DesCartes: A Continuum of Learning®

Mathematics

Goal: Operations and Algebraic Thinking

RIT Score Range: 241 - 250
Statements Last Updated: Mar 10, 2014

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
• Evaluates numerical expressions using the order of operations (whole numbers only)	• Evaluates expressions using the order of operations, including exponents (whole numbers only)	• Simplifies rational expressions with exponents
• 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	• Solves problems with scientific notation
• Solves real-world problems involving rate of pay	• Evaluates numerical expressions using the order of operations (using integers)	• Describes and uses a variable with whole numbers, multiplication, and division in a contextual situation
• Solves real-world problems involving rate of pay with time and a half	• Evaluates expressions using the order of operations, including exponents (using integers)	• Uses expressions to represent situations that involve variable quantities with exponents
• Solves difficult real-world problems involving decimals (e.g., multiple multiplications, conversions)	• Solves problems involving simple interest rates without the formula	• Evaluates expressions by substituting with rational numbers
• Evaluates numerical expressions using the order of operations (using integers)	• Simplifies rational expressions with scientific notation	• Simplifies monomials
• Divides rational expressions in a/b form	• Solves problems with scientific notation	• Simplifies polynomial expressions
• Uses the distributive property	• Describes and uses a variable with whole numbers, multiplication, and division in a contextual situation	• Simplifies algebraic expressions with integer exponents
• Calculates the power of a number (e.g., 8 = 2^3)	• Uses expressions to represent situations that involve variable quantities with exponents	• Multiplies binomials
• Evaluates expressions containing powers (e.g., 3^2 x 2^3)	• Evaluates expressions by substituting with rational numbers	• Multiplies a polynomial by a polynomial
• Applies rules for multiplying and dividing powers	• Simplifies polynomial expressions	• Divides a polynomial by a monomial
• Solves problems with scientific notation	• Multiplies binomials	• Factors polynomials by identifying common factors
• Describes and uses a variable with whole numbers, multiplication, and division in a contextual situation	• Factors trinomials in the form x^2 + bx + c	• Factors trinomials in the form x^2 + bx + c
• Uses expressions to represent situations that involve variable quantities with exponents	• Factors polynomials using difference of squares	• Factors polynomials using difference of squares
• Uses basic operations on algebraic expressions (substituting for unknowns)	• Uses basic operations on algebraic expressions (uses correct order of operations)	• Writes equivalent forms of algebraic equations using multiplication and division
• Uses basic operations on algebraic expressions (substituting for unknown exponents)	• Uses linear equations to represent situations involving variable quantities	• Solves linear equations using rational numbers
• Recognizes commutative, associative, distributive, symmetric, transitive, and reflexive properties	• Solves 2-step open sentences with missing factors (variables on both sides of the sentence)	• Applies algebraic methods to solve complex real-world and theoretical problems
• Uses basic operations on algebraic expressions (combining like terms)	• Solves linear equations with fractions	• Rewrites a complex formula to solve for a specific variable
• Uses basic operations on algebraic expressions (expanding - monomial by a binomial)	• Solves linear equations using rational numbers	• Identifies discriminants and roots
• Writes equivalent forms of algebraic expressions (e.g., (x + 3)/2 = x/2 + 3/2)	• Solves open sentences with fractions	• Solves quadratic equations by factoring
• Represents relationships of quantities in the form of an expression	• Applies algebraic methods to solve real-world problems	• Solves quadratic equations by completing the square
• Uses basic operations on algebraic expressions (uses correct order of operations)	• Applies algebraic methods to solve a variety of real-world and theoretical problems	• 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	• Solves problems involving consecutive numbers	• 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 polynomial equations to solve complex real-world problems (e.g., using distributive property, variables on both sides)	• Solves polynomial equations with integers as exponents
• Solves 2-step linear equations	• Uses algebraic methods to solve systems of linear equations	• Uses the Multiplication Property of Equality as a first step in solving systems of linear equations
• Solves linear equations with integers	• Solves simple one-step inequality open sentences	• Uses substitution as a first step in solving systems of linear equations
• Solves linear equations with fractions	• Solves single variable linear inequalities with the variable in only one member using number lines	• Uses algebraic methods to solve systems of linear equations
	• 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 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
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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) • Uses graphs to solve simple systems of linear equations • 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 linear inequalities using graphs • 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**
• Recognizes and extends arithmetic sequences (predicts nth term) • Represents geometric sequences using written descriptions in recursive terms (present term, next 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 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 • Solves problems involving simple functions • Solves problems involving complex functions • Interprets data given in line graphs to solve problems	• 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 • 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 • Performs operations on functions • Solves problems involving complex functions • Determines the domain and range 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

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Use Functions to Model Relationships	Use Functions to Model Relationships	Use Functions to Model Relationships
		• Determines the domain and range of a function
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

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