane	Translating Plane Figures	Students will select translations that match a pre-image to a target image figure, given a reference point.	8.G.A.3	•				
	Rotating Plane Figures	Students will select rotations that match a pre-image to a target image figure, given a reference point.	8.G.A.3	•				
	Dilating Plane Figures	Students will select dilations that match a pre-image to target image figures, given a reference point.	8.G.A.3	•				
	Performing One Transformation	Students will select a translation, rotation, reflection, or dilation that matches a pre-image to a target image figure, given a reference point.	8.G.A.3	•				
	Performing Multiple Transformations	Students will select multiple transformations from translation, rotation, reflection, and dilation to match a pre-image to a target image figure, given a reference point.	8.G.A.3	•				
Lines Cut by a Transversal	Classifying Angles Formed by Transversals	Students follow worked examples and complete sorting activities as they learn to identify angles and angle pairs formed by lines cut by a transversal.	8.G.A.5			•	•	
	Reasoning about Angles Formed by Transversals*	Students solve reasoning problems involving angle measures formed by lines cut by a transversal.	8.G.A.5					

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MATHia Unit	MATHia Workspace	Overview	CCSS	Problem Solving	Animation	Worked Examples	Classification Tools	Explore
Solving Two-Step Equations	Checking Solutions to Linear Equations	Students substitute given values into two-step equations to determine the values are solutions to the equations.	7.EE.B.4.a	●				
	Solving the Multiplication (No Type In)	Students solve two-step equations involving multiplication using the solver.	7.EE.B.4.a	●				
	Solving the Multiplication (Type In)	Students solve two-step equations involving multiplication.	7.EE.B.4.a	●				
	Solving with Division (No Type In)	Students solve two-step equations involving division using the solver.	7.EE.B.4.a	●				
	Solving with Division (Type In)	Students solve two-step equations involving division using the solver.	7.EE.B.4.a	●				
	Solving Two-Step Equations	Students solve two-step equations involving all four operations.	7.EE.B.4.a	●				
Linear Equations with Variables on Both Sides	Solving with Integers (No Type In)	Students will solve equations with variables on both sides of the equals sign.	8.EE.C.7.b	●				
	Solving with Integers (Type In)	Students will solve equations with variables on both sides of the equals sign.	8.EE.C.7.b	●				
Writing Equations of Line	Modeling Given Slope and a Point	Students graph relations given in standard form by applying an indicated method: the slope-intercept method, two-points method, or two-intercepts method.	8.F.B.4	●				
	Calculating Slopes	Students are given a relation and a choice as to which method to use to graph it. Students are then given information about the line appropriate to the chosen method.	8.F.B.4	●				
	Modeling Given Two Points	Students are given the ordered pairs for two points, either mathematically or in context and are asked to identify the equation of the line that connects the points.	8.F.B.4	●				
	Modeling Given an Initial Point	Students define variables and write expressions and relations to describe linear contexts.	8.F.B.4	●				
	Modeling Linear Functions using Multiple Representations	Students model problems using expressions, tables, and graphs. Students use number properties to evaluate and solve one-step and two-step equations.	8.F.B.4	●				

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Algebra II: High School Rtl

MATHia Unit	MATHia Workspace	Overview	CCSS	Problem Solving	Animation	Worked Examples	Classification Tools	Explore
Polynomial Operations	Introduction to Polynomial Arithmetic	Students are introduced to polynomials and identify the difference between different types of polynomials as well as non-polynomials. They then use an Explore Tool to investigate combining like terms when adding polynomial expressions. Finally, students examine the steps to simplifying polynomial expressions that are either added or subtracted before simplifying on their own.	A.APR.A.1					●
	Adding Polynomials	Students add quadratic expressions.	A.APR.A.1	●				
	Subtracting Polynomials	Students subtract polynomials.	A.APR.A.1	●				
	Using a Factor Table to Multiply Polynomials	Students use factor tables to multiply polynomials. Students combine like terms.	A.APR.A.1	●				
	Multiplying Polynomials	Students determine which factor table is appropriate for a given problem, set up the table, and then use the table to multiply polynomials.	A.APR.A.1	●				
Sequences	Describing Patterns in Sequences	Students determine the patterns in sequences and determine the next terms in sequences.	F.IF.A.3	●				
	Writing Recursive Formulas	Students determine if sequences are arithmetic or geometric and determine recursive formulas for the sequences.	F.IF.A.3 F.BF.A.1.a	●				
	Writing Explicit Formulas	Students determine if sequences are arithmetic or geometric and develop the explicit formulas for the sequences.	F.BF.A.1.a	●				
	Sequences and Functions	Writing sequences as functions.	F.IF.A.3	●				
Rational and Irrational Numbers	Introduction to Irrational Numbers	Students determine perfect squares and their square roots. They use rational approximations to determine decimal approximations of square roots of non-perfect squares. Students watch an animation about the real number system and classify real numbers as rational or irrational.	8.NS.A.1 8.NS.A.2 8.EE.A.2		●			
	Graphing Real Numbers on a Number Line	Students practice plotting various real numbers on a number line. Students approximate, if necessary, and plot decimals, percents, fractions, square roots, and pi.	8.NS.A.1 8.NS.A.2	●				
	Ordering Rational and Irrational Numbers	Students use a number line tool to plot approximate values of real numbers and then compare and order the numbers.	8.NS.A.1 8.NS.A.2					●

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MATHia Unit	MATHia Workspace	Overview	CCSS	Problem Solving	Animation	Worked Examples	Classification Tools	Explore
Exponential Functions	Introduction to Exponential Functions	Students view an animation explaining an exponential function in context. They compare linear and exponential sequences, functions, tables and graphs, and then sort examples of these based upon whether they show linear or exponential growth. Students identify key characteristics of exponential functions (asymptotes, x-intercepts, y-intercepts, domain, range, and intervals of increase or decrease) from a function, table or graph.	F.IF.B.4		●			
	Relating Domain to Exponential Functions	Students determine the domain of exponential functions. Scenarios are provided, and in light of the context, two factors must be considered: the lowest and highest values for the independent variable and the types of numbers that make sense for the independent variable. Several examples are provided to model the process of selecting an appropriate domain prior to students completing problems independently.	F.IF.B.5			●		
	Using Properties of Exponents	Students review the properties of powers and identify simplified versions of expressions with numeric powers. They deal with more complex exponential expressions with variables, sorting them into groups that are equivalent expressions.	F.IF.C.8.b				●	
Linear and Quadratic Transformations	Shifting Vertically	Students vertically shift graphs of linear and quadratic functions. Students use verbal descriptions, graphs, and algebraic representations.	F.BF.B.3	●				
	Reflecting and Dilating using Graphs	Students reflect and dilate graphs of linear and quadratic functions. Students use verbal descriptions, graphs, and algebraic representations.	F.BF.B.3	●				
	Shifting Horizontally	Students horizontally shift graphs of linear and quadratic functions. Students use verbal descriptions, graphs, and algebraic representations.	F.BF.B.3	●				
	Transforming using Tables of Values	Given a table of values and a table of transformed values, students determine how the basic linear and quadratic functions were transformed to create the new functions.	F.BF.B.3	●				

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MATHia Unit	MATHia Workspace	Overview	CCSS	Problem Solving	Animation	Worked Examples	Classification Tools	Explore
Quadratic Expression Factoring	Multiplying Binomials	Given a representation of a transformed function, students determine how the basic linear and quadratic functions were transformed to create the new functions.	F.BF.B.3	●				
	Factoring Trinomials with Coefficients of One	Students factor quadratic trinomials with a coefficient of one.	A.APR.D.6	●				
	Factoring Trinomials with Coefficients other than One	Students factor quadratic trinomials with a coefficient other than one.	A.APR.D.6	●				
	Factoring using Difference of Squares	Students factor quadratic expressions using difference to two squares.	A.APR.D.6	●				
	Factoring Quadratic Expressions	Students factor quadratic expressions using all known factoring methods.	A.APR.D.6	●				
	Completing the Square	Students analyze a worked example of a quadratic function in general form being written in vertex form through the process of completing the square. They then practice completing the square using polynomials and area models before filling in unknown values in trinomials that create perfect square trinomials. Finally, students are shown the algebraic method of changing a quadratic function in general form to vertex form by completing the square. They use the algebra shown to determine the axis of symmetry and vertex of quadratic functions in general form.	A.REI.B.4.a F.IF.C.8.a			●		
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. The quadratic formula is provided as a method for calculating roots when a quadratic function is written in general form. Clarification is made as to when to use the terms zeros and roots.	A.REI.D.11			●	●	
	Solving Quadratic Equations by Factoring	Students solve quadratic equations by factoring and applying the zero-product property.	A.REI.B.4.b	●				
	Solving Quadratic Equations	Students solve quadratic equations by using factoring or the quadratic formula.	A.REI.B.4.b	●				

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