# Math DesCartes: Patterns, Functions, and Algebra

Skills: Symbolic Presentation

| Students: | DesCartes Skills:<br>(Highlight the skills related to your chosen standard/concept) |
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| | **RIT 261-270:**<br>• Solves problems involving rate conversions (e.g., mi/hr to ft/sec)<br>• Solves problems involving rates<br>• Simplifies monomials<br>• Simplifies polynomial expressions using power laws<br>• Factors polynomials by identifying a common monomial and then factoring the trinomial<br>• Rewrites a complex formula to solve for a specific variable<br>• Determines x- or y-intercept of a given linear equation<br>• Writes the equation of the line when given the graph of the line<br>• Writes linear equations, given slope and point on a line<br>• Determines slope from an equation (analysis)<br>• Determines the slope of parallel lines<br>• Determines the slope of perpendicular lines<br>• Solves quadratic equations using the quadratic formula<br>• Solves quadratic equations by completing the square<br>• Solves polynomial equations with fractions as exponents<br>• Solves logarithmic equations<br>• Solves real-world systems of linear equations |
| | **RIT 251-260:**<br>• Uses algebraic representations to model and interpret mathematical and real-world situations<br>• Uses graphic representations to model and interpret mathematical and real-world situations<br>• Solves problems involving rate conversions (e.g., mi/hr to ft/sec)<br>• Uses expressions to represent situations that involve variable quantities with exponents<br>• Uses expressions with absolute value to represent situations<br>• Evaluates expressions by substituting with rational numbers<br>• Simplifies monomials<br>• Simplifies polynomial expressions<br>• Multiplies binomials<br>• Multiplies a polynomial by a polynomial<br>• Divides a polynomial by a monomial<br>• Factors polynomials by identifying common factors<br>• Factors trinomials in the form x^2 + bx + c<br>• Factors polynomials using difference of squares<br>• Writes equivalent forms of algebraic equations using multiplication and division<br>• Solves linear equations using rational numbers<br>• Applies algebraic methods to solve complex real-world and theoretical problems<br>• Solves problems involving consecutive numbers<br>• Rewrites a complex formula to solve for a specific variable<br>• Rewrites an equation for a line in standard form<br>• Writes the equation of the line when given the graph of the line<br>• Determines the graph of a line when given the equation<br>• Writes linear equations, given two points on a line<br>• Determines slope from an equation (analysis)<br>• Determines slope from graphs<br>• Determines slope from ordered pairs and tables<br>• Interprets the meaning of slope and intercepts in problem solving situations<br>• Determines the slope of parallel lines<br>• Determines the slope of perpendicular lines<br>• Uses algebraic terms appropriately (e.g., "equation," "inequality," "variable," "expression," "term," "coefficient," "domain," "range")<br>• Identifies discriminants and roots<br>• Solves quadratic equations by factoring<br>• Solves quadratic equations by completing the square<br>• 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)<br>• Uses polynomial equations to solve complex theoretical problems (e.g., using distributive property, variables on both sides)<br>• Rewrites an equation as a first step in factoring<br>• Uses polynomial equations to solve area and perimeter problems<br>• Solves polynomial equations using binomial expansion<br>• Solves polynomial equations with integers as exponents<br>• Solves logarithmic equations<br>• Uses the Multiplication Property of Equality as a first step in solving systems of linear equations<br>• Uses substitution as a first step in solving systems of linear equations<br>• Uses algebraic methods to solve systems of linear equations<br>• Uses graphs to solve systems of linear equations<br>• Uses graphs to solve systems of linear equations in real-world situations<br>• Solves real-world systems of linear equations<br>• Solves single variable linear inequalities with variable in both members using number lines |
| | **RIT 241-250:**<br>• Uses algebraic representations to model and interpret mathematical and real-world situations<br>• Solves problems involving rate |

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| | conversions (e.g., mi/hr to ft/sec)<br>• Uses expressions to represent situations that involve variable quantities with exponents<br>• Determines the expression for the area of a figure represented by algebra tiles<br>• Evaluates expressions by substituting with rational numbers<br>• Evaluates absolute-value algebraic expressions using substitution strategies<br>• Simplifies polynomial expressions<br>• Multiplies binomials<br>• Factors trinomials in the form x^2 + bx + c<br>• Factors polynomials using difference of squares<br>• Uses linear equations to represent situations involving variable quantities<br>• Solves 2-step open sentences with missing factors<br>(variables on both sides of the sentence)<br>• Solves linear equations with fractions<br>• Solves linear equations using rational numbers<br>• Solves open sentences with fractions<br>• Applies algebraic methods to solve real-world problems<br>• Applies algebraic methods to solve a variety of real-world and theoretical problems<br>• Solves problems involving consecutive numbers<br>• Writes linear equations when given ordered pairs<br>• Determines slope from a linear equation<br>• Using the slope of an equation, identifies parallel and perpendicular lines<br>• Recognizes the slope of horizontal and vertical lines<br>• Identifies and describes situations with varying rates of change<br>• Describes a relationship or a real-world situation represented by a quadratic equation<br>• Uses polynomial equations to solve complex real-world problems (e.g., using distributive property, variables on<br>both sides)<br>• Uses the Multiplication Property of Equality as a first step in solving systems of linear equations<br>• Uses algebraic methods to solve systems of linear equations<br>• Uses graphs to solve systems of linear equations in real-world situations<br>• Describes the relationship or a real-world situation represented by a simple linear inequality (e.g., 1- or 2-step)<br>• Solves linear inequalities using graphs |
| | **RIT 231-240:**<br>• Translates a problem to a symbolic expression or equation (analysis)<br>• Solves complex problems involving miles per gallon<br>• Solves problems comparing unit prices<br>• Uses expressions to represent situations that involve variable quantities with exponents |
| | • Uses basic operations on algebraic expressions (substituting for unknowns)<br>• Uses basic operations on algebraic expressions (substituting for unknown exponents)<br>• Recognizes commutative, associative, distributive, symmetric, transitive, and reflexive properties<br>• Uses basic operations on algebraic expressions (combining like terms)<br>• Uses basic operations on algebraic expressions (expanding - monomial by a binomial)<br>• Writes equivalent forms of algebraic expressions (e.g., (x + 3)/2 = x/2 + 3/2)<br>• Represents relationships of quantities in the form of an expression<br>• Expresses a simple linear equation from a contextual situation<br>• Solves 2-step open sentences with missing factors (variables on both sides of the sentence)<br>• Solves 2-step linear equations<br>• Solves linear equations with decimals<br>• Solves linear equations with integers<br>• Solves linear equations with fractions<br>• Solves open sentences with integers<br>• Solves linear equations using rational numbers<br>• Applies algebraic methods to solve real-world problems<br>• Writes the equation of a horizontal or vertical line when given the graph of the line<br>• Determines the graph of a horizontal or vertical line when given the equation<br>• Determines slope from a linear equation<br>• Using the slope of an equation, identifies parallel and perpendicular lines<br>• Uses polynomial equations to solve complex real-world problems (e.g., using distributive property, variables on<br>both sides)<br>• Expresses a simple linear inequality from a contextual situation<br>• Describes the relationship or a real-world situation represented by a simple linear inequality (e.g., 1- or 2-step)<br>• Solves simple linear inequalities using graphs<br>• Solves simple inequalities with rational number solutions |
| | **RIT 221-230:**<br>• Translates a problem to a symbolic expression or equation (analysis)<br>• Expresses the solution clearly and logically by using the appropriate mathematical terms and notation<br>• Solves complex problems involving miles per gallon<br>• Solves complex problems involving miles/kilometers per hour<br>• Describes and uses a variable with whole numbers, multiplication, and division in a contextual situation<br>• Uses basic operations on algebraic expressions (substituting for unknowns)<br>• Recognizes commutative, associative, |

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| | distributive, symmetric, transitive, and reflexive properties<br>• Uses basic operations on algebraic expressions (expanding - monomial by a binomial)<br>• Demonstrates an understanding of properties (e.g., commutative, associative, distributive, properties of 0)<br>• Writes equivalent forms of algebraic expressions (e.g., (x + 3)/2 = x/2 + 3/2)<br>• Represents relationships of quantities in the form of an expression<br>• Uses basic operations on algebraic expressions (uses correct order of operations)<br>• Expresses a simple linear equation from a contextual situation<br>• Solves open sentences with calculations on both sides of the sentence<br>• Solves 2-step open sentences with missing factors<br>• Solves 1-step linear equations<br>• Solves 2-step linear equations<br>• Solves linear equations with decimals<br>• Solves linear equations with integers<br>• Solves linear equations using substitution<br>• Writes equivalent forms of algebraic equations using addition and subtraction<br>• Solves open sentences with decimals<br>• Solves linear equations in a real-world context using a given formula<br>• Solves open sentences with integers<br>• Applies algebraic methods to solve theoretical problems<br>• Applies algebraic methods to solve real-world problems<br>• Applies systems-of-linear-equations methods to solve theoretical problems<br>• Solves simple one-step inequality open sentences<br>• Describes the relationship or a real-world situation represented by a simple linear inequality (e.g., 1- or 2-step) |
| | **RIT 211-220:**<br>• Translates a 2-step problem to a symbolic expression or equation<br>• Expresses the solution clearly and logically by using the appropriate mathematical terms and notation<br>• Solves simple problems involving miles per gallon<br>• Determines unit price<br>• Uses algebraic reasoning to solve problems involving equality relationships<br>• Uses basic operations on algebraic expressions (uses correct order of operations)<br>• Uses simple linear equations to represent problem situations<br>• Solves simple open sentences with missing factors (numbers over 100)<br>• Solves open sentences using the distributive property<br>• Solves open sentences with calculations on both sides of the sentence<br>• Solves 2-step open sentences with missing factors |

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| | • Solves 1-step linear equations<br>• Applies algebraic methods to solve theoretical problems |
| | **RIT 201-210:**<br>• Translates a number sentence to a real-world situation<br>• Translates a 1-step problem to a symbolic expression or equation<br>• Translates a 2-step problem to a symbolic expression or equation<br>• Relates everyday language to mathematical language and symbols and progresses toward the use of appropriate terminology (e.g., "repeated addition" becomes "multiplication," "fair share" becomes "divide," "balance the equation" becomes "solve the equation")<br>• Solves simple problems involving miles per gallon<br>• Solves simple problems involving miles/kilometers per hour<br>• Determines unit price<br>• Uses algebraic reasoning to solve problems involving equality relationships<br>• Uses basic operations on algebraic expressions (uses correct order of operations)<br>• Uses simple linear equations to represent problem situations<br>• Describes a realistic situation using information given in a linear equation<br>• Solves complex open linear sentences using diagrams and models (e.g., using balances)<br>• Solves 1-step open sentences with missing addends (numbers over 100)<br>• Solves simple open sentences with missing factors (numbers 100 and under)<br>• Solves 2-step open sentences with missing addends<br>• Solves open sentences with basic-facts calculations on both sides of the sentence |
| | **RIT 191-200:**<br>• Translates from a diagram to an expression or equation<br>• Translates a 1-step problem to a symbolic expression or equation<br>• Relates everyday language to mathematical language and symbols, and progresses toward the use of appropriate terminology (e.g., "add more" becomes "plus")<br>• Relates everyday language to mathematical language and symbols and progresses toward the use of appropriate terminology (e.g., "repeated addition" becomes "multiplication," "fair share" becomes "divide," "balance the equation" becomes "solve the equation")<br>• Solves simple problems involving miles/kilometers per hour<br>• Uses algebraic reasoning to solve problems involving equality relationships<br>• Solves basic facts addition and subtraction open sentences using diagrams and models (e.g., using balances) |

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| | • Solves complex open linear sentences using diagrams and models (e.g., using balances)<br>• Solves 1-step open sentences with missing addends (numbers 100 and under)<br>• Solves 1-step open sentences with missing addends (numbers over 100)<br>• Solves simple open sentences with missing factors (numbers 100 and under)<br>• Solves 2-step open sentences with missing addends |
| | **RIT 181-190:**<br>• Relates everyday language to mathematical language and symbols, and progresses toward the use of appropriate terminology (e.g., "add more" becomes "plus")<br>• Uses words, pictures, numbers, and technology to explain the solution to problems<br>• Solves basic facts addition and subtraction open sentences using diagrams and models (e.g., using balances)<br>• Solves linear equations with basic facts - 1-step addition using a letter for the variable<br>• Solves 1-step open sentences with missing addends (numbers 100 and under) |
| | **RIT 171-180:**<br>• Uses words, pictures, numbers, and technology to explain the solution to problems<br>• Solves basic-facts open sentences - addition and subtraction<br>• Solves linear equations with basic facts - 1-step addition using a letter for the variable |
| | **RIT 161-170:**<br>• Solves basic-facts open sentences - addition and subtraction |

**Lesson Title:**

**Standard/Concept for All:**

**Introduction:** (Get Attention; Connect to Prior Knowledge)

**For Students Ready for a Challenge:**

Lesson/Activity:

Resources:

Means of Assessment:

**For Most Students:**

Lesson/Activity:

Resources:

Means of Assessment:

**For Students Needing Extra Support:**

Lesson/Activity:

Resources:

Means of Assessment:

**Closure/Summary for All:**