DesCartes: A Continuum of Learning®

Mathematics

Goal: Operations and Algebraic Thinking

RIT Score Range: < 171

Skills and Concepts to Develop (50% Probability*) < 171	Skills and Concepts to Introduce (27% Probability*) 171 - 180
Expressions and Equations	Expressions and Equations
• Solves basic-facts open sentences - addition and subtraction	• Represents a basic facts addition problem with a number sentence
	• Solves basic-facts open sentences - addition and subtraction
	• Solves linear equations with basic facts - 1-step addition using a letter for the variable
	• Solves basic facts open sentences - multiplication and division
	• Writes a number sentence for a simple problem solving situation
	• Writes equivalent forms of whole number expressions (e.g., 15 + 5 = 10 + 10)
Use Functions to Model Relationships	Use Functions to Model Relationships
	• Extends a growing arithmetic pattern, defined by numbers
	• Analyzes a growing, arithmetic pattern with numbers to determine the rule
New Vocabulary: None	*New Vocabulary:* None
New Signs and Symbols: + addition, = is equal to, - subtraction, variable	*New Signs and Symbols:* None

Common Core 3.4.1

Mathematics

Goal: Operations and Algebraic Thinking

RIT Score Range: 171 - 180

Skills and concepts to Enhance (73% Probability*) < 170	Skills and Concepts to Develop (50% Probability*) 171 - 180	Skills and Concepts to Introduce (27% Probability*) 181 - 190
Expressions and Equations	Expressions and Equations	Expressions and Equations
• Solves basic-facts open sentences - addition and subtraction	• Represents a basic facts addition problem with a number sentence • Solves basic-facts open sentences - addition and subtraction • Solves linear equations with basic facts - 1-step addition using a letter for the variable • Solves basic facts open sentences - multiplication and division • Writes a number sentence for a simple problem solving situation • Writes equivalent forms of whole number expressions (e.g., 15 + 5 = 10 + 10)	• Solves real-world whole number problems involving subtraction with numbers under 1000 • Demonstrates an understanding of the zero property of multiplication • Solves basic facts addition and subtraction open sentences using diagrams and models (e.g., using balances) • Solves linear equations with basic facts - 1-step addition using a letter for the variable • Solves 1-step open sentences with missing addends (numbers 100 and under) • Writes a number sentence for a simple problem solving situation • Writes equivalent forms of whole numbers 11 to 20 using addition (e.g., 14 = 7 + 7)
Use Functions to Model Relationships	Use Functions to Model Relationships	Use Functions to Model Relationships
	• Extends a growing arithmetic pattern, defined by numbers • Analyzes a growing, arithmetic pattern with numbers to determine the rule	• Extends a growing arithmetic pattern, defined by numbers • Analyzes a growing, arithmetic pattern with numbers to determine the rule • Identifies transformations of plane figures (translations/slides) • Reads data in a line graph - no calculations
New Vocabulary: None	*New Vocabulary:* None	*New Vocabulary:* None
New Signs and Symbols: + addition, = is equal to, - subtraction, variable	*New Signs and Symbols:* None	*New Signs and Symbols:* × multiplication

Common Core 3.4.1

Skills and concepts to Enhance (73% Probability*) 171 - 180	Skills and Concepts to Develop (50% Probability*) 181 - 190	Skills and Concepts to Introduce (27% Probability*) 191 - 200
Expressions and Equations	Expressions and Equations	Expressions and Equations
• Represents a basic facts addition problem with a number sentence • Solves basic-facts open sentences - addition and subtraction • Solves linear equations with basic facts - 1-step addition using a letter for the variable • Solves basic facts open sentences - multiplication and division • Writes a number sentence for a simple problem solving situation • Writes equivalent forms of whole number expressions (e.g., 15 + 5 = 10 + 10)	• Solves real-world whole number problems involving subtraction with numbers under 1000 • Demonstrates an understanding of the zero property of multiplication • Solves basic facts addition and subtraction open sentences using diagrams and models (e.g., using balances) • Solves linear equations with basic facts - 1-step addition using a letter for the variable • Solves 1-step open sentences with missing addends (numbers 100 and under) • Writes a number sentence for a simple problem solving situation • Writes equivalent forms of whole numbers 11 to 20 using addition (e.g., 14 = 7 + 7)	• Solves 1-step open sentences with missing addends (numbers over 100) • Solves real-world whole number problems involving subtraction with numbers under 1000 • Solves whole number subtraction word problems with numbers over 1000 • Evaluates numerical expressions using grouping symbols (whole numbers only) • Demonstrates an understanding of the zero property of multiplication • Computes half price (multiplication/division) • Uses algebraic reasoning to solve problems involving equality relationships • Solves 1-step open sentences with missing addends (numbers 100 and under) • Solves simple open sentences with missing factors (numbers 100 and under) • Solves 2-step open sentences with missing addends • Writes equivalent forms of whole numbers 11 to 20 using addition (e.g., 14 = 7 + 7)
Use Functions to Model Relationships	Use Functions to Model Relationships	Use Functions to Model Relationships
• Extends a growing arithmetic pattern, defined by numbers • Analyzes a growing, arithmetic pattern with numbers to determine the rule	• Extends a growing arithmetic pattern, defined by numbers • Analyzes a growing, arithmetic pattern with numbers to determine the rule • Identifies transformations of plane figures (translations/slides) • Reads data in a line graph - no calculations	• Extends a growing arithmetic pattern, defined by objects or diagrams • Analyzes a growing, arithmetic pattern with numbers to determine the rule • Completes a simple function table based on real-life situations (e.g., the number of tricycles related to the number of wheels) • Reads data in a line graph - no calculations
New Vocabulary: None	*New Vocabulary:* None	*New Vocabulary:* longer
New Signs and Symbols: None	*New Signs and Symbols:* × multiplication	*New Signs and Symbols:* ( ) order of operations, ÷ division, $ dollar sign

Skills and concepts to Enhance (73% Probability*) 181 - 190	Skills and Concepts to Develop (50% Probability*) 191 - 200	Skills and Concepts to Introduce (27% Probability*) 201 - 210
Expressions and Equations	**Expressions and Equations**	**Expressions and Equations**
• Solves real-world whole number problems involving subtraction with numbers under 1000 • Demonstrates an understanding of the zero property of multiplication • Solves basic facts addition and subtraction open sentences using diagrams and models (e.g., using balances) • Solves linear equations with basic facts - 1-step addition using a letter for the variable • Solves 1-step open sentences with missing addends (numbers 100 and under) • Writes a number sentence for a simple problem solving situation • Writes equivalent forms of whole numbers 11 to 20 using addition (e.g., 14 = 7 + 7)	• Solves 1-step open sentences with missing addends (numbers over 100) • Solves real-world whole number problems involving subtraction with numbers under 1000 • Solves whole number subtraction word problems with numbers over 1000 • Evaluates numerical expressions using grouping symbols (whole numbers only) • Demonstrates an understanding of the zero property of multiplication • Computes half price (multiplication/division) • Uses algebraic reasoning to solve problems involving equality relationships • Solves 1-step open sentences with missing addends (numbers 100 and under) • Solves simple open sentences with missing factors (numbers 100 and under) • Solves 2-step open sentences with missing addends • Writes equivalent forms of whole numbers 11 to 20 using addition (e.g., 14 = 7 + 7)	• Uses rounding to estimate answers to 2-step problems involving money (using decimals) • Solves whole number subtraction word problems with numbers over 1000 • Evaluates numerical expressions using grouping symbols (whole numbers only) • Demonstrates an understanding of the commutative property of addition • Understands equivalence and extends the concept to number sentences involving variables (e.g., 8 + 2 = [] + 2) • Uses algebraic reasoning to solve problems involving equality relationships • Uses simple linear equations to represent problem situations • Describes a realistic situation using information given in a linear equation • Solves 1-step open sentences with missing addends (numbers over 100) • Solves simple open sentences with missing factors (numbers 100 and under) • Solves 2-step open sentences with missing addends • Solves open sentences with basic-facts calculations on both sides of the sentence • Translates a 2-step problem to a symbolic expression or equation • Solves real-world problems using reasoning strategies
Use Functions to Model Relationships	**Use Functions to Model Relationships**	**Use Functions to Model Relationships**
• Extends a growing arithmetic pattern, defined by numbers • Analyzes a growing, arithmetic pattern with numbers to determine the rule • Identifies transformations of plane figures (translations/slides) • Reads data in a line graph - no calculations	• Extends a growing arithmetic pattern, defined by objects or diagrams • Analyzes a growing, arithmetic pattern with numbers to determine the rule • Completes a simple function table based on real-life situations (e.g., the number of tricycles related to the number of wheels) • Reads data in a line graph - no calculations	• Completes a function table given a simple rule (e.g., x + 2) • Extends a growing arithmetic pattern, defined by objects or diagrams • Completes a simple function table based on real-life situations (e.g., the number of tricycles related to the number of wheels) • Predicts from simple charts and tables
New Vocabulary: None	*New Vocabulary:* longer	*New Vocabulary:* minimum, plus
New Signs and Symbols: × multiplication	*New Signs and Symbols:* ( ) order of operations, ÷ division, $ dollar sign	*New Signs and Symbols:* °C degrees Celsius, = is equal to, min minute, - negative number, p.m., + positive number

Skills and concepts to Enhance (73% Probability*) 191 - 200	Skills and Concepts to Develop (50% Probability*) 201 - 210	Skills and Concepts to Introduce (27% Probability*) 211 - 220
Expressions and Equations	**Expressions and Equations**	**Expressions and Equations**
• Solves 1-step open sentences with missing addends (numbers over 100) • Solves real-world whole number problems involving subtraction with numbers under 1000 • Solves whole number subtraction word problems with numbers over 1000 • Evaluates numerical expressions using grouping symbols (whole numbers only) • Demonstrates an understanding of the zero property of multiplication • Computes half price (multiplication/division) • Uses algebraic reasoning to solve problems involving equality relationships • Solves 1-step open sentences with missing addends (numbers 100 and under) • Solves simple open sentences with missing factors (numbers 100 and under) • Solves 2-step open sentences with missing addends • Writes equivalent forms of whole numbers 11 to 20 using addition (e.g., 14 = 7 + 7)	• Uses rounding to estimate answers to 2-step problems involving money (using decimals) • Solves whole number subtraction word problems with numbers over 1000 • Evaluates numerical expressions using grouping symbols (whole numbers only) • Demonstrates an understanding of the commutative property of addition • Understands equivalence and extends the concept to number sentences involving variables (e.g., 8 + 2 = [] + 2) • Uses algebraic reasoning to solve problems involving equality relationships • Uses simple linear equations to represent problem situations • Describes a realistic situation using information given in a linear equation • Solves 1-step open sentences with missing addends (numbers over 100) • Solves simple open sentences with missing factors (numbers 100 and under) • Solves 2-step open sentences with missing addends • Solves open sentences with basic-facts calculations on both sides of the sentence • Translates a 2-step problem to a symbolic expression or equation • Solves real-world problems using reasoning strategies	• Uses rounding to estimate answers to 2-step problems involving money (using decimals) • Demonstrates an understanding of the associative property of multiplication • Demonstrates an understanding of the distributive property of multiplication by decomposing a term • Calculates the value of a power (e.g., 2^3 = 8) • Uses a table of input/output values to represent patterns • Understands equivalence and extends the concept to number sentences involving variables (e.g., 8 + 2 = [] + 2) • Uses algebraic reasoning to solve problems involving equality relationships • Uses simple linear equations to represent problem situations • Solves simple open sentences with missing factors (numbers over 100) • Solves open sentences using the distributive property • Solves open sentences with calculations on both sides of the sentence • Solves 2-step open sentences with missing factors • Solves 1-step linear equations • Applies algebraic methods to solve theoretical problems • Translates a 2-step problem to a symbolic expression or equation • Solves real-world problems using reasoning strategies • Uses powers to represent 10, 100, 1000, 10,000, and 100,000
Use Functions to Model Relationships	**Use Functions to Model Relationships**	**Use Functions to Model Relationships**
• Extends a growing arithmetic pattern, defined by objects or diagrams • Analyzes a growing, arithmetic pattern with numbers to determine the rule • Completes a simple function table based on real-life situations (e.g., the number of tricycles related to the number of wheels) • Reads data in a line graph - no calculations	• Completes a function table given a simple rule (e.g., x + 2) • Extends a growing arithmetic pattern, defined by objects or diagrams • Completes a simple function table based on real-life situations (e.g., the number of tricycles related to the number of wheels) • Predicts from simple charts and tables	• Completes a function table given a simple rule (e.g., x + 2) • Solves problems involving simple functions • Looks for a growing pattern to solve a problem • Interprets data in line graphs (e.g., change over time)
New Vocabulary: longer	*New Vocabulary:* minimum, plus	*New Vocabulary:* None
New Signs and Symbols: ( ) order of operations, ÷ division, $ dollar sign	*New Signs and Symbols:* °C degrees Celsius, = is equal to, min minute, - negative number, p.m., + positive number	*New Signs and Symbols:* ( ) parenthesis around an integer, a.m., ¢ cent sign, °F degrees Fahrenheit, $ dollar sign, lb pound, mph miles per hour

Explanatory Notes

* At the range mid-point, this is the probability students would correctly answer items measuring these concepts and skills. Both data from test items and review by NWEA curriculum specialists are used to place Learning Continuum statements into appropriate RIT ranges. Blank cells indicate data are limited or unavailable for this range or document version.

Common Core 3.4.1

DesCartes: A Continuum of Learning®

Mathematics

Goal: Operations and Algebraic Thinking

RIT Score Range: 211 - 220

Skills and concepts to Enhance (73% Probability*) 201 - 210	Skills and Concepts to Develop (50% Probability*) 211 - 220	Skills and Concepts to Introduce (27% Probability*) 221 - 230
Expressions and Equations	Expressions and Equations	Expressions and Equations
• Uses rounding to estimate answers to 2-step problems involving money (using decimals) • Solves whole number subtraction word problems with numbers over 1000 • Evaluates numerical expressions using grouping symbols (whole numbers only) • Demonstrates an understanding of the commutative property of addition • Understands equivalence and extends the concept to number sentences involving variables (e.g., 8 + 2 = [] + 2) • Uses algebraic reasoning to solve problems involving equality relationships • Uses simple linear equations to represent problem situations • Describes a realistic situation using information given in a linear equation • Solves 1-step open sentences with missing addends (numbers over 100) • Solves simple open sentences with missing factors (numbers 100 and under) • Solves 2-step open sentences with missing addends • Solves open sentences with basic-facts calculations on both sides of the sentence • Translates a 2-step problem to a symbolic expression or equation • Solves real-world problems using reasoning strategies	• Uses rounding to estimate answers to 2-step problems involving money (using decimals) • Demonstrates an understanding of the associative property of multiplication • Demonstrates an understanding of the distributive property of multiplication by decomposing a term • Calculates the value of a power (e.g., 2^3 = 8) • Uses a table of input/output values to represent patterns • Understands equivalence and extends the concept to number sentences involving variables (e.g., 8 + 2 = [] + 2) • Uses algebraic reasoning to solve problems involving equality relationships • Uses simple linear equations to represent problem situations • Solves simple open sentences with missing factors (numbers over 100) • Solves open sentences using the distributive property • Solves open sentences with calculations on both sides of the sentence • Solves 2-step open sentences with missing factors • Solves 1-step linear equations • Applies algebraic methods to solve theoretical problems • Translates a 2-step problem to a symbolic expression or equation • Solves real-world problems using reasoning strategies • Uses powers to represent 10, 100, 1000, 10,000, and 100,000	• Solves real-world problems involving rate of pay • Solves difficult real-world problems involving decimals (e.g., multiple multiplications, conversions) • Uses the distributive property • Calculates the value of a power (e.g., 2^3 = 8) • Solves problems involving simple interest rates with the formula • Uses a table of input/output values to represent patterns • Uses basic operations on algebraic expressions (substituting for unknowns) • Recognizes commutative, associative, distributive, symmetric, transitive, and reflexive properties • Uses basic operations on algebraic expressions (expanding - monomial by a binomial) • Demonstrates an understanding of properties (e.g., commutative, associative, distributive, properties of 0) • Writes equivalent forms of algebraic expressions (e.g., (x + 3)/2 = x/2 + 3/2) • Represents relationships of quantities in the form of an expression • Uses basic operations on algebraic expressions (uses correct order of operations) • Expresses a simple linear equation from a contextual situation • Solves open sentences with calculations on both sides of the sentence • Solves 2-step open sentences with missing factors • Solves 1-step linear equations • Solves 2-step linear equations • Solves linear equations with decimals • Solves linear equations with integers • Writes equivalent forms of algebraic equations using addition and subtraction • Solves open sentences with decimals • Solves linear equations in a real-world context using a given formula • Applies algebraic methods to solve theoretical problems • Applies algebraic methods to solve real-world problems • Uses graphs to solve simple systems of linear equations • Applies systems-of-linear-equations methods to solve theoretical problems • Describes the relationship or a real-world situation represented by a simple linear inequality (e.g., 1- or 2-step) • Solves real-world problems using reasoning strategies • Uses powers to represent 10, 100, 1000, 10,000, and 100,000

Skills and concepts to Enhance (73% Probability*) 201 - 210	Skills and Concepts to Develop (50% Probability*) 211 - 220	Skills and Concepts to Introduce (27% Probability*) 221 - 230
Expressions and Equations	Expressions and Equations	Expressions and Equations
		• Writes a number expressed in scientific notation in standard form
Use Functions to Model Relationships	Use Functions to Model Relationships	Use Functions to Model Relationships
• Completes a function table given a simple rule (e.g., x + 2) • Extends a growing arithmetic pattern, defined by objects or diagrams • Completes a simple function table based on real-life situations (e.g., the number of tricycles related to the number of wheels) • Predicts from simple charts and tables	• Completes a function table given a simple rule (e.g., x + 2) • Solves problems involving simple functions • Looks for a growing pattern to solve a problem • Interprets data in line graphs (e.g., change over time)	• Extends a growing pattern of triangular numbers, defined by objects or diagrams • Represents geometric sequences using written descriptions in recursive terms (present term, next term) • Solves problems involving simple functions • Looks for a growing pattern to solve a problem
New Vocabulary: minimum, plus	*New Vocabulary:* None	*New Vocabulary:* algebra, net, reflexive, short, transitive
New Signs and Symbols: °C degrees Celsius, = is equal to, min minute, - negative number, p.m., + positive number	*New Signs and Symbols:* ( ) parenthesis around an integer, a.m., ¢ cent sign, °F degrees Fahrenheit, $ dollar sign, lb pound, mph miles per hour	*New Signs and Symbols:* < less than, m meter/metre, repeating decimal overbar, triangle

Skills and concepts to Enhance (73% Probability*) 211 - 220	Skills and Concepts to Develop (50% Probability*) 221 - 230	Skills and Concepts to Introduce (27% Probability*) 231 - 240
Expressions and Equations	Expressions and Equations	Expressions and Equations
• Uses rounding to estimate answers to 2-step problems involving money (using decimals) • Demonstrates an understanding of the associative property of multiplication • Demonstrates an understanding of the distributive property of multiplication by decomposing a term • Calculates the value of a power (e.g., 2^3 = 8) • Uses a table of input/output values to represent patterns • Understands equivalence and extends the concept to number sentences involving variables (e.g., 8 + 2 = [] + 2) • Uses algebraic reasoning to solve problems involving equality relationships • Uses simple linear equations to represent problem situations • Solves simple open sentences with missing factors (numbers over 100) • Solves open sentences using the distributive property • Solves open sentences with calculations on both sides of the sentence • Solves 2-step open sentences with missing factors • Solves 1-step linear equations • Applies algebraic methods to solve theoretical problems • Translates a 2-step problem to a symbolic expression or equation • Solves real-world problems using reasoning strategies • Uses powers to represent 10, 100, 1000, 10,000, and 100,000	• Solves real-world problems involving rate of pay • Solves difficult real-world problems involving decimals (e.g., multiple multiplications, conversions) • Uses the distributive property • Calculates the value of a power (e.g., 2^3 = 8) • Solves problems involving simple interest rates with the formula • Uses a table of input/output values to represent patterns • Uses basic operations on algebraic expressions (substituting for unknowns) • Recognizes commutative, associative, distributive, symmetric, transitive, and reflexive properties • Uses basic operations on algebraic expressions (expanding - monomial by a binomial) • Demonstrates an understanding of properties (e.g., commutative, associative, distributive, properties of 0) • Writes equivalent forms of algebraic expressions (e.g., (x + 3)/2 = x/2 + 3/2) • Represents relationships of quantities in the form of an expression • Uses basic operations on algebraic expressions (uses correct order of operations) • Expresses a simple linear equation from a contextual situation • Solves open sentences with calculations on both sides of the sentence • Solves 2-step open sentences with missing factors • Solves 1-step linear equations • Solves 2-step linear equations • Solves linear equations with decimals • Solves linear equations with integers • Writes equivalent forms of algebraic equations using addition and subtraction • Solves open sentences with decimals • Solves linear equations in a real-world context using a given formula • Applies algebraic methods to solve theoretical problems • Applies algebraic methods to solve real-world problems • Uses graphs to solve simple systems of linear equations • Applies systems-of-linear-equations methods to solve theoretical problems • Describes the relationship or a real-world situation represented by a simple linear inequality (e.g., 1- or 2-step) • Solves real-world problems using reasoning strategies • Uses powers to represent 10, 100, 1000, 10,000, and 100,000	• Uses graphs to solve simple systems of linear equations • Evaluates numerical expressions using the order of operations (whole numbers only) • Evaluates expressions using the order of operations, including exponents (whole numbers only) • Solves real-world problems involving rate of pay • Solves real-world problems involving rate of pay with time and a half • Solves difficult real-world problems involving decimals (e.g., multiple multiplications, conversions) • Evaluates numerical expressions using the order of operations (using integers) • Divides rational expressions in a/b form • Uses the distributive property • Calculates the power of a number (e.g., 8 = 2^3) • Evaluates expressions containing powers (e.g., 3^2 x 2^3) • Applies rules for multiplying and dividing powers • Solves problems with scientific notation • Describes and uses a variable with whole numbers, multiplication, and division in a contextual situation • Uses expressions to represent situations that involve variable quantities with exponents • Uses basic operations on algebraic expressions (substituting for unknowns) • Uses basic operations on algebraic expressions (substituting for unknown exponents) • Recognizes commutative, associative, distributive, symmetric, transitive, and reflexive properties • Uses basic operations on algebraic expressions (combining like terms) • Uses basic operations on algebraic expressions (expanding - monomial by a binomial) • Writes equivalent forms of algebraic expressions (e.g., (x + 3)/2 = x/2 + 3/2) • Represents relationships of quantities in the form of an expression • Uses basic operations on algebraic expressions (uses correct order of operations) • Expresses a simple linear equation from a contextual situation • Solves 2-step open sentences with missing factors (variables on both sides of the sentence) • Solves 2-step linear equations • Solves linear equations with integers • Solves linear equations with fractions

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Skills and concepts to Enhance (73% Probability*) 211 - 220	Skills and Concepts to Develop (50% Probability*) 221 - 230	Skills and Concepts to Introduce (27% Probability*) 231 - 240
Expressions and Equations	Expressions and Equations	Expressions and Equations
	• Writes a number expressed in scientific notation in standard form	• Solves linear equations using rational numbers • Applies algebraic methods to solve real-world problems • Determines slope from a linear equation • Uses polynomial equations to solve complex real-world problems (e.g., using distributive property, variables on both sides) • Solves simple one-step inequality open sentences • Expresses a simple linear inequality from a contextual situation • Describes the relationship or a real-world situation represented by a simple linear inequality (e.g., 1- or 2-step) • Solves simple linear inequalities using graphs • Solves problems involving capacity in the metric system and converts to larger or smaller units • Converts from Celsius to Fahrenheit, given conversion ratios • Determines the prime factorization of a number • Writes a whole number in scientific notation
Use Functions to Model Relationships	Use Functions to Model Relationships	Use Functions to Model Relationships
• Completes a function table given a simple rule (e.g., x + 2) • Solves problems involving simple functions • Looks for a growing pattern to solve a problem • Interprets data in line graphs (e.g., change over time)	• Extends a growing pattern of triangular numbers, defined by objects or diagrams • Represents geometric sequences using written descriptions in recursive terms (present term, next term) • Solves problems involving simple functions • Looks for a growing pattern to solve a problem	• Solves problems involving complex functions • Solves problems involving simple functions • Interprets data given in line graphs to solve problems • Recognizes and extends arithmetic sequences (predicts nth term) • Recognizes and extends the Fibonacci sequence • Writes linear equations when given ordered pairs • Writes the equation of a horizontal or vertical line when given the graph of the line • Represents geometric sequences using written descriptions in recursive terms (present term, next term) • Represents real-world functions using an equation • Uses mapping diagrams to represent functions • Uses tables to determine function equations • Identifies the graph type, given equations of linear and nonlinear functions
New Vocabulary: None	*New Vocabulary:* algebra, net, reflexive, short, transitive	*New Vocabulary:* algebraic sentence, depreciate, equation of a line, is less than, regression equation, time-and-a-half
New Signs and Symbols: ( ) parenthesis around an integer, a.m., ¢ cent sign, °F degrees Fahrenheit, $ dollar sign, lb pound, mph miles per hour	*New Signs and Symbols:* < less than, m meter/metre, repeating decimal overbar, triangle	*New Signs and Symbols:* , , ( ) ordered pair, f(x) the value of the function f at x, > greater than, > greater than, greater than or equal to, km kilometer/kilometre, less than or equal to, • multiplication symbol (dot), - subtraction

Common Core 3.4.1

Skills and concepts to Enhance (73% Probability*) 221 - 230	Skills and Concepts to Develop (50% Probability*) 231 - 240	Skills and Concepts to Introduce (27% Probability*) 241 - 250
Expressions and Equations	Expressions and Equations	Expressions and Equations
• Solves real-world problems involving rate of pay	• Uses graphs to solve simple systems of linear equations	• Uses basic operations on algebraic expressions (uses correct order of operations)
• Solves difficult real-world problems involving decimals (e.g., multiple multiplications, conversions)	• Evaluates numerical expressions using the order of operations (whole numbers only)	• Uses linear equations to represent situations involving variable quantities
• Uses the distributive property	• Evaluates expressions using the order of operations, including exponents (whole numbers only)	• Solves 2-step open sentences with missing factors (variables on both sides of the sentence)
• Calculates the value of a power (e.g., 2^3 = 8)	• Solves real-world problems involving rate of pay	• Solves linear equations with fractions
• Solves problems involving simple interest rates with the formula	• Solves real-world problems involving rate of pay with time and a half	• Solves linear equations using rational numbers
• Uses a table of input/output values to represent patterns	• Solves difficult real-world problems involving decimals (e.g., multiple multiplications, conversions)	• Solves open sentences with fractions
• Uses basic operations on algebraic expressions (substituting for unknowns)	• Evaluates numerical expressions using the order of operations (using integers)	• Applies algebraic methods to solve real-world problems
• Recognizes commutative, associative, distributive, symmetric, transitive, and reflexive properties	• Divides rational expressions in a/b form	• Applies algebraic methods to solve a variety of real-world and theoretical problems
• Uses basic operations on algebraic expressions (expanding - monomial by a binomial)	• Uses the distributive property	• Solves problems involving consecutive numbers
• Demonstrates an understanding of properties (e.g., commutative, associative, distributive, properties of 0)	• Calculates the power of a number (e.g., 8 = 2^3)	• Evaluates expressions using the order of operations, including exponents (using integers)
• Writes equivalent forms of algebraic expressions (e.g., (x + 3)/2 = x/2 + 3/2)	• Evaluates expressions containing powers (e.g., 3^2 x 2^3)	• Evaluates expressions using the order of operations, including exponents (whole numbers only)
• Represents relationships of quantities in the form of an expression	• Applies rules for multiplying and dividing powers	• Solves real-world problems involving rate of pay with time and a half
• Uses basic operations on algebraic expressions (uses correct order of operations)	• Solves problems with scientific notation	• Evaluates numerical expressions using the order of operations (using integers)
• Expresses a simple linear equation from a contextual situation	• Describes and uses a variable with whole numbers, multiplication, and division in a contextual situation	• Solves problems involving simple interest rates without the formula
• Solves open sentences with calculations on both sides of the sentence	• Uses expressions to represent situations that involve variable quantities with exponents	• Simplifies rational expressions with scientific notation
• Solves 2-step open sentences with missing factors	• Uses basic operations on algebraic expressions (substituting for unknowns)	• Solves problems with scientific notation
• Solves 1-step linear equations	• Uses basic operations on algebraic expressions (substituting for unknown exponents)	• Describes and uses a variable with whole numbers, multiplication, and division in a contextual situation
• Solves 2-step linear equations	• Recognizes commutative, associative, distributive, symmetric, transitive, and reflexive properties	• Uses expressions to represent situations that involve variable quantities with exponents
• Solves linear equations with decimals	• Uses basic operations on algebraic expressions (combining like terms)	• Evaluates expressions by substituting with rational numbers
• Solves linear equations with integers	• Uses basic operations on algebraic expressions (expanding - monomial by a binomial)	• Simplifies polynomial expressions
• Writes equivalent forms of algebraic equations using addition and subtraction	• Writes equivalent forms of algebraic expressions (e.g., (x + 3)/2 = x/2 + 3/2)	• Multiplies binomials
• Solves open sentences with decimals	• Represents relationships of quantities in the form of an expression	• Factors trinomials in the form x^2 + bx + c
• Solves linear equations in a real-world context using a given formula	• Uses basic operations on algebraic expressions (uses correct order of operations)	• Factors polynomials using difference of squares
• Applies algebraic methods to solve theoretical problems	• Expresses a simple linear equation from a contextual situation	• Uses polynomial equations to solve complex real-world problems (e.g., using distributive property, variables on both sides)
• Applies algebraic methods to solve real-world problems	• Solves 2-step open sentences with missing factors (variables on both sides of the sentence)	• Uses algebraic methods to solve systems of linear equations
• Uses graphs to solve simple systems of linear equations	• Solves 2-step linear equations	• Solves simple one-step inequality open sentences
• Applies systems-of-linear-equations methods to solve theoretical problems	• Solves linear equations with integers	• Solves single variable linear inequalities with the variable in only one member using number lines
• Describes the relationship or a real-world situation represented by a simple linear inequality (e.g., 1- or 2-step)	• Solves linear equations with fractions	• Describes the relationship or a real-world situation represented by a simple linear inequality (e.g., 1- or 2-step)
• Solves real-world problems using reasoning strategies		• Solves linear inequalities using graphs
• Uses powers to represent 10, 100, 1000, 10,000, and 100,000		

Skills and concepts to Enhance (73% Probability*) 221 - 230	Skills and Concepts to Develop (50% Probability*) 231 - 240	Skills and Concepts to Introduce (27% Probability*) 241 - 250
Expressions and Equations	**Expressions and Equations**	**Expressions and Equations**
• Writes a number expressed in scientific notation in standard form	• Solves linear equations using rational numbers • Applies algebraic methods to solve real-world problems • Determines slope from a linear equation • Uses polynomial equations to solve complex real-world problems (e.g., using distributive property, variables on both sides) • Solves simple one-step inequality open sentences • Expresses a simple linear inequality from a contextual situation • Describes the relationship or a real-world situation represented by a simple linear inequality (e.g., 1- or 2-step) • Solves simple linear inequalities using graphs • Solves problems involving capacity in the metric system and converts to larger or smaller units • Converts from Celsius to Fahrenheit, given conversion ratios • Determines the prime factorization of a number • Writes a whole number in scientific notation	• Solves complex real-world problems involving capacity • Solves problems involving capacity in the metric system and converts to larger or smaller units • Converts from Celsius to Fahrenheit, given conversion ratios • Uses reasoning strategies to solve problems • Determines the prime factorization of a number using powers • Writes a whole number in scientific notation • Writes a decimal in scientific notation
Use Functions to Model Relationships	**Use Functions to Model Relationships**	**Use Functions to Model Relationships**
• Extends a growing pattern of triangular numbers, defined by objects or diagrams • Represents geometric sequences using written descriptions in recursive terms (present term, next term) • Solves problems involving simple functions • Looks for a growing pattern to solve a problem	• Solves problems involving complex functions • Solves problems involving simple functions • Interprets data given in line graphs to solve problems • Recognizes and extends arithmetic sequences (predicts nth term) • Recognizes and extends the Fibonacci sequence • Writes linear equations when given ordered pairs • Writes the equation of a horizontal or vertical line when given the graph of the line • Represents geometric sequences using written descriptions in recursive terms (present term, next term) • Represents real-world functions using an equation • Uses mapping diagrams to represent functions • Uses tables to determine function equations • Identifies the graph type, given equations of linear and nonlinear functions	• Determines the domain and range of a function • Represents growing arithmetic patterns using algebraic expressions or equations • Writes linear equations when given ordered pairs • Writes the equation of a horizontal or vertical line when given the graph of the line • Performs operations on functions • Solves problems involving complex functions • Determines x- or y-intercept of a given linear equation • Identifies and describes situations with varying rates of change • Solves quadratic equations using concrete models and tables • Uses tables to determine function equations • Represents a real-world function using a complex equation (e.g., variables on both sides, distributive, rational) • Models real life functions using function notation • Determines the minimum and maximum of a quadratic function • Analyzes the properties and characteristics of exponential functions • Determines the x- and/or y-intercept of an equation of a function
New Vocabulary: algebra, net, reflexive, short, transitive	*New Vocabulary:* algebraic sentence, depreciate, equation of a line, is less than, regression equation, time-and-a-half	*New Vocabulary:* polynomial, solution set, y-intercept
New Signs and Symbols: < less than, m meter/metre, repeating decimal overbar, triangle	*New Signs and Symbols:* , , ( ) ordered pair, f(x) the value of the function f at x, > greater than, > greater than, greater than or equal to, km kilometer/kilometre, less than or equal to, • multiplication symbol (dot), - subtraction	*New Signs and Symbols:* % percent

Skills and concepts to Enhance (73% Probability*) 231 - 240	Skills and Concepts to Develop (50% Probability*) 241 - 250	Skills and Concepts to Introduce (27% Probability*) 251 - 260
Expressions and Equations	Expressions and Equations	Expressions and Equations
• Uses graphs to solve simple systems of linear equations	• Uses basic operations on algebraic expressions (uses correct order of operations)	• Uses algebraic methods to solve systems of linear equations
• Evaluates numerical expressions using the order of operations (whole numbers only)	• Uses linear equations to represent situations involving variable quantities	• Solves quadratic equations by completing the square
• Evaluates expressions using the order of operations, including exponents (whole numbers only)	• Solves 2-step open sentences with missing factors (variables on both sides of the sentence)	• Simplifies rational expressions with exponents
• Solves real-world problems involving rate of pay	• Solves linear equations with fractions	• Solves problems with scientific notation
• Solves real-world problems involving rate of pay with time and a half	• Solves linear equations using rational numbers	• Describes and uses a variable with whole numbers, multiplication, and division in a contextual situation
• Solves difficult real-world problems involving decimals (e.g., multiple multiplications, conversions)	• Solves open sentences with fractions	• Uses expressions to represent situations that involve variable quantities with exponents
• Evaluates numerical expressions using the order of operations (using integers)	• Applies algebraic methods to solve real-world problems	• Evaluates expressions by substituting with rational numbers
• Divides rational expressions in a/b form	• Applies algebraic methods to solve a variety of real-world and theoretical problems	• Simplifies monomials
• Uses the distributive property	• Solves problems involving consecutive numbers	• Simplifies polynomial expressions
• Calculates the power of a number (e.g., $8 = 2^3$)	• Evaluates expressions using the order of operations, including exponents (using integers)	• Simplifies algebraic expressions with integer exponents
• Evaluates expressions containing powers (e.g., $3^2 \times 2^3$)	• Evaluates expressions using the order of operations, including exponents (whole numbers only)	• Multiplies binomials
• Applies rules for multiplying and dividing powers	• Solves real-world problems involving rate of pay with time and a half	• Multiplies a polynomial by a polynomial
• Solves problems with scientific notation	• Evaluates numerical expressions using the order of operations (using integers)	• Divides a polynomial by a monomial
• Describes and uses a variable with whole numbers, multiplication, and division in a contextual situation	• Solves problems involving simple interest rates without the formula	• Factors polynomials by identifying common factors
• Uses expressions to represent situations that involve variable quantities with exponents	• Simplifies rational expressions with scientific notation	• Factors trinomials in the form $x^2 + bx + c$
• Uses basic operations on algebraic expressions (substituting for unknowns)	• Solves problems with scientific notation	• Factors polynomials using difference of squares
• Uses basic operations on algebraic expressions (substituting for unknown exponents)	• Describes and uses a variable with whole numbers, multiplication, and division in a contextual situation	• Writes equivalent forms of algebraic equations using multiplication and division
• Recognizes commutative, associative, distributive, symmetric, transitive, and reflexive properties	• Uses expressions to represent situations that involve variable quantities with exponents	• Solves linear equations using rational numbers
• Uses basic operations on algebraic expressions (combining like terms)	• Evaluates expressions by substituting with rational numbers	• Applies algebraic methods to solve complex real-world and theoretical problems
• Uses basic operations on algebraic expressions (expanding - monomial by a binomial)	• Simplifies polynomial expressions	• Rewrites a complex formula to solve for a specific variable
• Writes equivalent forms of algebraic expressions (e.g., $(x + 3)/2 = x/2 + 3/2$)	• Multiplies binomials	• Identifies discriminants and roots
• Represents relationships of quantities in the form of an expression	• Factors trinomials in the form $x^2 + bx + c$	• Solves quadratic equations by factoring
• Uses basic operations on algebraic expressions (uses correct order of operations)	• Factors polynomials using difference of squares	• Solves polynomial equations (e.g., $ax = b + cx$, $a(x + b) = c$, $ax + b = cx + d$, $a(bx + c) = d(ex + f)$, $a/x = b$)
• Expresses a simple linear equation from a contextual situation	• Uses polynomial equations to solve complex real-world problems (e.g., using distributive property, variables on both sides)	• Uses polynomial equations to solve area and perimeter problems
• Solves 2-step open sentences with missing factors (variables on both sides of the sentence)	• Uses algebraic methods to solve systems of linear equations	• Solves polynomial equations with integers as exponents
• Solves 2-step linear equations	• Solves simple one-step inequality open sentences	• Uses the Multiplication Property of Equality as a first step in solving systems of linear equations
• Solves linear equations with integers	• Solves single variable linear inequalities with the variable in only one member using number lines	• Uses substitution as a first step in solving systems of linear equations
• Solves linear equations with fractions	• Describes the relationship or a real-world situation represented by a simple linear inequality (e.g., 1- or 2-step)	• Uses graphs to solve systems of linear equations
	• Solves linear inequalities using graphs	• Solves real-world systems of linear equations
		• Solves single variable linear inequalities with the variable in only one member using number lines
		• Solves single variable linear inequalities with variable in both members using number lines

Explanatory Notes

* At the range mid-point, this is the probability students would correctly answer items measuring these concepts and skills. Both data from test items and review by NWEA curriculum specialists are used to place Learning Continuum statements into appropriate RIT ranges. Blank cells indicate data are limited or unavailable for this range or document version.

Common Core 3.4.1

Skills and concepts to Enhance (73% Probability*) 231 - 240	Skills and Concepts to Develop (50% Probability*) 241 - 250	Skills and Concepts to Introduce (27% Probability*) 251 - 260
Expressions and Equations	**Expressions and Equations**	**Expressions and Equations**
• Solves linear equations using rational numbers • Applies algebraic methods to solve real-world problems • Determines slope from a linear equation • Uses polynomial equations to solve complex real-world problems (e.g., using distributive property, variables on both sides) • Solves simple one-step inequality open sentences • Expresses a simple linear inequality from a contextual situation • Describes the relationship or a real-world situation represented by a simple linear inequality (e.g., 1- or 2-step) • Solves simple linear inequalities using graphs • Solves problems involving capacity in the metric system and converts to larger or smaller units • Converts from Celsius to Fahrenheit, given conversion ratios • Determines the prime factorization of a number • Writes a whole number in scientific notation	• Solves complex real-world problems involving capacity • Solves problems involving capacity in the metric system and converts to larger or smaller units • Converts from Celsius to Fahrenheit, given conversion ratios • Uses reasoning strategies to solve problems • Determines the prime factorization of a number using powers • Writes a whole number in scientific notation • Writes a decimal in scientific notation	• Uses graphs to solve systems of linear inequalities • Determines the length of the side of a square, given the area • Uses reasoning strategies to solve problems • Uses fractional and negative exponents as optional ways of representing problem situations (e.g., $27^{2/3} = (27^{1/3})^2 = 9$)
Use Functions to Model Relationships	**Use Functions to Model Relationships**	**Use Functions to Model Relationships**
• Solves problems involving complex functions • Solves problems involving simple functions • Interprets data given in line graphs to solve problems • Recognizes and extends arithmetic sequences (predicts nth term) • Recognizes and extends the Fibonacci sequence • Writes linear equations when given ordered pairs • Writes the equation of a horizontal or vertical line when given the graph of the line • Represents geometric sequences using written descriptions in recursive terms (present term, next term) • Represents real-world functions using an equation • Uses mapping diagrams to represent functions • Uses tables to determine function equations • Identifies the graph type, given equations of linear and nonlinear functions	• Determines the domain and range of a function • Represents growing arithmetic patterns using algebraic expressions or equations • Writes linear equations when given ordered pairs • Writes the equation of a horizontal or vertical line when given the graph of the line • Performs operations on functions • Solves problems involving complex functions • Determines x- or y-intercept of a given linear equation • Identifies and describes situations with varying rates of change • Solves quadratic equations using concrete models and tables • Uses tables to determine function equations • Represents a real-world function using a complex equation (e.g., variables on both sides, distributive, rational) • Models real life functions using function notation • Determines the minimum and maximum of a quadratic function • Analyzes the properties and characteristics of exponential functions • Determines the x- and/or y-intercept of an equation of a function	• Uses an algebraic expression to represent a triangular number pattern • Rewrites an equation for a line in standard form • Determines x- or y-intercept of a given linear equation • Writes the equation of the line when given the graph of the line • Determines the graph of a line when given the equation • Writes linear equations, given two points on a line • Determines slope from graphs • Determines slope from ordered pairs and tables • Identifies and describes situations with varying rates of change • Represents a real-world function using a complex equation (e.g., variables on both sides, distributive, rational) • Models real life functions using function notation • Distinguishes between linear and nonlinear functions (analysis) • Uses graphs to represent functions and interpret slope • Identifies the equation of a parabola • Determines the vertex of a parabola • Determines the minimum and maximum of a quadratic function • Analyzes the properties and characteristics of exponential functions • Investigates, describes, and predicts the effects of parameter changes on the graphs of exponential functions • Determines the effects of parameter changes on functions • Determines the domain and range of a function

Explanatory Notes

* At the range mid-point, this is the probability students would correctly answer items measuring these concepts and skills. Both data from test items and review by NWEA curriculum specialists are used to place Learning Continuum statements into appropriate RIT ranges. Blank cells indicate data are limited or unavailable for this range or document version.

Educational Standard: Common Core Mathematics K-12: 2010

Skills and concepts to Enhance (73% Probability*) 231 - 240	Skills and Concepts to Develop (50% Probability*) 241 - 250	Skills and Concepts to Introduce (27% Probability*) 251 - 260
New Vocabulary: algebraic sentence, depreciate, equation of a line, is less than, regression equation, time-and-a-half	*New Vocabulary:* polynomial, solution set, y-intercept	*New Vocabulary:* coordinate plane, quadratic equation, undefined, wider, x-coordinate, y-coordinate
New Signs and Symbols: , , ( ) ordered pair, f(x) the value of the function f at x, > greater than, > greater than, greater than or equal to, km kilometer/kilometre, less than or equal to, • multiplication symbol (dot), - subtraction	*New Signs and Symbols:* % percent	*New Signs and Symbols:* [ ] square brackets, { } set notation, P perimeter

Skills and concepts to Enhance (73% Probability*) 241 - 250	Skills and Concepts to Develop (50% Probability*) 251 - 260	Skills and Concepts to Introduce (27% Probability*) 261 - 270
Expressions and Equations	Expressions and Equations	Expressions and Equations
• Uses basic operations on algebraic expressions (uses correct order of operations) • Uses linear equations to represent situations involving variable quantities • Solves 2-step open sentences with missing factors (variables on both sides of the sentence) • Solves linear equations with fractions • Solves linear equations using rational numbers • Solves open sentences with fractions • Applies algebraic methods to solve real-world problems • Applies algebraic methods to solve a variety of real-world and theoretical problems • Solves problems involving consecutive numbers • Evaluates expressions using the order of operations, including exponents (using integers) • Evaluates expressions using the order of operations, including exponents (whole numbers only) • Solves real-world problems involving rate of pay with time and a half • Evaluates numerical expressions using the order of operations (using integers) • Solves problems involving simple interest rates without the formula • Simplifies rational expressions with scientific notation • Solves problems with scientific notation • Describes and uses a variable with whole numbers, multiplication, and division in a contextual situation • Uses expressions to represent situations that involve variable quantities with exponents • Evaluates expressions by substituting with rational numbers • Simplifies polynomial expressions • Multiplies binomials • Factors trinomials in the form $x^2 + bx + c$ • Factors polynomials using difference of squares • Uses polynomial equations to solve complex real-world problems (e.g., using distributive property, variables on both sides) • Uses algebraic methods to solve systems of linear equations • Solves simple one-step inequality open sentences • Solves single variable linear inequalities with the variable in only one member using number lines • Describes the relationship or a real-world situation represented by a simple linear inequality (e.g., 1- or 2-step) • Solves linear inequalities using graphs	• Uses algebraic methods to solve systems of linear equations • Solves quadratic equations by completing the square • Simplifies rational expressions with exponents • Solves problems with scientific notation • Describes and uses a variable with whole numbers, multiplication, and division in a contextual situation • Uses expressions to represent situations that involve variable quantities with exponents • Evaluates expressions by substituting with rational numbers • Simplifies monomials • Simplifies polynomial expressions • Simplifies algebraic expressions with integer exponents • Multiplies binomials • Multiplies a polynomial by a polynomial • Divides a polynomial by a monomial • Factors polynomials by identifying common factors • Factors trinomials in the form $x^2 + bx + c$ • Factors polynomials using difference of squares • Writes equivalent forms of algebraic equations using multiplication and division • Solves linear equations using rational numbers • Applies algebraic methods to solve complex real-world and theoretical problems • Rewrites a complex formula to solve for a specific variable • Identifies discriminants and roots • Solves quadratic equations by factoring • Solves polynomial equations (e.g., $ax = b + cx$, $a(x + b) = c$, $ax + b = cx + d$, $a(bx + c) = d(ex + f)$, $a/x = b$) • Uses polynomial equations to solve area and perimeter problems • Solves polynomial equations with integers as exponents • Uses the Multiplication Property of Equality as a first step in solving systems of linear equations • Uses substitution as a first step in solving systems of linear equations • Uses graphs to solve systems of linear equations • Solves real-world systems of linear equations • Solves single variable linear inequalities with the variable in only one member using number lines • Solves single variable linear inequalities with variable in both members using number lines	• Simplifies rational expressions with exponents • Simplifies rational expressions with negative exponents • Estimates the limit of a given infinite sequence (e.g., given the sequence 1/n, as n gets larger) • Uses the compound interest equation to solve problems • Simplifies monomials • Simplifies polynomial expressions using power laws • Factors polynomials by identifying a common monomial and then factoring the trinomial • Rewrites a complex formula to solve for a specific variable • Solves quadratic equations using the quadratic formula • Solves quadratic equations by completing the square • Solves real-world systems of linear equations • Solves polynomial inequalities • Uses graphs to solve systems of linear inequalities

Mathematics

Goal: Operations and Algebraic Thinking

RIT Score Range: 251 - 260

Skills and concepts to Enhance (73% Probability*) 241 - 250	Skills and Concepts to Develop (50% Probability*) 251 - 260	Skills and Concepts to Introduce (27% Probability*) 261 - 270
Expressions and Equations	Expressions and Equations	Expressions and Equations
• Solves complex real-world problems involving capacity • Solves problems involving capacity in the metric system and converts to larger or smaller units • Converts from Celsius to Fahrenheit, given conversion ratios • Uses reasoning strategies to solve problems • Determines the prime factorization of a number using powers • Writes a whole number in scientific notation • Writes a decimal in scientific notation	• Uses graphs to solve systems of linear inequalities • Determines the length of the side of a square, given the area • Uses reasoning strategies to solve problems • Uses fractional and negative exponents as optional ways of representing problem situations (e.g., $27^{2/3} = (27^{1/3})^2 = 9$)	
Use Functions to Model Relationships	Use Functions to Model Relationships	Use Functions to Model Relationships
• Determines the domain and range of a function • Represents growing arithmetic patterns using algebraic expressions or equations • Writes linear equations when given ordered pairs • Writes the equation of a horizontal or vertical line when given the graph of the line • Performs operations on functions • Solves problems involving complex functions • Determines x- or y-intercept of a given linear equation • Identifies and describes situations with varying rates of change • Solves quadratic equations using concrete models and tables • Uses tables to determine function equations • Represents a real-world function using a complex equation (e.g., variables on both sides, distributive, rational) • Models real life functions using function notation • Determines the minimum and maximum of a quadratic function • Analyzes the properties and characteristics of exponential functions • Determines the x- and/or y-intercept of an equation of a function	• Uses an algebraic expression to represent a triangular number pattern • Rewrites an equation for a line in standard form • Determines x- or y-intercept of a given linear equation • Writes the equation of the line when given the graph of the line • Determines the graph of a line when given the equation • Writes linear equations, given two points on a line • Determines slope from graphs • Determines slope from ordered pairs and tables • Identifies and describes situations with varying rates of change • Represents a real-world function using a complex equation (e.g., variables on both sides, distributive, rational) • Models real life functions using function notation • Distinguishes between linear and nonlinear functions (analysis) • Uses graphs to represent functions and interpret slope • Identifies the equation of a parabola • Determines the vertex of a parabola • Determines the minimum and maximum of a quadratic function • Analyzes the properties and characteristics of exponential functions • Investigates, describes, and predicts the effects of parameter changes on the graphs of exponential functions • Determines the effects of parameter changes on functions • Determines the domain and range of a function	• Writes the equation of the line when given the graph of the line • Writes linear equations, given slope and point on a line • Models real life functions using function notation • Determines the minimum and maximum of a quadratic function • Analyzes the properties and characteristics of exponential functions
New Vocabulary: polynomial, solution set, y-intercept	*New Vocabulary:* coordinate plane, quadratic equation, undefined, wider, x-coordinate, y-coordinate	*New Vocabulary:* geometric series, semi-annual
New Signs and Symbols: % percent	*New Signs and Symbols:* [ ] square brackets, { } set notation, P perimeter	*New Signs and Symbols:* P principal, r rate, t time

Common Core 3.4.1

Skills and concepts to Enhance (73% Probability*) 251 - 260	Skills and Concepts to Develop (50% Probability*) 261 - 270	Skills and Concepts to Introduce (27% Probability*) 271 - 280
Expressions and Equations	Expressions and Equations	Expressions and Equations
• Uses algebraic methods to solve systems of linear equations • Solves quadratic equations by completing the square • Simplifies rational expressions with exponents • Solves problems with scientific notation • Describes and uses a variable with whole numbers, multiplication, and division in a contextual situation • Uses expressions to represent situations that involve variable quantities with exponents • Evaluates expressions by substituting with rational numbers • Simplifies monomials • Simplifies polynomial expressions • Simplifies algebraic expressions with integer exponents • Multiplies binomials • Multiplies a polynomial by a polynomial • Divides a polynomial by a monomial • Factors polynomials by identifying common factors • Factors trinomials in the form $x^2 + bx + c$ • Factors polynomials using difference of squares • Writes equivalent forms of algebraic equations using multiplication and division • Solves linear equations using rational numbers • Applies algebraic methods to solve complex real-world and theoretical problems • Rewrites a complex formula to solve for a specific variable • Identifies discriminants and roots • Solves quadratic equations by factoring • Solves polynomial equations (e.g., $ax = b + cx$, $a(x + b) = c$, $ax + b = cx + d$, $a(bx + c) = d(ex + f)$, $a/x = b$) • Uses polynomial equations to solve area and perimeter problems • Solves polynomial equations with integers as exponents • Uses the Multiplication Property of Equality as a first step in solving systems of linear equations • Uses substitution as a first step in solving systems of linear equations • Uses graphs to solve systems of linear equations • Solves real-world systems of linear equations • Solves single variable linear inequalities with the variable in only one member using number lines • Solves single variable linear inequalities with variable in both members using number lines	• Simplifies rational expressions with exponents • Simplifies rational expressions with negative exponents • Estimates the limit of a given infinite sequence (e.g., given the sequence 1/n, as n gets larger) • Uses the compound interest equation to solve problems • Simplifies monomials • Simplifies polynomial expressions using power laws • Factors polynomials by identifying a common monomial and then factoring the trinomial • Rewrites a complex formula to solve for a specific variable • Solves quadratic equations using the quadratic formula • Solves quadratic equations by completing the square • Solves real-world systems of linear equations • Solves polynomial inequalities • Uses graphs to solve systems of linear inequalities	• Describes a relationship or a real-world situation represented by a quadratic equation

Common Core 3.4.1

Skills and concepts to Enhance (73% Probability*) 251 - 260	Skills and Concepts to Develop (50% Probability*) 261 - 270	Skills and Concepts to Introduce (27% Probability*) 271 - 280
Expressions and Equations	**Expressions and Equations**	**Expressions and Equations**
• Uses graphs to solve systems of linear inequalities • Determines the length of the side of a square, given the area • Uses reasoning strategies to solve problems • Uses fractional and negative exponents as optional ways of representing problem situations (e.g., $27^{2/3} = (27^{1/3})^2 = 9$)		
Use Functions to Model Relationships	**Use Functions to Model Relationships**	**Use Functions to Model Relationships**
• Uses an algebraic expression to represent a triangular number pattern • Rewrites an equation for a line in standard form • Determines x- or y-intercept of a given linear equation • Writes the equation of the line when given the graph of the line • Determines the graph of a line when given the equation • Writes linear equations, given two points on a line • Determines slope from graphs • Determines slope from ordered pairs and tables • Identifies and describes situations with varying rates of change • Represents a real-world function using a complex equation (e.g., variables on both sides, distributive, rational) • Models real life functions using function notation • Distinguishes between linear and nonlinear functions (analysis) • Uses graphs to represent functions and interpret slope • Identifies the equation of a parabola • Determines the vertex of a parabola • Determines the minimum and maximum of a quadratic function • Analyzes the properties and characteristics of exponential functions • Investigates, describes, and predicts the effects of parameter changes on the graphs of exponential functions • Determines the effects of parameter changes on functions • Determines the domain and range of a function	• Writes the equation of the line when given the graph of the line • Writes linear equations, given slope and point on a line • Models real life functions using function notation • Determines the minimum and maximum of a quadratic function • Analyzes the properties and characteristics of exponential functions	
New Vocabulary: coordinate plane, quadratic equation, undefined, wider, x-coordinate, y-coordinate *New Signs and Symbols:* [ ] square brackets, { } set notation, P perimeter	*New Vocabulary:* geometric series, semi-annual *New Signs and Symbols:* P principal, r rate, t time	*New Vocabulary:* None *New Signs and Symbols:* None

Explanatory Notes

* At the range mid-point, this is the probability students would correctly answer items measuring these concepts and skills. Both data from test items and review by NWEA curriculum specialists are used to place Learning Continuum statements into appropriate RIT ranges. Blank cells indicate data are limited or unavailable for this range or document version.

Educational Standard: Common Core Mathematics K-12: 2010

Common Core 3.4.1

Skills and concepts to Enhance (73% Probability*) 261 - 270	Skills and Concepts to Develop (50% Probability*) 271 - 280	Skills and Concepts to Introduce (27% Probability*) > 280
Expressions and Equations	**Expressions and Equations**	**Expressions and Equations**
• Simplifies rational expressions with exponents • Simplifies rational expressions with negative exponents • Estimates the limit of a given infinite sequence (e.g., given the sequence 1/n, as n gets larger) • Uses the compound interest equation to solve problems • Simplifies monomials • Simplifies polynomial expressions using power laws • Factors polynomials by identifying a common monomial and then factoring the trinomial • Rewrites a complex formula to solve for a specific variable • Solves quadratic equations using the quadratic formula • Solves quadratic equations by completing the square • Solves real-world systems of linear equations • Solves polynomial inequalities • Uses graphs to solve systems of linear inequalities	• Describes a relationship or a real-world situation represented by a quadratic equation	• Describes a relationship or a real-world situation represented by a quadratic equation
Use Functions to Model Relationships	**Use Functions to Model Relationships**	**Use Functions to Model Relationships**
• Writes the equation of the line when given the graph of the line • Writes linear equations, given slope and point on a line • Models real life functions using function notation • Determines the minimum and maximum of a quadratic function • Analyzes the properties and characteristics of exponential functions		
New Vocabulary: geometric series, semi-annual	*New Vocabulary:* None	*New Vocabulary:* None
New Signs and Symbols: P principal, r rate, t time	*New Signs and Symbols:* None	*New Signs and Symbols:* None

Skills and concepts to Enhance (73% Probability*) 271 - 280	Skills and Concepts to Develop (50% Probability*) > 280
Expressions and Equations	Expressions and Equations
• Describes a relationship or a real-world situation represented by a quadratic equation	• Describes a relationship or a real-world situation represented by a quadratic equation
New Vocabulary: None	*New Vocabulary:* None
New Signs and Symbols: None	*New Signs and Symbols:* None

Common Core 3.4.1