

New Mexico Curriculum Framework Correlated to Merit Software Mathematics Programs

Middle School

5-8 Benchmark: Use mathematical models to represent and understand quantitative relationships.

Grade	Performance Standards
5	<ol style="list-style-type: none"> 1. Use mathematical models to represent and explain mathematical concepts and procedures. Understand and use mathematical models such as: 2. The number line to model the relationship between rational numbers and rational number operations • pictorial representation of addition and subtraction of rational numbers with regrouping <ul style="list-style-type: none"> • manipulatives or pictures to model computational procedures • graphs, tables, and charts to describe data • diagrams or pictures to model problem situations 3. Demonstrate how a situation can be represented in more than one way.
6	<ol style="list-style-type: none"> 1. Develop and use mathematical models to represent and justify mathematical relationships found in a variety of situations. Create, explain, and use mathematical models such as: <ul style="list-style-type: none"> • Venn diagrams to show the relationships between the characteristics of two or more sets • equations and inequalities to model numerical relationships • three-dimensional geometric models • graphs, tables, and charts to interpret and analyze data
7	<ol style="list-style-type: none"> 1. Create scale models and use them for dimensional drawings. 2. Understand and use the coordinate plane to graph ordered pairs and linear equations. 3. Select and use an appropriate model for a particular situation.
8	<ol style="list-style-type: none"> 1. Generate different representations to model a specific numerical relationship given one representation of data (e.g., a table, a graph, an equation, a verbal description).

Merit Software: Pre-Algebra Shape-Up, Basic Algebra Shape-Up

Strand: ALGEBRA

Standard: Students will understand algebraic concepts and applications.

5-8 Benchmark: Analyze changes in various contexts.

Grade	Performance Standards
5	1 Recognize and create patterns of change from everyday life using numerical or pictorial representations. . 2 Generalize patterns of change and recognize the same general patterns presented in different representations. .
6	1 Represent and explain changes using one-step equations with one variable. . 2 Solve problems that involve change using proportional relationships. . 3 Use ratios to predict changes in proportional situations. . 4 Use tables and symbols to represent and describe proportional and other relationships involving conversions, sequences, and perimeter. 5 Generate formulas to represent relationships involving changes in perimeter. .
7	1 Use variables and appropriate operations to write an expression, an equation, and/or an inequality that represents a verbal description involving change. . 2 Interpret and evaluate expressions involving integer powers and simple roots as they relate to change. . 3 Graph and interpret linear functions as they are used to solve problems. . 4 Solve two-step equations and inequalities with one variable over the rational numbers, interpret the solution or solutions in the context from which they arose, and verify the reasonableness of the results.

8	1	Use graphs, tables, and algebraic representations to make predictions and solve problems that involve change.
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	2	Estimate, find, and justify solutions to problems that involve change using tables, graphs, and algebraic expressions.
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	3	Use appropriate problem-solving strategies (e.g., drawing a picture, looking for a pattern, systematic guessing and checking, acting it out, making a table or graph, working a simpler problem, writing an algebraic expression or working backward) to solve problems that involve change.
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	4	Solve multi-step problems that involve changes in rate, average speed, distance, and time.
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5	Analyze problems that involve change by identifying relationships, distinguishing relevant from irrelevant information, identifying missing information, sequencing, and observing patterns.	
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6	Generalize a pattern of change using algebra and show the relationship among the equation, graph, and table of values.	
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7	Recognize the same general pattern of change presented in different representations.	
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Merit Software: Pre-Algebra Shape-Up, Basic Algebra Shape-Up

High School

Strand: ALGEBRA, FUNCTIONS, AND GRAPHS Standard: Students will understand algebraic concepts and applications.

9-12 Benchmark: Represent and analyze mathematical situations and structures using algebraic symbols.

Grade	Performance Standards
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<p>9-12</p>	<ol style="list-style-type: none"> 1. Classify numbers and members of the following sets: <ul style="list-style-type: none"> • natural • whole • integers • rationals • irrationals 2. Simplify numerical expressions using the order of operations, including exponents. 3. Evaluate the numerical value of expressions of one or more variables that are: <ul style="list-style-type: none"> • polynomial • rational • radical 4. Simplify algebraic monomial expressions raised to a power (e.g., $[5xy^2]^3$) and algebraic binomial (e.g., $[5x^2 + y]^2$) expressions raised to a power. 5. Compare and order polynomial expressions by degree. 6. Represent and analyze relationships using written and verbal expressions, tables, equations, and graphs, and describe the connections among those representations: <ul style="list-style-type: none"> • translate from verbal expression to algebraic formulae (e.g., “Set up the equations that represent the data in the following equation: John’s father is 23 years older than John. John is 4 years older than his sister Jane. John’s mother is 3 years younger than John’s father. John’s mother is 9 times as old as Jane. How old are John, Jane, John’s mother, and John’s father?”) • given data in a table, construct a function that represents these data (linear only) • given a graph, construct a function that represents the graph (linear only)
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Merit Software: Basic Algebra Shape-Up

Strand: ALGEBRA, FUNCTIONS, AND GRAPHS**Standard:** Students will understand algebraic concepts and applications.**9-12 Benchmark:** Understand patterns, relations, functions, and graphs.

Grade	Performance Standards
9-12	<ol style="list-style-type: none">1. Distinguish between the concept of a relation and a function.2. Determine whether a relation defined by a graph, a set of ordered pairs, a table of values, an equation, or a rule is a function.3. Describe the concept of a graph of a function.4. Translate among tabular, symbolic, and graphical representations of functions.5. Explain and use function notation.6. Determine the domain of independent variables and the range of dependent variables defined by a graph, a set of ordered pairs, or a symbolic expression.7. Identify the independent and dependent variables from an application problem (e.g., height of a child).8. Describe the concept of a graph of an equation.9. Understand symmetry of graphs.10. Analyze and describe middle and end (asymptotic) behavior of linear, quadratic, and exponential functions, and sketch the graphs of functions.11. Work with composition of functions (e.g., find f of g when $f(x) = 2x - 3$ and $g(x) = 3x - 2$), and find the domain, range, intercepts, zeros, and local maxima or minima of the final function.12. Use the quadratic formula and factoring techniques to determine whether the graph of a quadratic function will intersect the x-axis in zero, one, or two points.13. Apply quadratic equations to physical phenomena (e.g., the motion of an object under the force of gravity).

Merit Software: Basic Algebra Shape-Up

Strand: ALGEBRA, FUNCTIONS, AND GRAPHS

Standard: Students will understand algebraic concepts and applications.

9-12 Benchmark: Use mathematical models to represent and understand quantitative relationships.

9 - 12	<p>1. Model real-world phenomena using linear and quadratic equations and linear inequalities (e.g., apply algebraic techniques to solve rate problems, work problems, and percent mixture problems; solve problems that involve discounts, markups, commissions, and profit and compute simple and compound interest; apply quadratic equations to model throwing a baseball in the air). 2. Use a variety of computational methods (e.g., mental arithmetic, paper and pencil, technological tools). 3. Express the relationship between two variables using a table with a finite set of values and graph the relationship. 4. Express the relationship between two variables using an equation and a graph:</p> <ul style="list-style-type: none">• graph a linear equation and linear inequality in two variables• solve linear inequalities and equations in one variable• solve systems of linear equations in two variables and graph the solutions• use the graph of a system of equations in two variables to help determine the solution <p>5. Solve applications involving systems of equations. 6. Evaluate numerical and algebraic absolute value expressions. 7. Create a linear equation from a table of values containing co-linear data. 8. Determine the solution to a system of equations in two variables from a given graph. 9. Generate an algebraic sentence to model real-life situations. 10. Write an equation of the line that passes through two given points. 11. Understand and use:</p> <ul style="list-style-type: none">• such operations as taking the inverse, finding the reciprocal, taking a root, and raising to a fractional power
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- the rules of exponents 12. Verify that a point lies on a line, given an equation of the line, and be able to derive linear equations by using the point-slope formula.

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