Math: Operations and Algebraic Thinking: Represent and Solve Problems

Students:	DesCartes Statements:

Students:

RIT Above 250:
- Uses reasoning strategies to solve problems

Students:

RIT 241-250:
- Applies algebraic methods to solve real-world problems
- Solves multiple-step problems involving proportions
- Uses reasoning strategies to solve problems

Students:

RIT 231-240:
- Applies algebraic methods to solve real-world problems
- Evaluates numerical expressions using the order of operations (whole numbers only)
- Models algorithms using place value concepts (multiplication and division with whole numbers)
- Represents relationships of quantities in the form of an expression
- Solves multiple-step problems involving proportions
- Solves problems comparing unit prices
- Uses pictures to represent problems

Students:

RIT 221-230:
- Applies algebraic methods to solve real-world problems
- Applies algebraic methods to solve theoretical problems
- Demonstrates an understanding of multiple properties
- Models algorithms using place value concepts (multiplication and division with whole numbers)
- Represents relationships of quantities in the form of an expression
- Solves complex word problems involving whole number division with remainder (e.g., 2-step, 2-digit divisor)
- Solves open sentences with calculations on both sides of the sentence
- Solves real-world multiple-step problems involving whole numbers
- Uses multiple number theory concepts to solve problems (e.g., factors, digits, odd/even, divisibility)
- Uses pictures to represent problems
- Uses rounding to estimate answers to real-world problems involving multiplication and division of numbers less than 100 (whole numbers only)
- Uses rounding to estimate answers to real-world problems involving numbers less than 1000 with multiplication and division (whole numbers only)

Students:

RIT 211-220:
- Applies algebraic methods to solve theoretical problems
- Demonstrates an understanding of the associative property of multiplication
- Demonstrates an understanding of the commutative property of multiplication with simple problems
- Demonstrates an understanding of the distributive property of multiplication by decomposing a term
- Demonstrates an understanding of the inverse relationship between addition and subtraction
- Models whole number multiplication and division algorithms (e.g., uses physical materials to show 4 groups of 3 objects)
- Performs mental computation with division
- Predicts the relative size of the answer when multiplying whole numbers
- Solves complex word problems involving whole number division with remainder (e.g., 2-step, 2-digit divisor)
- Solves open sentences using the distributive property
- Solves open sentences with calculations on both sides of the sentence
- Solves real-world multiple-step problems involving whole numbers
- Solves real-world problems involving 2-step multiple operations, whole numbers only
- Solves simple open sentences with missing factors (numbers over 100)
- Solves whole number word problems with division over 10 x 10
- Translates a 2-step problem to a symbolic expression or equation
- 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 pictures to represent problems
- Uses rounding to estimate answers to real-world problems involving multiplication and division of numbers less than 100 (whole numbers only)
- Uses rounding to estimate answers to real-world problems involving numbers less than 1000 with multiplication and division (whole numbers only)
- Uses simple linear equations to represent problem situations

Students:	**RIT 201-210:** • Demonstrates an understanding of the commutative property of multiplication with simple problems • Describes a realistic situation using information given in a linear equation • Determines the remainder in a real-world problem (whole numbers) • Evaluates numerical expressions using grouping symbols (whole numbers only) • Instantly recalls division facts with dividend and divisors less than 13 • Models whole number multiplication and division algorithms (e.g., uses physical materials to show 4 groups of 3 objects) • Performs mental computation with division • Solves 2-step open sentences with missing addends • Solves open sentences with basic-facts calculations on both sides of the sentence • Solves problems using tables • Solves problems using the inverse relationship between addition and subtraction • Solves real-world problems involving 2-step multiple operations, whole numbers only • Solves real-world whole number problems involving subtraction with numbers 100 and under (analysis) • Solves simple open sentences with missing factors (numbers 100 and under) • Solves simple word problems involving whole number division with remainder (e.g., 1-step, 1-digit divisor) • Solves whole number subtraction word problems with numbers over 1000 • Solves whole number word problems with division over 10 x 10 • Solves word problems involving whole number multiplication with numbers greater than 10 x 10 • Solves word problems with whole number division facts with dividend and divisors less than 11 • Translates a 1-step problem to a symbolic expression or equation • Translates a 2-step problem to a symbolic expression or equation • 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 division for multiple-step real-world problems (whole numbers) • Uses number sense strategies to solve problems (addition/subtraction only) • Uses rounding to estimate answers to real-world problems involving numbers 1000 or greater with addition and subtraction (whole numbers only) • Uses simple linear equations to represent problem situations
Students:	**RIT 191-200:** • Demonstrates an understanding of the commutative property of multiplication with simple problems • Demonstrates an understanding of the zero property of multiplication • Determines the operation needed from a simple problem • Distinguishes between odd and even numbers • Evaluates numerical expressions using grouping symbols (whole numbers only) • Instantly recalls basic multiplication facts where one factor is 6-12 and the other factor is 0-12 • Instantly recalls division facts with dividend and divisors less than 10 • Instantly recalls division facts with dividend and divisors less than 13 • Interprets a chart or table - calculation required • Models whole number multiplication and division algorithms (e.g., shows multiplication as repeated addition and division as repeated subtraction) • Solves 1-step open sentences with missing addends (numbers 100 and under) • Solves 2-step open sentences with missing addends • Solves problems using tables • Solves problems using the inverse relationship between addition and subtraction • Solves real-world whole number addition problems with sums to 20 (change unknown) • Solves real-world whole number addition problems with sums to 20 (result unknown) - with extraneous information given • Solves real-world whole number problems involving subtraction with numbers 100 and under • Solves real-world whole number problems involving subtraction with numbers under 1000 • Solves simple open sentences with missing factors (numbers 100 and under) • Solves simple word problems involving whole number division with remainder (e.g., 1-step, 1-digit divisor) • Solves whole number subtraction word problems with numbers over 1000 • Solves word problems involving basic whole number multiplication facts to 10 x 10 • Solves word problems involving whole number multiplication with numbers greater than 10 x 10 • Solves word problems with whole number division facts with dividend and divisors less than 11 • Translates a 1-step problem to a symbolic expression or equation • Uses algebraic reasoning to solve problems involving equality relationships • Uses manipulatives to divide a small set of objects into groups of equal size • Uses rounding to estimate answers to real-world problems involving numbers less than 1000 with addition and subtraction (whole numbers only) • Writes equivalent forms of whole numbers 11 to 20 using addition (e.g., 14 = 7 + 7)

Students:	**RIT 181-190:** • Demonstrates an understanding of the inverse relationship between multiplication and division • Demonstrates an understanding of the zero property of multiplication • Determines the operation needed from a simple problem • Distinguishes between odd and even numbers • Instantly recalls basic addition facts with sums to 18 in a table • Instantly recalls basic multiplication facts where one factor is 6-12 and the other factor is 0-12 • Instantly recalls basic subtraction facts with minuend less than 10 • Instantly recalls division facts with dividend and divisors less than 10 • Interprets a chart or table - calculation required • Models multiplication and division algorithms using arrays (whole numbers) • Models whole number multiplication and division algorithms (e.g., shows multiplication as repeated addition and division as repeated subtraction) • Multiplies basic facts to 10 x 10 vertically • Recognizes addition and subtraction fact families through 18 • Solves 1-step open sentences with missing addends (numbers 100 and under) • Solves basic facts addition and subtraction open sentences using diagrams and models (e.g., using balances) • Solves problems using the inverse relationship between addition and subtraction • Solves real-world whole number addition problems with sums to 100 (result unknown) • Solves real-world whole number addition problems with sums to 20 (result unknown) - with extraneous information given • Solves real-world whole number problems involving addition and subtraction • Solves real-world whole number problems involving subtraction with numbers 100 and under • Solves real-world whole number problems involving subtraction with numbers under 1000 • Solves real-world whole number problems involving subtraction with numbers under 20 • Solves word problems involving basic whole number multiplication facts to 10 x 10 • Uses counting by multiples for multiplication • Uses manipulatives to divide a small set of objects into groups of equal size • Uses rounding to estimate answers to real-world problems involving addition of numbers less than 100 (whole numbers only) • Uses sharing for division • 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)
Students:	**RIT 171-180:** • Adds 1-digit numbers with sums to 18 (with parentheses) • Counts by 2's to 100 • Determines the operation needed from a simple problem • Instantly recalls basic multiplication facts where one factor is 0-5 and the other factor is 0-12 • Multiplies basic facts to 10 x 10 vertically • Recognizes addition and subtraction fact families through 18 • Represents a basic facts addition problem with a number sentence • Solves basic facts open sentences - multiplication and division • Solves basic-facts open sentences - addition and subtraction • Solves real-world whole number addition problems with sums to 100 (result unknown) • Solves real-world whole number addition problems with sums to 20 (result unknown) • Solves real-world whole number addition problems with sums to 20 (start unknown) • Solves real-world whole number problems involving subtraction with numbers under 20 • Subtracts a 1-digit number from a 2-digit number that is less than 20 (whole numbers only) • Uses a number line to construct addition facts with sums through 20 (whole numbers) • Writes a number sentence for a simple problem solving situation • Writes equivalent forms of whole number expressions (e.g., 15 + 5 = 10 + 10)
Students:	**RIT 161-170:** • Adds two 1-digit numbers with sums between 10 and 19 in horizontal format • Adds two 1-digit numbers with sums between 10 and 19 in vertical format • Adds two 1-digit numbers with sums to 10 in horizontal format • Instantly recalls basic multiplication facts where one factor is 0-5 and the other factor is 0-12 • Solves basic-facts open sentences - addition and subtraction • Solves real-world whole number addition problems with sums to 20 (result unknown) • Subtracts a 1-digit number from a 2-digit number that is less than 20 (whole numbers only) • Subtracts two 1-digit numbers vertically • Uses a number line to construct addition facts with sums through 20 (whole numbers)

Students:

RIT Below 161:
- Adds two 1-digit numbers with sums to 10 in horizontal format
- Uses models to construct whole number addition facts with addends through 10

Students: