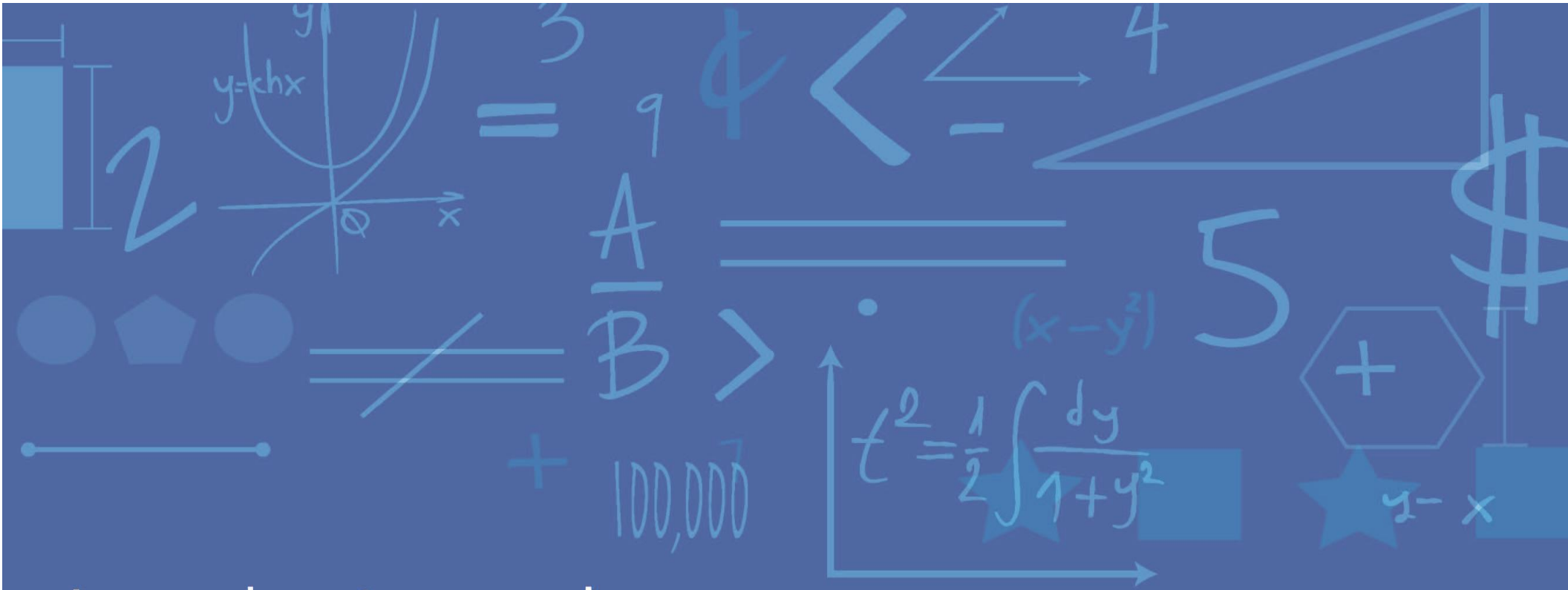

Introduction to the **Revised Mathematics TEKS**

VERTICAL ALIGNMENT CHART
GRADES 5 - ALGEBRA I, ALGEBRA II

Texas Education Agency

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Grade 5	Grade 6	Grade 7	Grade 8	Algebra I	Algebra II
(1) Mathematical process standards. The student uses mathematical processes to acquire and demonstrate mathematical understanding. The student is expected to:					
(A) apply mathematics to problems arising in everyday life, society, and the workplace;					
(B) use a problem-solving model that incorporates analyzing given information, formulating a plan or strategy, determining a solution, justifying the solution, and evaluating the problem-solving process and the reasonableness of the solution;					
(C) select tools, including real objects, manipulatives, paper and pencil, and technology as appropriate, and techniques, including mental math, estimation, and number sense as appropriate, to solve problems;					
(D) communicate mathematical ideas, reasoning, and their implications using multiple representations, including symbols, diagrams, graphs, and language as appropriate;					
(E) create and use representations to organize, record, and communicate mathematical ideas;					
(F) analyze mathematical relationships to connect and communicate mathematical ideas; and					
(G) display, explain, and justify mathematical ideas and arguments using precise mathematical language in written or oral communication.					

Grade 5	Grade 6	Grade 7	Grade 8	Algebra I	Algebra II
Comparing and Ordering Numbers					
(2) Number and operations. The student applies mathematical process standards to represent, compare, and order positive rational numbers and understand relationships as related to place value. The student is expected to:	(2) Number and operations. The student applies mathematical process standards to represent and use rational numbers in a variety of forms. The student is expected to:		(2) Number and operations. The student applies mathematical process standards to represent and use real numbers in a variety of forms. The student is expected to:		
(B) compare and order two decimals to thousandths and represent comparisons using the symbols >, <, or =.	(D) order a set of rational numbers arising from mathematical and real-world contexts.		(D) order a set of real numbers arising from mathematical and real-world contexts.		
Representing and Relating Numbers Using Number Lines					
	(2) Number and operations. The student applies mathematical process standards to represent and use rational numbers in a variety of forms. The student is expected to:		(2) Number and operations. The student applies mathematical process standards to represent and use real numbers in a variety of forms. The student is expected to:		
	(B) identify a number, its opposite, and its absolute value.		(B) approximate the value of an irrational number, including π and square roots of numbers less than 225, and locate that rational number approximation on a number line.		
	(C) locate, compare, and order integers and rational numbers using a number line.				
	Representing and Classifying Numbers				
	(2) Number and operations. The student applies mathematical process standards to represent and use rational numbers in a variety of forms. The student is expected to:	(2) Number and operations. The student applies mathematical process standards to represent and use rational numbers in a variety of forms. The student is expected to:	(2) Number and operations. The student applies mathematical process standards to represent and use real numbers in a variety of forms. The student is expected to:		
	(A) classify whole numbers, integers, and rational numbers using a visual representation such as a Venn diagram to describe relationships between sets of numbers.	(A) extend previous knowledge of sets and subsets using a visual representation to describe relationships between sets of rational numbers.	(A) extend previous knowledge of sets and subsets using a visual representation to describe relationships between sets of real numbers.		

Grade 5	Grade 6	Grade 7	Grade 8	Algebra I	Algebra II
Composing and Decomposing Numbers: Place Value					
(2) Number and operations. The student applies mathematical process standards to represent, compare, and order positive rational numbers and understand relationships as related to place value. The student is expected to:			(2) Number and operations. The student applies mathematical process standards to represent and use real numbers in a variety of forms. The student is expected to:		
(A) represent the value of the digit in decimals through the thousandths using expanded notation and numerals.			(C) convert between standard decimal notation and scientific notation.		
Applying Strategies for Estimation					
(2) Number and operations. The student applies mathematical process standards to represent, compare, and order positive rational numbers and understand relationships as related to place value. The student is expected to:					
(C) round decimals to tenths or hundredths.					

Grade 5	Grade 6	Grade 7	Grade 8	Algebra I	Algebra II
	Representing Fraction Concepts				
	(2) Number and operations. The student applies mathematical process standards to represent and use rational numbers in a variety of forms. The student is expected to:				
	(E) extend representations for division to include fraction notation such as *a/b* represents the same number as *a* ÷ *b* where *b* ≠ 0.				
	Determining Equivalence and Comparing Part-to-Whole Relationships				
	(5) Proportionality. The student applies mathematical process standards to solve problems involving proportional relationships. The student is expected to:				
	(C) use equivalent fractions, decimals, and percents to show equal parts of the same whole.				
Adding and Subtracting Fractions and Rational Numbers				**Extending Operations to Polynomial Expressions and Complex Numbers**	
(3) Number and operations. The student applies mathematical process standards to develop and use strategies and methods for positive rational number computations in order to solve problems with efficiency and accuracy. The student is expected to:		(3) Number and operations. The student applies mathematical process standards to add, subtract, multiply, and divide while solving problems and justifying solutions. The student is expected to:		(10) Number and algebraic methods. The student applies the mathematical process standards and algebraic methods to rewrite in equivalent forms and perform operations on polynomial expressions. The student is expected to:	(7) Number and algebraic methods. The student applies mathematical processes to simplify and perform operations on expressions and to solve equations. The student is expected to:
(H) represent and solve addition and subtraction of fractions with unequal denominators referring to the same whole using objects and pictorial models and properties of operations.		(B) apply and extend previous understandings of operations to solve problems using addition, subtraction, multiplication, and division of rational numbers.		(A) add and subtract polynomials of degree one and degree two.	(F) determine the sum, difference, product, and quotient of rational expressions with integral exponents of degree one and of degree two numbers.
(K) add and subtract positive rational numbers fluently.		(A) add, subtract, multiply, and divide rational numbers fluently.			

Grade 5	Grade 6	Grade 7	Grade 8	Algebra I	Algebra II
Adding and Subtracting Whole Numbers, Decimals, and Rational Numbers				**Extending Operations to Polynomial Expressions and Complex Numbers**	
(3) Number and operations. The student applies mathematical process standards to develop and use strategies and methods for positive rational number computations in order to solve problems with efficiency and accuracy. The student is expected to:		(3) Number and operations. The student applies mathematical process standards to add, subtract, multiply, and divide while solving problems and justifying solutions. The student is expected to:		(10) Number and algebraic methods. The student applies the mathematical process standards and algebraic methods to rewrite in equivalent forms and perform operations on polynomial expressions. The student is expected to:	(7) Number and algebraic methods. The student applies mathematical processes to simplify and perform operations on expressions and to solve equations. The student is expected to:
(A) estimate to determine solutions to mathematical and real-world problems involving addition, subtraction, multiplication, or division.		(A) add, subtract, multiply, and divide rational numbers fluently.		(A) add and subtract polynomials of degree one and degree two.	(A) add, subtract, and multiply complex
		(B) apply and extend previous understandings of operations to solve problems using addition, subtraction, multiplication, and division of rational numbers.			(B) add, subtract, and multiply polynomials.

Grade 5	Grade 6	Grade 7	Grade 8	Algebra I	Algebra II
Multiplying Whole Numbers, Decimals, Fractions, and Rational Numbers				**Extending Operations to Polynomial Expressions and Complex Numbers**	
(3) Number and operations. The student applies mathematical process standards to develop and use strategies and methods for positive rational number computations in order to solve problems with efficiency and accuracy. The student is expected to:	(3) Number and operations. The student applies mathematical process standards to represent addition, subtraction, multiplication, and division while solving problems and justifying solutions. The student is expected to:	(3) Number and operations. The student applies mathematical process standards to add, subtract, multiply, and divide while solving problems and justifying solutions. The student is expected to:		(10) Number and algebraic methods. The student applies the mathematical process standards and algebraic methods to rewrite in equivalent forms and perform operations on polynomial expressions. The student is expected to:	(7) Number and algebraic methods. The student applies mathematical processes to simplify and perform operations on expressions and to solve equations. The student is expected to:
(B) multiply with fluency a three-digit number by a two-digit number using the standard algorithm.	(E) multiply and divide positive rational numbers fluently.	(A) add, subtract, multiply, and divide rational numbers fluently.		(B) multiply polynomials of degree one and degree two.	(A) add, subtract, and multiply complex numbers.
(D) represent multiplication of decimals with products to the hundredths using objects and pictorial models, including area models.					(B) add, subtract, and multiply polynomials.
(E) solve for products of decimals to the hundredths, including situations involving money, using strategies based on place-value understandings, properties of operations, and the relationship to the multiplication of whole numbers.		(B) apply and extend previous understandings of operations to solve problems using addition, subtraction, multiplication, and division of rational numbers.		(C) determine the quotient of a polynomial of degree one and polynomial of degree two when divided by a polynomial of degree one and polynomial of degree two when the degree of the divisor does not exceed the degree of the dividend.	(C) determine the quotient of a polynomial of degree three and of degree four when divided by a polynomial of degree one and of degree two.
(I) represent and solve multiplication of a whole number and a fraction that refers to the same whole using objects and pictorial models, including area models.	(B) determine, with and without computation, whether a quantity is increased or decreased when multiplied by a fraction, including values greater than or less than one.			(D) rewrite polynomial expressions of degree one and degree two in equivalent forms using the distributive property.	(F) determine the sum, difference, product, and quotient of rational expressions with integral exponents of degree one and of degree two.

Grade 5	Grade 6	Grade 7	Grade 8	Algebra I	Algebra II
Dividing Whole Numbers, Decimals, Fractions, and Rational Numbers					**Dividing Rational Polynomials**
(3) Number and operations. The student applies mathematical process standards to develop and use strategies and methods for positive rational number computations in order to solve problems with efficiency and accuracy. The student is expected to:	(3) Number and operations. The student applies mathematical process standards to represent addition, subtraction, multiplication, and division while solving problems and justifying solutions. The student is expected to:	(3) Number and operations. The student applies mathematical process standards to add, subtract, multiply, and divide while solving problems and justifying solutions. The student is expected to:			(7) Number and algebraic methods. The student applies mathematical processes to simplify and perform operations on expressions and to solve equations. The student is expected to:
(L) divide whole numbers by unit fractions and unit fractions by whole numbers.	(A) recognize that dividing by a rational number and multiplying by its reciprocal result in equivalent values.				
(C) solve with proficiency for quotients of up to a four-digit dividend by a two-digit divisor using strategies and the standard algorithm.		(A) add, subtract, multiply, and divide rational numbers fluently.			
(G) solve for quotients of decimals to the hundredths, up to four-digit dividends and two-digit whole number divisors, using strategies and algorithms, including the standard algorithm.					(F) determine the sum, difference, product, and quotient of rational expressions with integral exponents of degree one and of degree two numbers.
(F) represent quotients of decimals to the hundredths, up to four-digit dividends and two-digit whole number divisors, using objects and pictorial models, including area models.	(E) multiply and divide positive rational numbers fluently.				
(J) represent division of a unit fraction by a whole number and the division of a whole number by a unit fraction such as 1/3 ÷ 7 and 7 ÷ 1/3 using objects and pictorial models, including area models.		(B) apply and extend previous understandings of operations to solve problems using addition, subtraction, multiplication, and division of rational numbers.			

Grade 5	Grade 6	Grade 7	Grade 8	Algebra I	Algebra II
	Applying Operations with Integers and Rational Numbers				**Dividing Rational Polynomials**
	(3) Number and operations. The student applies mathematical process standards to represent addition, subtraction, multiplication, and division while solving problems and justifying solutions. The student is expected to:	(3) Number and operations. The student applies mathematical process standards to add, subtract, multiply, and divide while solving problems and justifying solutions. The student is expected to:			(7) Number and algebraic methods. The student applies mathematical processes to simplify and perform operations on expressions and to solve equations. The student is expected to:
	(C) represent integer operations with concrete models and connect the actions with the models to standardized algorithms.	(A) add, subtract, multiply, and divide rational numbers fluently.			(F) determine the sum, difference, product, and quotient of rational expressions with integral exponents of degree one and of degree two numbers.
	(D) add, subtract, multiply, and divide integers fluently.				
	(E) multiply and divide positive rational numbers fluently.	(B) apply and extend previous understandings of operations to solve problems using addition, subtraction, multiplication, and division of rational numbers.			

Grade 5	Grade 6	Grade 7	Grade 8	Algebra I	Algebra II
Connecting Counting and Divisibility					
(4) Algebraic reasoning. The student applies mathematical process standards to develop concepts of expressions and equations. The student is expected to:					
(A) identify prime and composite numbers.					
Representing Problem Situations with the Equal Sign					
(4) Algebraic reasoning. The student applies mathematical process standards to develop concepts of expressions and equations. The student is expected to:	(7) Expressions, equations, and relationships. The student applies mathematical process standards to develop concepts of expressions and equations. The student is expected to:				
(B) represent and solve multi-step problems involving the four operations with whole numbers using equations with a letter standing for the unknown quantity.	(B) distinguish between expressions and equations verbally, numerically, and algebraically.				
	Representing Problem Situations with Equations and Inequalities				
	(9) Expressions, equations, and relationships. The student applies mathematical process standards to use equations and inequalities to represent situations. The student is expected to:	(10) Expressions, equations, and relationships. The student applies mathematical process standards to use one- variable equations and inequalities to represent situations. The student is expected to:	(8) Expressions, equations, and relationships. The student applies mathematical process standards to use one- variable equations or inequalities in problem situations. The student is expected to:	(2) Linear functions, equations, and inequalities. The student applies the mathematical process standards when using properties of linear functions to write and represent in multiple ways, with and without technology, linear equations, inequalities, and systems of equations. The student is expected to:	(3) Systems of equations and inequalities. The student applies mathematical processes to formulate systems of equations and inequalities, use a variety of methods to solve, and analyze reasonableness of solutions. The student is expected to:
	(A) write one-variable, one-step equations and inequalities to represent constraints or conditions within problems.	(A) write one-variable, two-step equations and inequalities to represent constraints or conditions within problems.	(A) write one-variable equations or inequalities with variables on both sides that represent problems using rational number coefficients and constants.	(I) write systems of two linear equations given a table of values, a graph, and a verbal description.	(A) formulate systems of equations, including systems consisting of three linear equations in three variables and systems consisting of two equations, the first linear and the second quadratic.
				(H) write linear inequalities in two variables given a table of values, a graph, and a verbal description.	(E) formulate systems of at least two linear inequalities in two variables.

Grade 5	Grade 6	Grade 7	Grade 8	Algebra I	Algebra II
	Representing with Equations and Inequalities				
	(9) Expressions, equations, and relationships. The student applies mathematical process standards to use equations and inequalities to represent situations. The student is expected to:	(10) Expressions, equations, and relationships. The student applies mathematical process standards to use one-variable equations and inequalities to represent situations. The student is expected to:	(8) Expressions, equations, and relationships. The student applies mathematical process standards to use one-variable equations or inequalities in problem situations. The student is expected to:		
	(C) write corresponding real-world problems given one-variable, one-step equations or inequalities.	(C) write a corresponding real-world problem given a one-variable, two-step equation or inequality.	(B) write a corresponding real-world problem when given a one-variable equation or inequality with variables on both sides of the equal sign using rational number coefficients and constants.		

Grade 5	Grade 6	Grade 7	Grade 8	Algebra I	Algebra II
Representing and Solving Problems with Equations and Inequalities					
(4) Algebraic reasoning. The student applies mathematical process standards to develop concepts of expressions and equations. The student is expected to:	(10) Expressions, equations, and relationships. The student applies mathematical process standards to use equations and inequalities to solve problems. The student is expected to:	(11) Expressions, equations, and relationships. The student applies mathematical process standards to solve one-variable equations and inequalities. The student is expected to:	(8) Expressions, equations, and relationships. The student applies mathematical process standards to use one-variable equations or inequalities in problem situations. The student is expected to:	(5) Linear functions, equations, and inequalities. The student applies the mathematical process standards to solve, with and without technology, linear equations and evaluate the reasonableness of their solutions. The student is expected to:	(6) Cubic, cube root, absolute value and rational functions, equations, and inequalities. The student applies mathematical processes to understand that cubic, cube root, absolute value and rational functions, equations, and inequalities can be used to model situations, solve problems, and make predictions. The student is expected to:
(B) represent and solve multi-step problems involving the four operations with whole numbers using equations with a letter standing for the unknown quantity.	(A) model and solve one-variable, one-step equations and inequalities that represent problems, including geometric concepts.	(A) model and solve one-variable, two-step equations and inequalities.	(C) model and solve one-variable equations with variables on both sides of the equal sign that represent mathematical and real-world problems using rational number coefficients and constants.	(A) solve linear equations in one variable, including those for which the application of the distributive property is necessary and for which variables are included on both sides.	(E) solve absolute value linear equations.
				(B) solve linear inequalities in one variable, including those for which the application of the distributive property is necessary and for which variables are included on both sides.	(F) solve absolute value linear inequalities.
	(9) Expressions, equations, and relationships. The student applies mathematical process standards to use equations and inequalities to represent situations. The student is expected to:	(10) Expressions, equations, and relationships. The student applies mathematical process standards to use one-variable equations and inequalities to represent situations. The student is expected to:		(C) solve systems of two linear equations with two variables for mathematical and real-world problems.	(3) Systems of equations and inequalities. The student applies mathematical processes to formulate systems of equations and inequalities, use a variety of methods to solve, and analyze reasonableness of solutions. The student is expected to:
	(B) represent solutions for one-variable, one-step equations and inequalities on number lines.	(B) represent solutions for one-variable, two-step equations and inequalities on number lines.			(B) solve systems of three linear equations in three variables by using Gaussian elimination, technology with matrices, and substitution.

Grade 5	Grade 6	Grade 7	Grade 8	Algebra I	Algebra II
	Representing and Solving Problems with Equations and Inequalities				
	(10) Expressions, equations, and relationships. The student applies mathematical process standards to use equations and inequalities to solve problems. The student is expected to:	(11) Expressions, equations, and relationships. The student applies mathematical process standards to solve one-variable equations and inequalities. The student is expected to:	(9) Expressions, equations, and relationships. The student applies mathematical process standards to use multiple representations to develop foundational concepts of simultaneous linear equations. The student is expected to:	(3) Linear functions, equations, and inequalities. The student applies the mathematical process standards when using graphs of linear functions, key features, and related transformations to represent in multiple ways and solve, with and without technology, equations, inequalities, and systems of equations. The student is expected to:	(3) Systems of equations and inequalities. The student applies mathematical processes to formulate systems of equations and inequalities, use a variety of methods to solve, and analyze reasonableness of solutions. The student is expected to:
	(B) determine if the given value(s) make(s) one-variable, one-step equations or inequalities true.	(B) determine if the given value(s) make(s) one-variable, two-step equations and inequalities true.	(A) identify and verify the values of x and y that simultaneously satisfy two linear equations in the form $y = mx + b$ from the intersections of the graphed equations.	(F) graph systems of two linear equations in two variables on the coordinate plane and determine the solutions if they exist.	(C) solve, algebraically, systems of two equations in two variables consisting of a linear equation and a quadratic equation.
				(G) estimate graphically the solutions to systems of two linear equations with two variables in real-world problems.	(D) determine the reasonableness of solutions to systems of a linear equation and a quadratic equation in two variables.
				(D) graph the solution set of linear inequalities in two variables on the coordinate plane.	(F) solve systems of two or more linear inequalities in two variables.
				(H) graph the solution set of systems of two linear inequalities in two variables on the coordinate plane.	(G) determine possible solutions in the solution set of systems of two or more linear inequalities in two variables.

Grade 5	Grade 6	Grade 7	Grade 8	Algebra I	Algebra II
Describing and Simplifying Numerical Expressions				**Simplifying Polynomial Expressions**	
(4) Algebraic reasoning. The student applies mathematical process standards to develop concepts of expressions and equations. The student is expected to:	(7) Expressions, equations, and relationships. The student applies mathematical process standards to develop concepts of expressions and equations. The student is expected to:			(10) Number and algebraic methods. The student applies the mathematical process standards and algebraic methods to rewrite in equivalent forms and perform operations on polynomial expressions. The student is expected to:	(7) Number and algebraic methods. The student applies mathematical processes to simplify and perform operations on expressions and to solve equations. The student is expected to:
(E) describe the meaning of parentheses and brackets in a numeric expression.	(A) generate equivalent numerical expressions using order of operations, including whole number exponents and prime factorization.			(E) factor, if possible, trinomials with real factors in the form $ax^2 + bx + c$, including perfect square trinomials of degree two.	(D) determine the linear factors of a polynomial function of degree three and of degree four using algebraic methods.
(F) simplify numerical expressions that do not involve exponents, including up to two levels of grouping.				(F) decide if a binomial can be written as the difference of two squares and, if possible, use the structure of a difference of two squares to rewrite the binomial.	(E) determine linear and quadratic factors of a polynomial expression of degree three and of degree four, including factoring the sum and difference of two cubes and factoring by grouping.
				(D) rewrite polynomial expressions of degree one and degree two in equivalent forms using the distributive property.	
	(C) determine if two expressions are equivalent using concrete models, pictorial models, and algebraic representations.			(7) Quadratic functions and equations. The student applies the mathematical process standards when using graphs of quadratic functions and their related transformations to represent in multiple ways and determine, with and without technology, the solutions to equations.	
				(B) describe the relationship between the linear factors of quadratic expressions and the zeros of their associated quadratic functions.	

Grade 5	Grade 6	Grade 7	Grade 8	Algebra I	Algebra II
	Describing and Simplifying Numerical Expressions				
	(7) Expressions, equations, and relationships. The student applies mathematical process standards to develop concepts of expressions and equations. The student is expected to:				
	(D) generate equivalent expressions using the properties of operations: inverse, identity, commutative, associative, and distributive properties.				

Grade 5	Grade 6	Grade 7	Grade 8	Algebra I	Algebra II
Applying Multiple Representations for Foundations of Functions					
(4) Algebraic reasoning. The student applies mathematical process standards to develop concepts of expressions and equations. The student is expected to:	(4) Proportionality. The student applies mathematical process standards to develop an understanding of proportional relationships in problem situations. The student is expected to:	(4) Proportionality. The student applies mathematical process standards to represent and solve problems involving proportional relationships. The student is expected to:	(5) Proportionality. The student applies mathematical process standards to use proportional and non-proportional relationships to develop foundational concepts of functions. The student is expected to:	(2) Linear functions, equations, and inequalities. The student applies the mathematical process standards when using properties of linear functions to write and represent in multiple ways, with and without technology, linear equations, inequalities, and systems of equations. The student is expected to:	(6) Cubic, cube root, absolute value and rational functions, equations, and inequalities. The student applies mathematical processes to understand that cubic, cube root, absolute value and rational functions, equations, and inequalities can be used to model situations, solve problems, and make predictions. The student is expected to:
(C) generate a numerical pattern when given a rule in the form $y = ax$ or $y = x + a$ and graph.	(A) compare two rules verbally, numerically, graphically, and symbolically in the form of $y = ax$ or $y = x + a$ in order to differentiate between additive and multiplicative relationships.	(A) represent constant rates of change in mathematical and real-world problems given pictorial, tabular, verbal, numeric, graphical, and algebraic representations, including $d = rt$.	(A) represent linear proportional situations with tables, graphs, and equations in the form of $y = kx$.	(D) write and solve equations involving direct variation.	(L) formulate and solve equations involving inverse variation.
(D) recognize the difference between additive and multiplicative numerical patterns given in a table or graph.		(C) determine the constant of proportionality ($k = y/x$) within mathematical and real-world problems.	(E) solve problems involving direct variation.		
	(6) Expressions, equations, and relationships. The student applies mathematical process standards to use multiple representations to describe algebraic relationships. The student is expected to:	(7) Expressions, equations, and relationships. The student applies mathematical process standards to represent linear relationships using multiple representations. The student is expected to:			
	(A) identify independent and dependent quantities from tables and graphs.	(A) represent linear relationships using verbal descriptions, tables, graphs, and equations that simplify to the form $y = mx + b$.	(B) represent linear non-proportional situations with tables, graphs, and equations in the form of $y = mx + b$, where $b \neq 0$.	(B) write linear equations in two variables in various forms, including $y = mx + b$, $Ax + By = C$, and $y - y_1 = m(x - x_1)$, given one point and the slope and given two points.	

Grade 5	Grade 6	Grade 7	Grade 8	Algebra I	Algebra II
				Identifying Key Attributes	
			(4) Proportionality. The student applies mathematical process standards to explain proportional and non-proportional relationships involving slope. The student is expected to:	(3) Linear functions, equations, and inequalities. The student applies the mathematical process standards when using graphs of linear functions, key features, and related transformations to represent in multiple ways and solve, with and without technology, equations, inequalities, and systems of equations. The student is expected to:	(2) Attributes of functions and their inverses. The student applies mathematical processes to understand that functions have distinct key attributes and understand the relationship between a function and its inverse. The student is expected to:
			(C) use data from a table or graph to determine the rate of change or slope and *y*-intercept in mathematical and real-world problems.	(C) graph linear functions on the coordinate plane and identify key features, including *x*-intercept, *y*-intercept, zeros, and slope, in mathematical and real-world problems.	(A) graph the functions $f(x)=\sqrt{x}$, $f(x)=1/x$, $f(x)=x^3$, $f(x)=\sqrt[3]{x}$, $f(x)=b^x$, $f(x)=\lvert x\rvert$, and $f(x)=\log_b(x)$ where b is 2, 10, and e, and, when applicable, analyze the key attributes such as domain, range, intercepts, symmetries, asymptotic behavior, and maximum and minimum given an interval.
				(7) Quadratic functions and equations. The student applies the mathematical process standards when using graphs of quadratic functions and their related transformations to represent in multiple ways and determine, with and without technology, the solutions to equations. The student is expected to:	(4) Quadratic and square root functions, equations, and inequalities. The student applies mathematical processes to understand that quadratic and square root functions, equations, and quadratic inequalities can be used to model situations, solve problems, and make predictions. The student is expected to:
				(A) graph quadratic functions on the coordinate plane and use the graph to identify key attributes, if possible, including *x*-intercept, *y*-intercept, zeros, maximum value, minimum values, vertex, and the equation of the axis of symmetry.	(B) write the equation of a parabola using given attributes, including vertex, focus, directrix, axis of symmetry, and direction of opening.

Grade 5	Grade 6	Grade 7	Grade 8	Algebra I	Algebra II
				Identifying Key Attributes of Functions	
				(9) Exponential functions and equations. The student applies the mathematical process standards when using properties of exponential functions and their related transformations to write, graph, and represent in multiple ways exponential equations and evaluate, with and without technology, the reasonableness of their solutions. The student formulates statistical relationships and evaluates their reasonableness based on real- world data. The student is expected to:	(2) Attributes of functions and their inverses. The student applies mathematical processes to understand that functions have distinct key attributes and understand the relationship between a function and its inverse. The student is expected to:
				(B) interpret the meaning of the values of a and b in exponential functions of the form $f(x) = ab^x$ in real-world problems.	(A) graph the functions $f(x)=\sqrt{x}$, $f(x)=1/x$, $f(x)=x^3$, $f(x)=\sqrt[3]{x}$, $f(x)=b^x$, $f(x)=\lvert x\rvert$, and $f(x)=\log_b(x)$ where b is 2, 10, and e, and, when applicable, analyze the key attributes such as domain, range, intercepts, symmetries, asymptotic behavior, and maximum and minimum given an interval.
				(D) graph exponential functions that model growth and decay and identify key features, including y-intercept and asymptote, in mathematical and real-world problems.	

Grade 5	Grade 6	Grade 7	Grade 8	Algebra I	Algebra II
			Determining Domain and Range		
	(6) Expressions, equations, and relationships. The student applies mathematical process standards to use multiple representations to describe algebraic relationships. The student is expected to:		(5) Proportionality. The student applies mathematical process standards to use proportional and non-proportional relationships to develop foundational concepts of functions. The student is expected to::	(2) Linear functions, equations, and inequalities. The student applies the mathematical process standards when using properties of linear functions to write and represent in multiple ways, with and without technology, linear equations, inequalities, and systems of equations. The student is expected to:	(7) Number and algebraic methods. The student applies mathematical processes to simplify and perform operations on expressions and to solve equations. The student is expected to:
	(A) identify independent and dependent quantities from tables and graphs.		(G) identify functions using sets of ordered pairs, tables, mappings, and graphs.	(A) determine the domain and range of a linear function in mathematical problems; determine reasonable domain and range values for real-world situations, both continuous and discrete; and represent domain and range using inequalities.	(I) write the domain and range of a function in interval notation, inequalities, and set notation.
				(6) Quadratic functions and equations. The student applies the mathematical process standards when using properties of quadratic functions to write and represent in multiple ways, with and without technology, quadratic equations. The student is expected to:	
				(A) determine the domain and range of quadratic functions and represent the domain and range using inequalities.	

Grade 5	Grade 6	Grade 7	Grade 8	Algebra I	Algebra II
		Determining Domain and Range			
	(6) Expressions, equations, and relationships. The student applies mathematical process standards to use multiple representations to describe algebraic relationships. The student is expected to:			(9) Exponential functions and equations. The student applies the mathematical process standards when using properties of exponential functions and their related transformations to write, graph, and represent in multiple ways exponential equations and evaluate, with and without technology, the reasonableness of their solutions. The student formulates statistical relationships and evaluates their reasonableness based on real- world data. The student is expected to:	(7) Number and algebraic methods. The student applies mathematical processes to simplify and perform operations on expressions and to solve equations. The student is expected to:
	(A) identify independent and dependent quantities from tables and graphs.			(A) determine the domain and range of exponential functions of the form $f(x) = ab^x$ and represent the domain and range using inequalities.	(I) write the domain and range of a function in interval notation, inequalities, and set notation.
					(6) Cubic, cube root, absolute value and rational functions, equations, and inequalities. The student applies mathematical processes to understand that cubic, cube root, absolute value and rational functions, equations, and inequalities can be used to model situations, solve problems, and make predictions. The student is expected to:
					(K) determine the asymptotic restrictions on the domain of a rational function and represent domain and range using interval notation, inequalities, and set notation.

Grade 5	Grade 6	Grade 7	Grade 8	Algebra I	Algebra II
	Representing Linear Relationships				
	(6) Expressions, equations, and relationships. The student applies mathematical process standards to use multiple representations to describe algebraic relationships. The student is expected to:	(7) Expressions, equations, and relationships. The student applies mathematical process standards to represent linear relationships using multiple representations. The student is expected to:	(5) Proportionality. The student applies mathematical process standards to use proportional and non-proportional relationships to develop foundational concepts of functions. The student is expected to:	(2) Linear functions, equations, and inequalities. The student applies the mathematical process standards when using properties of linear functions to write and represent in multiple ways, with and without technology, linear equations, inequalities, and systems of equations. The student is expected to:	
		(A) represent linear relationships using verbal descriptions, tables, graphs, and equations that simplify to the form $y = mx + b$.	(B) represent linear non-proportional situations with tables, graphs, and equations in the form of $y = mx + b$, where $b \neq 0$.	(B) write linear equations in two variables in various forms, including $y = mx + b$, $Ax + By = C$, and $y - y_1 = m(x - x_1)$, given one point and the slope and given two points.	
	(B) write an equation that represents the relationship between independent and dependent quantities from a table.		(I) write an equation in the form $y = mx + b$ to model a linear relationship between two quantities using verbal, numerical, tabular, and graphical representations.	(C) write linear equations in two variables given a table of values, a graph, and a verbal description.	
	(C) represent a given situation using verbal descriptions, tables, graphs, and equations in the form $y = kx$ or $y = x + b$.		(F) distinguish between proportional and non-proportional situations using tables, graphs, and equations in the form $y = kx$ or $y = mx + b$, where $b \neq 0$.	(E) write the equation of a line that contains a given point and is parallel to a given line.	
				(F) write the equation of a line that contains a given point and is perpendicular to a given line.	
				(G) write an equation of a line that is parallel or perpendicular to the X or Y axis and determine whether the slope of the line is zero or undefined.	
			(H) identify examples of proportional and non-proportional functions that arise from mathematical and real-world problems.	(I) write systems of two linear equations given a table of values, a graph, and a verbal description.	

Grade 5	Grade 6	Grade 7	Grade 8	Algebra I	Algebra II
		Representing and Analyzing Bivariate Data			
(9) Data analysis. The student applies mathematical process standards to solve problems by collecting, organizing, displaying, and interpreting data. The student is expected to:			(11) Measurement and data. The student applies mathematical process standards to use statistical procedures to describe data. The student is expected to:	(4) Linear functions, equations, and inequalities. The student applies the mathematical process standards to formulate statistical relationships and evaluate their reasonableness based on real-world data. The student is expected to:	(8) Data. The student applies mathematical processes to analyze data, select appropriate models, write corresponding functions, and make predictions. The student is expected to:
(B) represent discrete paired data on a scatterplot.			(A) construct a scatterplot and describe the observed data to address questions of association such as linear, non-linear, and no association between bivariate data.	(A) calculate, using technology, the correlation coefficient between two quantitative variables and interpret this quantity as a measure of the strength of the linear association.	(A) analyze data to select the appropriate model from among linear, quadratic, and exponential models.
			(5) Proportionality. The student applies mathematical process standards to use proportional and non-proportional relationships to develop foundational concepts of functions. The student is expected to:		
			(C) contrast bivariate sets of data that suggest a linear relationship with bivariate sets of data that do not suggest a linear relationship from a graphical representation.	(B) compare and contrast association and causation in real-world problems.	(B) use regression methods available through technology to write a linear function, a quadratic function, and an exponential function from a given set of data.
			(D) use a trend line that approximates the linear relationship between bivariate sets of data to make predictions.	(C) write, with and without technology, linear functions that provide a reasonable fit to data to estimate solutions and make predictions for real-world problems.	(C) predict and make decisions and critical judgments from a given set of data using linear, quadratic, and exponential models.

Grade 5	Grade 6	Grade 7	Grade 8	Algebra I	Algebra II
				Generalizing Relationships From Data	
				(8) Quadratic functions and equations. The student applies the mathematical process standards to solve, with and without technology, quadratic equations and evaluate the reasonableness of their solutions. The student formulates statistical relationships and evaluates their reasonableness based on real-world data. The student is expected to:	(4) Quadratic and square root functions, equations, and inequalities. The student applies mathematical processes to understand that quadratic and square root functions, equations, and quadratic inequalities can be used to model situations, solve problems, and make predictions. The student is expected to:
				(B) write, using technology, quadratic functions that provide a reasonable fit to data to estimate solutions and make predictions for real-world problems.	(E) formulate quadratic and square root equations using technology given a table of data.
					(8) Data. The student applies mathematical processes to analyze data, select appropriate models, write corresponding functions, and make predictions. The student is expected to:
				(9) Exponential functions and equations. The student applies the mathematical process standards when using properties of exponential functions and their related transformations to write, graph, and represent in multiple ways exponential equations and evaluate, with and without technology, the reasonableness of their solutions. The student formulates statistical relationships and evaluates their reasonableness based on real-world data. The student is expected to:	(B) use regression methods available through technology to write a linear function, a quadratic function, and an exponential function from a given set of data.
				(E) write, using technology, exponential functions that provide a reasonable fit to data and make predictions for real-world problems.	(C) predict and make decisions and critical judgments from a given set of data using linear, quadratic, and exponential models.

Grade 5	Grade 6	Grade 7	Grade 8	Algebra I	Algebra II
		Developing Foundations of Slope		**Representing Slope**	
		(4) Proportionality. The student applies mathematical process standards to represent and solve problems involving proportional relationships. The student is expected to:	(4) Proportionality. The student applies mathematical process standards to explain proportional and non-proportional relationships involving slope. The student is expected to:	(3) Linear functions, equations, and inequalities. The student applies the mathematical process standards when using graphs of linear functions, key features, and related transformations to represent in multiple ways and solve, with and without technology, equations, inequalities, and systems of equations. The student is expected to:	
		(B) calculate unit rates from rates in mathematical and real-world problems.	(A) use similar right triangles to develop an understanding that slope, m, given as the rate comparing the change in y-values to the change in x-values, $(y_2 - y_{1)}/ (x_2 - x_1)$, is the same for any two points (x_1, y_1) and (x_2, y_2) on the same line.	(A) determine the slope of a line given a table of values, a graph, two points on the line, and an equation written in various forms, including $y = mx + b$, $Ax + By = C$, and $y - y_1 = m(x - x_1)$.	
			(B) graph proportional relationships, interpreting the unit rate as the slope of the line that models the relationship.	(B) calculate the rate of change of a linear function represented tabularly, graphically, or algebraically in context of mathematical and real-world problems.	
			(C) use data from a table or graph to determine the rate of change or slope and y-intercept in mathematical and real-world problems.	(C) graph linear functions on the coordinate plane and identify key features, including x-intercept, y-intercept, zeros, and slope, in mathematical and real-world problems.	

Grade 5	Grade 6	Grade 7	Grade 8	Algebra I	Algebra II
Connecting Algebra and Geometry					
(4) Algebraic reasoning. The student applies mathematical process standards to develop concepts of expressions and equations. The student is expected to:	(8) Expressions, equations, and relationships. The student applies mathematical process standards to use geometry to represent relationships and solve problems. The student is expected to:	(8) Expressions, equations, and relationships. The student applies mathematical process standards to develop geometric relationships with volume. The student is expected to:	(6) Expressions, equations, and relationships. The student applies mathematical process standards to develop mathematical relationships and make connections to geometric formulas. The student is expected to:		
(G) use concrete objects and pictorial models to develop the formulas for the volume of a rectangular prism, including the special form for a cube ($V = l \times w \times h$, $V = s \times s \times s$, and $V = Bh$).	(B) model area formulas for parallelograms, trapezoids, and triangles by decomposing and rearranging parts of these shapes.	(A) model the relationship between the volume of a rectangular prism and a rectangular pyramid having both congruent bases and heights and connect that relationship to the formulas.	(A) describe the volume formula $V = Bh$ of a cylinder in terms of its base area and its height.		
(H) represent and solve problems related to perimeter and/or area and related to volume.	(C) write equations that represent problems related to the area of rectangles, parallelograms, trapezoids, and triangles and volume of right rectangular prisms where dimensions are positive rational numbers.	(B) explain verbally and symbolically the relationship between the volume of a triangular prism and a triangular pyramid having both congruent bases and heights and connect that relationship to the formulas.	(B) model the relationship between the volume of a cylinder and a cone having both congruent bases and heights and connect that relationship to the formulas.		
		(C) use models to determine the approximate formulas for the circumference and area of a circle and connect the models to the actual formulas.			

Grade 5	Grade 6	Grade 7	Grade 8	Algebra I	Algebra II
Connecting Algebra and Geometry					
(4) Algebraic reasoning. The student applies mathematical process standards to develop concepts of expressions and equations. The student is expected to:	(8) Expressions, equations, and relationships. The student applies mathematical process standards to use geometry to represent relationships and solve problems. The student is expected to:	(9) Expressions, equations, and relationships. The student applies mathematical process standards to solve geometric problems. The student is expected to:	(7) Expressions, equations, and relationships. The student applies mathematical process standards to use geometry to solve problems. The student is expected to:		
(H) represent and solve problems related to perimeter and/or area and related to volume.		(B) determine the circumference and area of circles.			
(6) Geometry and measurement. The student applies mathematical process standards to understand, recognize, and quantify volume. The student is expected to:	(D) determine solutions for problems involving the area of rectangles, parallelograms, trapezoids, and triangles and volume of right rectangular prisms where dimensions are positive rational numbers.		(A) solve problems involving the volume of cylinders, cones, and spheres.		
(A) recognize a cube with side length of one unit as a unit cube having one cubic unit of volume and the volume of a three-dimensional figure as the number of unit cubes (*n* cubic units) needed to fill it with no gaps or overlaps if possible.		(A) solve problems involving the volume of rectangular prisms, triangular prisms, rectangular pyramids, and triangular pyramids			
(B) determine the volume of a rectangular prism with whole number side lengths in problems related to the number of layers times the number of unit cubes in the area of the base.					

Grade 5	Grade 6	Grade 7	Grade 8	Algebra I	Algebra II
		Connecting Algebra and Geometry			
(4) Algebraic reasoning. The student applies mathematical process standards to develop concepts of expressions and equations. The student is expected to:	(8) Expressions, equations, and relationships. The student applies mathematical process standards to use geometry to represent relationships and solve problems. The student is expected to:	(9) Expressions, equations, and relationships. The student applies mathematical process standards to solve geometric problems. The student is expected to:	(7) Expressions, equations, and relationships. The student applies mathematical process standards to use geometry to solve problems. The student is expected to:		
(H) represent and solve problems related to perimeter and/or area and related to volume.	(B) model area formulas for parallelograms, trapezoids, and triangles by decomposing and rearranging parts of these shapes.	(B) determine the circumference and area of circles.			
		(C) determine the area of composite figures containing combinations of rectangles, squares, parallelograms, trapezoids, triangles, semicircles, and quarter circles.			
	(D) determine solutions for problems involving the area of rectangles, parallelograms, trapezoids, and triangles and volume of right rectangular prisms where dimensions are positive rational numbers.	(D) solve problems involving the lateral and total surface area of a rectangular prism, rectangular pyramid, triangular prism, and triangular pyramid by determining the area of the shape's net.	(B) use previous knowledge of surface area to make connections to the formulas for lateral and total surface area and determine solutions for problems involving rectangular prisms, triangular prisms, and cylinders.		

Grade 5	Grade 6	Grade 7	Grade 8	Algebra I	Algebra II
			Connecting Algebra and Geometry		
			(6) Expressions, equations, and relationships. The student applies mathematical process standards to develop mathematical relationships and make connections to geometric formulas. The student is expected to:		
			(C) use models and diagrams to explain the Pythagorean theorem.		
			(7) Expressions, equations, and relationships. The student applies mathematical process standards to use geometry to solve problems. The student is expected to:		
			(C) use the Pythagorean Theorem and its converse to solve problems.		
			(D) determine the distance between two points on a coordinate plane using the Pythagorean Theorem.		
	(8) Expressions, equations, and relationships. The student applies mathematical process standards to use geometry to represent relationships and solve problems. The student is expected to:	(11) Expressions, equations, and relationships. The student applies mathematical process standards to solve one-variable equations and inequalities. The student is expected to:	(8) Expressions, equations, and relationships. The student applies mathematical process standards to use one-variable equations or inequalities in problem situations. The student is expected to:		
	(A) extend previous knowledge of triangles and their properties to include the sum of angles of a triangle, the relationship between the lengths of sides and measures of angles in a triangle, and determining when three lengths form a triangle.	(C) write and solve equations using geometry concepts, including the sum of the angles in a triangle, and angle relationships.	(D) use informal arguments to establish facts about the angle sum and exterior angle of triangles, the angles created when parallel lines are cut by a transversal, and the angle-angle criterion for similarity of triangles.		

Grade 5	Grade 6	Grade 7	Grade 8	Algebra I	Algebra II
	Developing Concepts Related to Proportionality				
	(4) Proportionality. The student applies mathematical process standards to develop an understanding of proportional relationships in problem situations. The student is expected to:	(4) Proportionality. The student applies mathematical process standards to represent and solve problems involving proportional relationships. The student is expected to:			
	(B) apply qualitative and quantitative reasoning to solve prediction and comparison of real-world problems involving ratios and rates.				
	(C) give examples of ratios as multiplicative comparisons of two quantities describing the same attribute.				
	(D) give examples of rates as the comparison by division of two quantities having different attributes, including rates as quotients.	(A) represent constant rates of change in mathematical and real-world problems given pictorial, tabular, verbal, numeric, graphical, and algebraic representations, including $d = rt$.			
		(B) calculate unit rates from rates in mathematical and real-world problems.			
	(E) represent ratios and percents with concrete models, fractions, and decimals.	(D) solve problems involving ratios, rates, and percents, including multi-step problems involving percent increase and percent decrease, and financial literacy problems.			
	(F) represent benchmark fractions and percents such as 1%, 10%, 25%, 33 1/3%, and multiples of these values using 10 by 10 grids, strip diagrams, number lines, and numbers.				
	(G) generate equivalent forms of fractions, decimals, and percents using real-world problems, including problems that involve money.				
	(H) convert units within a measurement system, including the use of proportions and unit rates.	(E) convert between measurement systems, including the use of proportions and the use of unit rates.			

Grade 5	Grade 6	Grade 7	Grade 8	Algebra I	Algebra II
	Developing Concepts Related to Proportionality				
	(5) Proportionality. The student applies mathematical process standards to solve problems involving proportional relationships. The student is expected to:	(4) Proportionality. The student applies mathematical process standards to represent and solve problems involving proportional relationships. The student is expected to:			
	(A) represent mathematical and real-world problems involving ratios and rates using scale factors, tables, graphs, and proportions.	(A) represent constant rates of change in mathematical and real-world problems given pictorial, tabular, verbal, numeric, graphical, and algebraic representations, including $d = rt$.			
	(B) solve real-world problems to find the whole given a part and the percent, to find the part given the whole and the percent, and to find the percent given the part and the whole, including the use of concrete and pictorial models.	(D) solve problems involving ratios, rates, and percents, including multi-step problems involving percent increase and percent decrease, and financial literacy problems.			
	(C) use equivalent fractions, decimals, and percents to show equal parts of the same whole.				
		Connecting Proportionality and Geometry			
		(5) Proportionality. The student applies mathematical process standards to use geometry to describe or solve problems involving proportional relationships. The student is expected to:	(10) Two-dimensional shapes. The student applies mathematical process standards to develop transformational geometry concepts. The student is expected to:		
		(A) generalize the critical attributes of similarity, including ratios within and between similar shapes.	(A) generalize the properties of orientation and congruence of rotations, reflections, translations, and dilations of two-dimensional shapes on a coordinate plane.		
		(B) describe π as the ratio of the circumference of a circle to its diameter.			
		(C) solve mathematical and real-world problems involving similar shape and scale drawings.	(D) model the effect on linear and area measurements of dilated two-dimensional shapes.		

Grade 5	Grade 6	Grade 7 **Connecting Proportionality and Geometry**	Grade 8	Algebra I	Algebra II
		(6) Proportionality. The student applies mathematical process standards to use probability and statistics to describe or solve problems involving proportional relationships. The student is expected to:			
		(A) represent sample spaces for simple and compound events using lists and tree diagrams.			
		(B) select and use different simulations to represent simple and compound events with and without technology.			
		(C) make predictions and determine solutions using experimental data for simple and compound events.			
		(D) make predictions and determine solutions using theoretical probability for simple and compound events.			
		(E) find the probabilities of a simple event and its complement and describe the relationship between the two.			
		(F) use data from a random sample to make inferences about a population.			
		(G) solve problems using data represented in bar graphs, dot plots, and circle graphs, including part-to-whole and part-to-part comparisons and equivalents.			
		(H) solve problems using qualitative and quantitative predictions and comparisons from simple experiments.			
		(I) determine experimental and theoretical probabilities related to simple and compound events using data and sample spaces.			

Grade 5	Grade 6	Grade 7	Grade 8	Algebra I	Algebra II
			Generalizing Attributes of Similar Figures		
			(3) Proportionality. The student applies mathematical process standards to use proportional relationships to describe dilations. The student is expected to:		
			(A) generalize that the ratio of corresponding sides of similar shapes are proportional, including a shape and its dilation.		
			(B) compare and contrast the attributes of a shape and its dilation(s) on a coordinate plane.		
			Generalizing Attributes with Transformational Geometry		
			(10) Two-dimensional shapes. The student applies mathematical process standards to develop transformational geometry concepts. The student is expected to:		
			(A) generalize the properties of orientation and congruence of rotations, reflections, translations, and dilations of two-dimensional shapes on a coordinate plane.		
			(B) differentiate between transformations that preserve congruence and those that do not.		
Classifying and Sorting Two-Dimensional and Three-Dimensional Figures					
(5) Geometry and measurement. The student applies mathematical process standards to classify two-dimensional figures by attributes and properties. The student is expected to:					
(A) classify two-dimensional figures in a hierarchy of sets and subsets using graphic organizers based on their attributes and properties.					

Grade 5	Grade 6	Grade 7	Grade 8	Algebra I	Algebra II
Solving Problems Using Measurement Systems					
(7) Geometry and measurement. The student applies mathematical process standards to select appropriate units, strategies, and tools to solve problems involving measurement. The student is expected to:	(4) Proportionality. The student applies mathematical process standards to develop an understanding of proportional relationships in problem situations. The student is expected to:	(4) Proportionality. The student applies mathematical process standards to represent and solve problems involving proportional relationships. The student is expected to:			
(A) solve problems by calculating conversions within a measurement system, customary or metric.	(H) convert units within a measurement system, including the use of proportions and unit rates.	(E) convert between measurement systems, including the use of proportions and the use of unit rates.			

Grade 5	Grade 6	Grade 7	Grade 8	Algebra I	Algebra II
Graphing on the Coordinate Plane			**Representing Dilations on the Coordinate Plane**		
(8) Geometry and measurement. The student applies mathematical process standards to identify locations on a coordinate plane. The student is expected to:	(11) Measurement and data. The student applies mathematical process standards to use coordinate geometry to identify locations on a plane. The student is expected to:		(3) Proportionality. The student applies mathematical process standards to use proportional relationships to describe dilations. The student is expected to:		
(A) describe the key attributes of the coordinate plane, including perpendicular number lines (axes) where the intersection (origin) of the two lines coincides with zero on each number line and the given point (0, 0). The *x*-coordinate, the first number in an ordered pair, indicates movement parallel to the *x*-axis starting at the origin. The *y*-coordinate, the second number, indicates movement parallel to the *y*-axis starting at the origin.	(A) graph points in all four quadrants using ordered pairs of rational numbers.		(C) use an algebraic representation to explain the effect of a given positive rational scale factor applied to two- dimensional figures on a coordinate plane with the origin as the center of dilation.		
(B) describe the process for graphing ordered pairs of numbers in the first quadrant of the coordinate plane.					
(C) graph in the first quadrant of the coordinate plane ordered pairs of numbers arising from mathematical and real-world problems, including those generated by number patterns or found in an input-output table.					

Grade 5	Grade 6	Grade 7	Grade 8	Algebra I	Algebra II
Graphing on the Coordinate Plane			**Applying Transformational Geometry and the Coordinate Plane**	**Transforming Functions**	
(8) Geometry and measurement. The student applies mathematical process standards to identify locations on a coordinate plane. The student is expected to:	(11) Measurement and data. The student applies mathematical process standards to use coordinate geometry to identify locations on a plane. The student is expected to:		(10) Two-dimensional shapes. The student applies mathematical process standards to develop transformational geometry concepts. The student is expected to:	(3) Linear functions, equations, and inequalities. The student applies the mathematical process standards when using graphs of linear functions, key features, and related transformations to represent in multiple ways and solve, with and without technology, equations, inequalities, and systems of equations. The student is expected to:	(6) Cubic, cube root, absolute value and rational functions, equations, and inequalities. The student applies mathematical processes to understand that cubic, cube root, absolute value and rational functions, equations, and inequalities can be used to model situations, solve problems, and make predictions. The student is expected to:
(A) describe the key attributes of the coordinate plane, including perpendicular number lines (axes) where the intersection (origin) of the two lines coincides with zero on each number line and the given point (0, 0). The *x*-coordinate, the first number in an ordered pair, indicates movement parallel to the *x*-axis starting at the origin. The *y*-coordinate, the second number, indicates movement parallel to the *y*-axis starting at the origin.	(A) graph points in all four quadrants using ordered pairs of rational numbers.		(C) explain the effect of translations, reflections over the *x*- or *y*-axis, and rotations limited to 90°, 180°, 270°, and 360° as applied to two- dimensional shapes on a coordinate plane using an algebraic representation.	(E) determine the effects on the graph of the parent function $f(x) = x$ when $f(x)$ is replaced by $af(x)$, $f(x) + d$, $f(x - c)$, $f(bx)$ for specific values of a, b, c, and d.	(C) analyze the effect on the graphs of $f(x) = \|x\|$ when $f(x)$ is replaced by $af(x)$, $f(bx)$, $f(x- c)$, and $f(x) + d$ for specific positive and negative real values of a, b, c, and d.
(B) describe the process for graphing ordered pairs of numbers in the first quadrant of the coordinate plane.				(7) Quadratic functions and equations. The student applies the mathematical process standards when using graphs of quadratic functions and their related transformations to represent in multiple ways and determine, with and without technology, the solutions to equations. The student is expected to:	(4) Quadratic and square root functions, equations, and inequalities. The student applies mathematical processes to understand that quadratic and square root functions, equations, and quadratic inequalities can be used to model situations, solve problems, and make predictions. The student is expected to:
(C) graph in the first quadrant of the coordinate plane ordered pairs of numbers arising from mathematical and real-world problems, including those generated by number patterns or found in an input-output table.				(C) determine the effects on the graph of the parent function $f(x) = x^2$ when $f(x)$ is replaced by $af(x)$, $f(x) + d$, $f(x - c)$, $f(bx)$ for specific values of a, b, c, and d.	(C) determine the effect on the graph of $f(x) = \sqrt{x}$ when $f(x)$ is replaced by $af(x)$, $f(x) + d$, $f(bx)$, and $f(x - c)$ for specific positive and negative values of a, b, c, and d.

Grade 5	Grade 6	Grade 7	Grade 8	Algebra I	Algebra II
Graphing on the Coordinate Plane			Applying Transformational Geometry and the Coordinate Plane	Transforming Functions	
(8) Geometry and measurement. The student applies mathematical process standards to identify locations on a coordinate plane. The student is expected to:	(11) Measurement and data. The student applies mathematical process standards to use coordinate geometry to identify locations on a plane. The student is expected to:		(10) Two-dimensional shapes. The student applies mathematical process standards to develop transformational geometry concepts. The student is expected to:	(7) Quadratic functions and equations. The student applies the mathematical process standards when using graphs of quadratic functions and their related transformations to represent in multiple ways and determine, with and without technology, the solutions to equations. The student is expected to:	(5) Exponential and logarithmic functions and equations. The student applies mathematical processes to understand that exponential and logarithmic functions can be used to model situations and solve problems. The student is expected to:
(A) describe the key attributes of the coordinate plane, including perpendicular number lines (axes) where the intersection (origin) of the two lines coincides with zero on each number line and the given point (0, 0). The *x*-coordinate, the first number in an ordered pair, indicates movement parallel to the *x*-axis starting at the origin. The *y*-coordinate, the second number, indicates movement parallel to the *y*-axis starting at the origin.	(A) graph points in all four quadrants using ordered pairs of rational numbers.		(C) explain the effect of translations, reflections over the *x*- or *y*-axis, and rotations limited to 90°, 180°, 270°, and 360° as applied to two-dimensional shapes on a coordinate plane using an algebraic representation.	(C) determine the effects on the graph of the parent function $f(x) = x^2$ when $f(x)$ is replaced by $af(x)$, $f(x) + d$, $f(x - c)$, $f(bx)$ for specific values of a, b, c, and d.	(A) determine the effects on the key attributes on the graphs of $f(x) = b^x$ and $f(x) = \log_b(x)$ where b is 2, 10, and e when $f(x)$ is replaced by $af(x)$, $f(x) + d$, and $f(x - c)$ for specific positive and negative real values of a, c, and d.
					(6) Cubic, cube root, absolute value and rational functions, equations, and inequalities. The student applies mathematical processes to understand that cubic, cube root, absolute value and rational functions, equations, and inequalities can be used to model situations, solve problems, and make predictions. The student is expected to:
(B) describe the process for graphing ordered pairs of numbers in the first quadrant of the coordinate plane.					(A) analyze the effect on the graphs of $f(x) = x^3$ and $f(x) = \sqrt[3]{x}$ when $f(x)$ is replaced by $af(x)$, $f(bx)$, $f(x - c)$, and $f(x) + d$ for specific positive and negative real values of a, b, c, and d.
(C) graph in the first quadrant of the coordinate plane ordered pairs of numbers arising from mathematical and real-world problems, including those generated by number patterns or found in an input-output table.					(G) analyze the effect on the graphs of $f(x) = 1/x$ when $f(x)$ is replaced by $af(x)$, $f(bx)$, $f(x - c)$, and $f(x) + d$ for specific positive & negative real values of a, b, c, & d.

Grade 5	Grade 6	Grade 7	Grade 8	Algebra I	Algebra II
Representing Data					
(9) Data analysis. The student applies mathematical process standards to solve problems by collecting, organizing, displaying, and interpreting data. The student is expected to:	(12) Measurement and data. The student applies mathematical process standards to use numerical or graphical representations to analyze problems. The student is expected to:				
(A) represent categorical data with bar graphs or frequency tables and numerical data, including data sets of measurements in fractions or decimals, with dot plots or stem-and-leaf plots.	(A) represent numeric data graphically, including dot plots, stem-and-leaf plots, histograms, and box plots.				
Drawing Conclusions and Solving Problems Using Representations of Data					
(9) Data analysis. The student applies mathematical process standards to solve problems by collecting, organizing, displaying, and interpreting data. The student is expected to:	(13) Measurement and data. The student applies mathematical process standards to use numerical or graphical representations to solve problems. The student is expected to:				
(C) solve one- and two-step problems using data from a frequency table, dot plot, bar graph, stem-and-leaf plot, or scatterplot.	(A) interpret numeric data summarized in dot plots, stem-and-leaf plots, histograms, and box plots.				
	(B) distinguish between situations that yield data with and without variability.				

Grade 5	Grade 6	Grade 7	Grade 8	Algebra I	Algebra II
	Describing Data Distribution and Drawing Inferences				
	(12) Measurement and data. The student applies mathematical process standards to use numerical or graphical representations to analyze problems. The student is expected to:	(12) Measurement and data. The student applies mathematical process standards to use statistical representations to analyze data. The student is expected to:	(11) Measurement and data. The student applies mathematical process standards to use statistical procedures to describe data. The student is expected to:		
	(B) use the graphical representation of numeric data to describe the center, spread, and shape of the data distribution.	(A) compare two groups of numeric data using comparative dot plots or box plots by comparing their shapes, centers, and spreads.	(B) determine the mean absolute deviation and use this quantity as a measure of the average distance data are from the mean using a data set of no more than 10 data points.		
	(C) summarize numeric data with numerical summaries, including the mean and median (measures of center) and the range and interquartile range (IQR) (measures of spread), and use these summaries to describe the center, spread, and shape of the data distribution.				
	(D) summarize categorical data with numerical and graphical summaries, including the mode, the percent of values in each category (relative frequency table), and the percent bar graph, and use these summaries to describe the data distribution.				
		(B) use data from a random sample to make inferences about a population.			

Grade 5	Grade 6	Grade 7	Grade 8	Algebra I	Algebra II
		Describing Data Distribution and Drawing Inferences			
		(12) Measurement and data. The student applies mathematical process standards to use statistical representations to analyze data. The student is expected to:	(11) Measurement and data. The student applies mathematical process standards to use statistical procedures to describe data. The student is expected to:		
		(C) compare two populations based on data in random samples from these populations, including informal comparative inferences about differences between the two populations.	(C) simulate generating random samples of the same size from a population with known characteristics to develop the notion of a random sample being representative of the population from which it was selected.		

Grade 5	Grade 6	Grade 7	Grade 8	Algebra I	Algebra II
	Considering Income and Careers				
(10) Personal financial literacy. The student applies mathematical process standards to manage one's financial resources effectively for lifetime financial security. The student is expected to:	(14) Personal financial literacy. The student applies mathematical process standards to develop an economic way of thinking and problem solving useful in one's life as a knowledgeable consumer and investor. The student is expected to:	(13) Personal financial literacy. The student applies mathematical process standards to develop an economic way of thinking and problem solving useful in one's life as a knowledgeable consumer and investor. The student is expected to:			
(A) define income tax, payroll tax, sales tax, and property tax.		(A) calculate the sales tax for a given purchase and calculate income tax for earned wages.			
(B) explain the difference between gross income and net income.	(H) compare the annual salary of several occupations requiring various levels of post-secondary education or vocational training and calculate the effects of the different annual salaries on lifetime income.				
		Considering Saving and Investing			
		(13) Personal financial literacy. The student applies mathematical process standards to develop an economic way of thinking and problem solving useful in one's life as a knowledgeable consumer and investor. The student is expected to:	(12) Personal financial literacy. The student applies mathematical process standards to develop an economic way of thinking and problem solving useful in one's life as a knowledgeable consumer and investor. The student is expected to:		
		(E) calculate and compare simple interest and compound interest earnings.	(D) calculate and compare simple interest and compound interest earnings.		
	(G) explain various methods to pay for college, including through savings, grants, scholarships, student loans, and work-study.		(C) explain how small amounts of money invested regularly, including money saved for college and retirement, grow over time.		
			(G) estimate the cost of a two-year and four-year college education, including family contribution, and devise a periodic savings plan for accumulating the money needed to contribute to the total cost of attendance for at least the first year of college.		

Grade 5	Grade 6	Grade 7	Grade 8	Algebra I	Algebra II
Considering Credit and Debt					
(10) Personal financial literacy. The student applies mathematical process standards to manage one's financial resources effectively for lifetime financial security. The student is expected to:	(14) Personal financial literacy. The student applies mathematical process standards to develop an economic way of thinking and problem solving useful in one's life as a knowledgeable consumer and investor. The student is expected to:	(13) Personal financial literacy. The student applies mathematical process standards to develop an economic way of thinking and problem solving useful in one's life as a knowledgeable consumer and investor. The student is expected to:	(12) Personal financial literacy. The student applies mathematical process standards to develop an economic way of thinking and problem solving useful in one's life as a knowledgeable consumer and investor. The student is expected to:		
		(F) analyze and compare monetary incentives, including sales, rebates, and coupons.			
(C) identify the advantages and disadvantages of different methods of payment, including check, credit card, debit card, and electronic payments.	(B) distinguish between debit cards and credit cards.		(A) solve real-world problems comparing how interest rate and loan length affect the cost of credit.		
	(D) explain why it is important to establish a positive credit history.		(B) calculate the total cost of repaying a loan, including credit cards and easy access loans, under various rates of interest and over different periods using an online calculator.		
	(E) describe the information in a credit report and how long it is retained.				
	(F) describe the value of credit reports to borrowers and to lenders.		(E) identify and explain the advantages and disadvantages of different payment methods.		

Grade 5	Grade 6	Grade 7	Grade 8	Algebra I	Algebra II
Considering Planning and Money Management					
(10) Personal financial literacy. The student applies mathematical process standards to manage one's financial resources effectively for lifetime financial security. The student is expected to:	(14) Personal financial literacy. The student applies mathematical process standards to develop an economic way of thinking and problem solving useful in one's life as a knowledgeable consumer and investor. The student is expected to:	(13) Personal financial literacy. The student applies mathematical process standards to develop an economic way of thinking and problem solving useful in one's life as a knowledgeable consumer and investor. The student is expected to:	(12) Personal financial literacy. The student applies mathematical process standards to develop an economic way of thinking and problem solving useful in one's life as a knowledgeable consumer and investor. The student is expected to:		
			(F) analyze situations to determine if they represent financially responsible decisions and identify the benefits of financial responsibility and the costs of financial irresponsibility.		
	(A) compare the features and costs of a checking account and a debit card offered by different local financial institutions.				
(D) develop a system for keeping and using financial records.	(C) balance a check register that includes deposits, withdrawals, and transfers.	(C) create and organize a financial assets and liabilities record and construct a net worth statement.			
(E) describe actions that might be taken to balance a budget when expenses exceed income.					
(F) balance a simple budget.		(B) identify the components of a personal budget, including income; planned savings for college, retirement, and emergencies; taxes; fixed and variable expenses, and calculate what percentage each category comprises of the total budget.			
		(D) use a family budget estimator to determine the minimum household budget and average hourly wage needed for a family to meet its basic needs in the student's city or another large city nearby.			

Grade 5	Grade 6	Grade 7	Grade 8	Algebra I	Algebra II
				Representing Quadratic Functions	
				(6) Quadratic functions and equations. The student applies the mathematical process standards when using properties of quadratic functions to write and represent in multiple ways, with and without technology, quadratic equations. The student is expected to:	(4) Quadratic and square root functions, equations, and inequalities. The student applies mathematical processes to understand that quadratic and square root functions, equations, and quadratic inequalities can be used to model situations, solve problems, and make predictions. The student is expected to:
				(B) write equations of quadratic functions given the vertex and another point on the graph, write the equation in vertex form ($f(x) = a(x - h)^2 + k$), and rewrite the equation from vertex form to standard form ($f(x) = ax^2 + bx + c$).	(B) write the equation of a parabola using given attributes, including vertex, focus, directrix, axis of symmetry, and direction of opening.
					(D) transform a quadratic function $f(x) = ax^2 + bx + c$ to the form $f(x) = a(x - h)^2 + k$ to identify the different attributes of $f(x)$.
				C) write quadratic functions when given real solutions and graphs of their related equations.	(A) write the quadratic function given three specified points in the plane.
				Solving Quadratic Equations and Inequalities	
				(8) Quadratic functions and equations. The student applies the mathematical process standards to solve, with and without technology, quadratic equations and evaluate the reasonableness of their solutions. The student formulates statistical relationships and evaluates their reasonableness based on real-world data. The student is expected to:	(4) Quadratic and square root functions, equations, and inequalities. The student applies mathematical processes to understand that quadratic and square root functions, equations, and quadratic inequalities can be used to model situations, solve problems, and make predictions. The student is expected to:
					(G) identify extraneous solutions of square root equations.
				(A) solve quadratic equations having real solutions by factoring, taking square roots, completing the square, and applying the quadratic formula.	(F) solve quadratic and square root equations.
					(H) solve quadratic inequalities.

Grade 5	Grade 6	Grade 7	Grade 8	Algebra I	Algebra II
				Representing Exponential Equations	
				(9) Exponential functions and equations. The student applies the mathematical process standards when using properties of exponential functions and their related transformations to write, graph, and represent in multiple ways exponential equations and evaluate, with and without technology, the reasonableness of their solutions. The student formulates statistical relationships and evaluates their reasonableness based on real-world data. The student is expected to:	(5) Exponential and logarithmic functions and equations. The student applies mathematical processes to understand that exponential and logarithmic functions can be used to model situations and solve problems. The student is expected to:
				(C) write exponential functions in the form $f(x) = ab^x$ (where b is a rational number) to describe problems arising from mathematical and real-world situations, including growth and decay.	(B) formulate exponential and logarithmic equations that model real-world situations, including exponential relationships written in recursive notation.
					(C) rewrite exponential equations as their corresponding logarithmic equations and logarithmic equations as their corresponding exponential equations.

Grade 5	Grade 6	Grade 7	Grade 8	Algebra I	Algebra II
					Solving Exponential Equations
					(5) Exponential and logarithmic functions and equations. The student applies mathematical processes to understand that exponential and logarithmic functions can be used to model situations and solve problems. The student is expected to:
					(D) solve exponential equations of the form $y = ab^x$ where a is a nonzero real number and b is greater than zero and not equal to one and single logarithmic equations having real solutions.
					(E) determine the reasonableness of a solution to a logarithmic equation.
				Representing, Evaluating, and Solving in Mathematical and Other Contexts	
				(12) Number and algebraic methods. The student applies the mathematical process standards and algebraic methods to write, solve, analyze, and evaluate equations, relations, and functions. The student is expected to:	(2) Attributes of functions and their inverses. The student applies mathematical processes to understand that functions have distinct key attributes and understand the relationship between a function and its inverse. The student is expected to:
				(A) decide whether relations represented verbally, tabularly, graphically, and symbolically define a function.	(C) describe and analyze the relationship between a function and its inverse (quadratic and square root, logarithmic and exponential), including the restriction(s) on domain, which will restrict its range.
				(B) evaluate functions, expressed in function notation, given one or more elements in their domains.	
				(E) solve mathematic and scientific formulas, and other literal equations, for a specified variable.	(B) graph and write the inverse of a function using notation such as $f^{-1}(x)$.
					(D) use the composition of two functions, including the necessary restrictions on the domain, to determine if the functions are inverses of each other.

Grade 5	Grade 6	Grade 7	Grade 8	Algebra I	Algebra II
				Representing, Evaluating, and Solving in Mathematical and Other Contexts	
				(11) Number and algebraic methods. The student applies the mathematical process standards and algebraic methods to rewrite algebraic expressions into equivalent forms. The student is expected to:	(7) Number and algebraic methods. The student applies mathematical processes to simplify and perform operations on expressions and to solve equations. The student is expected to:
				(B) simplify numeric and algebraic expressions using the laws of exponents, including integral and rational exponents.	(H) solve equations involving rational exponents.
					(6) Cubic, cube root, absolute value and rational functions, equations, and inequalities. The student applies mathematical processes to understand that cubic, cube root, absolute value and rational functions, equations, and inequalities can be used to model situations, solve problems, and make predictions. The student is expected to:
					(B) solve cube root equations that have real roots.
					(I) solve rational equations that have real solutions.
					(J) determine the reasonableness of a solution to a rational equation.

Grade 5	Grade 6	Grade 7	Grade 8	Algebra I	Algebra II
				Other Nonlinear Representations	
				(11) Number and algebraic methods. The student applies the mathematical process standards and algebraic methods to rewrite algebraic expressions into equivalent forms. The student is expected to:	(7) Number and algebraic methods. The student applies mathematical processes to simplify and perform operations on expressions and to solve equations. The student is expected to:
				(A) simplify numerical radical expressions involving square roots.	(G) rewrite radical expressions that contain variables to equivalent forms.
				(12) Number and algebraic methods. The student applies the mathematical process standards and algebraic methods to write, solve, analyze, and evaluate equations, relations, and functions. The student is expected to:	(5) Exponential and logarithmic functions and equations. The student applies mathematical processes to understand that exponential and logarithmic functions can be used to model situations and solve problems. The student is expected to:
				(C) identify terms of arithmetic and geometric sequences when the sequences are given in function form using recursive processes.	(B) formulate exponential and logarithmic equations that model real-world situations, including exponential relationships written in recursive notation.
				(D) write a formula for the n^{th} term of arithmetic and geometric sequences, given the value of several of their terms.	(6) Cubic, cube root, absolute value and rational functions, equations, and inequalities. The student applies mathematical processes to understand that cubic, cube root, absolute value and rational functions, equations, and inequalities can be used to model situations, solve problems, and make predictions. The student is expected to:
					(D) formulate absolute value linear equations.
					(H) formulate rational equations that model real-world situations.