Mathletics NWEA Common Core -Operations & Algebraic Thinking

Skill Quests



RIT Score Band



May, 2022

NWEA Common Core

Operations & Algebraic Thinking 3–8 Skill Quests May 2022

RIT Score Band 189–200	4
1 Operations & Algebraic Thinking	.4
1.1 Represent and solve problems involving multiplication and division	.4
1.2 Understand properties of multiplication and the relationship between multiplication and division	ו .4
1.3 Multiply and divide within 100	5
1.4 Solve problems involving the four operations, and identify and explain patterns in arithmetic	.5
RIT Score Band 201–210	6
1 Operations & Algebraic Thinking	.6
1.1 Use the four operations with whole numbers to solve problems	6
1.2 Gain familiarity with factors and multiples	6
1.3 Generate and analyze patterns	.7
RIT Score Band 211–217	8
1 Operations & Algebraic Thinking	.8
1.1 Write and interpret numerical expressions	8
RIT Score Band 218–221	9
1 Expressions & Equations	.9
1.1 Apply and extend previous understandings of arithmetic to algebraic expressions	9
1.2 Reason about and solve one-variable equations and inequalities1	.0
1.3 Represent and analyze quantitative relationships between dependent and independent variables1	1
RIT Score Band 222–2261	.2
1 Expressions & Equations1	2
1.1 Use properties of operations to generate equivalent expressions	.2
1.2 Solve real-life and mathematical problems using numerical and algebraic expressions and equations1	.2
RIT Score Band 227–2281	.4
1 Expressions & Equations1	4
1.1 Work with radicals and integer exponents1	_4
1.2 Understand the connections between proportional relationships, lines, and linear equations	⊾5
1.3 Analyze and solve linear equations and pairs of simultaneous linear equations 1	.6

2 Functions	17
2.1 Define, evaluate, and compare functions	17
2.2 Use functions to model relationships between quantities	17

RIT Score Band 189–200

1 Operations & Algebraic Thinking

1.1 Represent and solve problems involving multiplication and division

Outcome	Quests	Content
3.OA.A.1 Interpret products of whole numbers.	Introducing multiplication	Multiplying using arrays and repeated addition
3.OA.A.2 Interpret whole-number	Introducing division	Dividing by sharing (up to 50)
quotients of whole numbers.		Dividing by grouping (up to 50)
		Create and solve problems involving equal groups
		Using repeated subtraction to divide
3.0A.A.3 Use multiplication and division within 100 to solve word	Multiplication and division problems	Multiplication problems: fair share/equal grouping
problems in situations involving equal groups, arrays, and measurement quantities.		Multiplication/division problems: arrays
3.OA.A.4 Determine the unknown whole number in a multiplication or division equation relating three whole numbers.	Multiply/divide: finding the unknown	Multiply/divide: finding the unknown

1.2 Understand properties of multiplication and the relationship between multiplication and division

Outcome	Quests	Content
3.OA.B.5 Apply properties of	Multiplication	Multiplication properties
operations as strategies to multiply	properties	
and divide.		
3.OA.B.6 Understand division as an	Division: unknown-	Understand division as an
unknown-factor problem.	factor problems	unknown-factor problem

1.3 Multiply and divide within 100

Outcome	Quests	Content
3.OA.C.7 Fluently multiply and	Multiplication and	Multiplication facts: 2, 4, 8
divide within 100, using strategies	division facts	Multiplication facts: 5, 10
such as the relationship between		Multiplication facts: 3, 6, 9
multiplication and division or		Multiplication facts: 7
properties of operations. By the end		Recalling multiplication facts
of Grade 3, know from memory all		to 5 x 5
products of two one-digit numbers.		Recalling multiplication facts
		to 10 x 10
		Division facts: 2, 4, 8
		Division facts: 5, 10
		Division facts: 3, 6, 9
		Division facts: 7

1.4 Solve problems involving the four operations, and identify and explain patterns in arithmetic

Outcome	Quests	Content
3.OA.D.8 Solve two-step word	2-step word problems:	2-step word problems with
problems using the four operations.	4 operations	the 4 operations
Represent these problems using		
equations with a letter standing for		
the unknown quantity. Assess the		
reasonableness of answers using		
mental computation and estimation		
strategies including rounding.		
3.0A.D.9 Identify arithmetic	Number patterns	Identifying and creating
patterns (including patterns in the		number patterns
addition table or multiplication		Identifying odd and even
table), and explain them using		number patterns
properties of operations.		Exploring number patterns in
		tables and charts

RIT Score Band 201–210

1 Operations & Algebraic Thinking

1.1 Use the four operations with whole numbers to solve problems

Outcome	Quests	Content
4.OA.A.1 Interpret a multiplication equation as a comparison. Represent verbal statements of multiplicative comparisons as multiplication equations.	Interpret multiplication as a comparison	Describe comparisons using multiplication language
4.OA.A.2 Multiply or divide to solve word problems involving multiplicative comparison, distinguishing multiplicative comparison from additive comparison.	Solving comparison word problems	Solving comparison word problems
4.OA.A.3 Solve multistep word problems posed with whole numbers and having whole-number answers using the four operations, including problems in which remainders must be interpreted. Represent these problems using equations with a letter standing for the unknown quantity. Assess the reasonableness of answers using	Solving word problems: 4 operations	Multi-step multiplication/division word problems Solving division word problems Solving multiplication word problems Two-step addition/subtraction word problems
mental computation and estimation strategies including rounding.		

1.2 Gain familiarity with factors and multiples

Outcome	Quests	Content
4.OA.B.4 Find all factor pairs for a	Factors, multiples and	Finding multiples: whole
whole number in the range 1-100.	prime numbers	numbers up to 100
Recognize that a whole number is a		Finding factors: whole
multiple of each of its factors.		numbers up to 100
Determine whether a given whole		Prime and composite numbers
number in the range 1-100 is a		
multiple of a given one-digit		
number. Determine whether a given		
whole number in the range 1-100 is		
prime or composite.		

1.3 Generate and analyze patterns

Outcome	Quests	Content
4.OA.C.5 Generate a number or	Generating number	Generate shape patterns from
rule. Identify apparent features of	und snupe putterns	Generate addition patterns
the rule itself.		Generate subtraction patterns
		Generate multiplication patterns from a given rule

RIT Score Band 211–217

1 Operations & Algebraic Thinking

1.1 Write and interpret numerical expressions

Outcome	Quests	Content
5.0A.A.1 Use parentheses,	Using grouping	Order of operations with
brackets, or braces in numerical	symbols	grouping symbols
expressions, and evaluate		
expressions with these symbols.		
5.0A.A.2 Write simple expressions	Writing and	Writing & interpreting
that record calculations with	interpreting	expressions without solving
numbers, and interpret numerical	expressions	Comparing numerical patterns
expressions without evaluating		Interpreting and creating a
them.		number pattern table
		Graphing ordered pairs from
		numerical patterns

RIT Score Band 218–221

1 Expressions & Equations

1.1 Apply and extend previous understandings of arithmetic to algebraic expressions

Outcome	Quests	Content
6.EE.A.1 Write and evaluate	Numerical expressions	Writing numerical expressions with exponents
whole-number exponents.	with exponents	Evaluating numerical
		expressions with exponents
6.EE.A.2.A Write expressions that record operations with numbers and with letters standing for numbers.	Writing expressions: numbers & variables	Writing expressions with numbers and variables
6.EE.A.2.B Identify parts of an expression using mathematical terms (sum, term, product, factor, quotient, coefficient); view one or more parts of an expression as a single entity.	Parts of an expression	Identifying parts of an expression
6.EE.A.2.C Evaluate expressions at specific values of their variables.	Evaluating algebraic expressions	Evaluating algebraic expressions
Include expressions that arise from formulas used in real-world problems. Perform arithmetic operations, including those involving whole-number exponents, in the conventional order when there are no parentheses to specify a particular order (Order of Operations).		Evaluating expressions using order of operations
6.EE.A.3 Apply the properties of operations to generate equivalent expressions.	Properties of operations: expressions	Properties of operations: equivalent expressions
6.EE.A.4 Identify when two expressions are equivalent (i.e., when the two expressions name the same number regardless of which value is substituted into them).	Equivalent expressions	Identifying equivalent expressions

1.2 Reason about and solve one-variable equations and inequalities

Outcome	Quests	Content
6.EE.B.5 Understand solving an equation or inequality as a process of answering a question: which values from a specified set, if any, make the equation or inequality true? Use substitution to determine whether a given number in a specified set makes an equation or inequality true.	Testing solutions	Testing solutions: equations Testing solutions: inequalities
6.EE.B.6 Use variables to represent numbers and write expressions when solving a real-world or mathematical problem; understand that a variable can represent an unknown number, or, depending on the purpose at hand, any number in a specified set.	Writing algebraic expressions	Writing algebraic expressions
6.EE.B.7 Solve real-world and mathematical problems by writing	Solving 1-step	Preserving equality in equations
and solving equations of the form $x + p = q$ and $px = q$ for cases in	equations	Solving simple linear equations using models
which p, q and x are all nonnegative rational numbers.		1-step equations: add/subtract, positive integers
		1-step equations: add/subtract, rational numbers
		1-step equations: multiply, positive integers
		1-step equations: multiply, rational numbers
		1-step equations: division, rational numbers
		Writing and solving 1-step equations
6.EE.B.8 Write an inequality of the	Writing and	Writing inequalities
form $x > c$ or $x < c$ to represent a	representing	Represent algebraic
constraint or condition in a real-	inequalities	inequalities on a number line
Recognize that inequalities of the		
form $x > c$ or $x < c$ have infinitely		
many solutions; represent solutions		
of such inequalities on number line		
diagrams.		

1.3 Represent and analyze quantitative relationships between dependent and independent variables

Outcome	Quests	Content
6.EE.C.9 Use variables to represent	Independent and	Independent and dependent
two quantities in a real-world	dependent variables	variables
problem that change in relationship		
to one another; write an equation to		
express one quantity, thought of as		
the dependent variable, in terms of		
the other quantity, thought of as		
the independent variable. Analyze		
the relationship between the		
dependent and independent		
variables using graphs and tables,		
and relate these to the equation.		
For example, in a problem involving		
motion at constant speed, list and		
graph ordered pairs of distances		
and times, and write the equation d		
= 65t to represent the relationship		
between distance and time.		

RIT Score Band 222–226

1 Expressions & Equations

1.1 Use properties of operations to generate equivalent expressions

Outcome	Quests	Content
7.EE.A.1 Apply properties of	Linear expressions:	Simplify algebraic expressions:
operations as strategies to dad,	properties	add/subtract
subtract, factor, and expand linear		Distributive property: algebraic
expressions with rational		expressions
coefficients.		Factoring algebraic
		expressions
7.EE.A.2 Understand that rewriting	Interpreting	Rearranging expressions to
an expression in different forms in a	expressions	interpret quantities
problem context can shed light on		
the problem and how the quantities		
in it are related.		

1.2 Solve real-life and mathematical problems using numerical and algebraic expressions and equations

Outcome	Quests	Content
7.EE.B.3 Solve multi-step real-life	Solving problems with	Solving problems with rational
and mathematical problems posed	rational numbers	numbers
with positive and negative rational		Converting terminating
numbers in any form (whole		decimals
numbers, fractions, and decimals),		
using tools strategically. Apply		
properties of operations to calculate		
with numbers in any form; convert		
between forms as appropriate; and		
assess the reasonableness of		
answers using mental computation		
and estimation strategies.		
7.EE.B.4.A Solve word problems	Solving 2-step	Solving 2-step equations:
leading to equations of the form px	equations	word problems
+ q = r and p(x + q) = r, where p, q,		2-step equations, positive
and r are specific rational numbers.		integer coefficients
Solve equations of these forms		2-step equations, integer
fluently. Compare an algebraic		coefficients
solution to an arithmetic solution,		2-step equations, positive
		rational coefficients

identifying the sequence of the		2-step equations, rational
operations used in each approach.		coefficients
		2-step equations, distributive
		property
7.EE.B.4.B Solve word problems	Solving 2-step	Creating and solving 2-step
leading to inequalities of the form	inequalities	inequalities
px + q > r or px + q < r, where p, q,		Representing inequalities
and r are specific rational numbers.		Graphing the solution of an
Graph the solution set of the		inequality
inequality and interpret it in the		Solving 2-step inequalities
context of the problem.		

RIT Score Band 227–228

1 Expressions & Equations

1.1 Work with radicals and integer exponents

Outcome Quests Content	
8.EE.A.1 Know and apply the Properties of integer Using exponent notation	
properties of integer exponents to exponents Product of powers, numeri	cal
generate equivalent numerical base	
expressions. Product of powers, algebra	iic
base	
Quotient of powers, numer	ical
base	
Quotient of powers, algebr	aic
base	
Power of a power, numeric	al
base	
Power of a power, algebra	ic
base	
Zero exponents, numerical	
base	
Zero exponents, algebraic	
base	
Negative exponents, nume	rical
base	
Negative exponents, algeb	raic
base	
Simplifying expressions,	
numerical base	
Simplifying expressions,	
algebraic base	
8.EE.A.2 Use square root and cube Square and cube roots Squares and square roots	
root symbols to represent solutions Evaluating expressions wit	h
to equations of the form $x^2 = p$ and square and cube roots	
x ³ = p, where p is a positive rational Square roots of fractions a	nd
number. Evaluate square roots of decimals	
small perfect squares and cube Cubes and cube roots	
roots of small perfect cubes. Know	
	-
8.EE.A.3 Use numbers expressed in Writing numbers in Introducing scientific notat	on
the form of a single digit times an scientific notation Converting scientific notati	on
to standard form	
and to express how many times as	10

8.EE.A.4 Perform operations with	Calculations in	Calculations in scientific
numbers expressed in scientific	scientific notation	notation
notation, including problems where		
both decimal and scientific notation		
are used. Use scientific notation		
and choose units of appropriate		
size for measurements of very large		
or very small quantities (e.g., use		
millimeters per year for seafloor		
spreading). Interpret scientific		
notation that has been generated		
by technology		

1.2 Understand the connections between proportional relationships, lines, and linear equations

Outcome	Quests	Content
8.EE.B.5 Graph proportional relationships, interpreting the unit	Proportional relationships	Graphing proportional relationships
rate as the slope of the graph. Compare two different proportional relationships represented in different ways.		Comparing proportional relationships
8.EE.B.6 Use similar triangles to explain why the slope m is the	Understanding slope and y-intercept	Using similar triangles to understand slope
same between any two distinct points on a non-vertical line in the		Writing equations of proportional relationships
coordinate plane; derive the equation $y = mx$ for a line through		Writing equations of
the origin and the equation $y = mx$ + b for a line intercepting the		Identifying the slope in an equation or graph
vertical axis at b.		Identifying the y-intercept on a graph
		Graphing equations in slope- intercept form
		Graphing equations not in slope-intercept form
		Finding the y-intercept algebraically

1.3 Analyze and solve linear equations and pairs of simultaneous linear equations

Outcome	Quests	Content
8.EE.C.7.A Give examples of linear equations in one variable with one solution, infinitely many solutions, or no solutions. Show which of these possibilities is the case by successively transforming the given equation into simpler forms, until an equivalent equation of the form $x =$ a, $a = a$, or $a = b$ results (where a and b are different numbers).	Solution types of linear equations	Solution types of linear equations
8.EE.C.7.B Solve linear equations with rational number coefficients	Solving linear	Solving 3-step linear
including equations whose solutions require expanding expressions using the distributive property and collecting like terms.		Solving linear equations, variables on both sides Solving linear equations, distributive property Using substitution to check
8.EE.C.8.A Understand that solutions to a system of two linear equations in two variables correspond to points of intersection of their graphs, because points of intersection satisfy both equations simultaneously.	ldentify solutions, systems of equations	Identify solutions, systems of equations
8.EE.C.8.B Solve systems of two linear equations in two variables	Solving systems of equations	Solving systems of equations graphically
algebraically, and estimate solutions by graphing the		Solving systems of equations using elimination
equations. Solve simple cases by inspection.		Solving systems of equations using substitution Checking the solution of a system of equations
8.EE.C.8.C Solve real-world and mathematical problems leading to two linear equations in two variables.	Writing and solving systems of equations	Writing and solving systems of equations

2 Functions

2.1 Define, evaluate, and compare functions

Outcome	Quests	Content
8.F.A.1 Understand that a function is a rule that assigns to each input exactly one output. The graph of a function is the set of ordered pairs consisting of an input and the corresponding output.	Identifying functions	Identifying functions
8.F.A.2 Compare properties of two functions each represented in a different way (algebraically, graphically, numerically in tables, or by verbal descriptions).	Comparing functions	Comparing functions represented in different ways
8.F.A.3 Interpret the equation y = mx + b as defining a linear function, whose graph is a straight line; give examples of functions that are not linear	Interpret y = mx + b as linear	Represent linear relationships in different forms Equations of linear and non- linear relationships

2.2 Use functions to model relationships between quantities

Outcome	Quests	Content
8.F.B.4 Construct a function to model a linear relationship between two quantities. Determine the rate of change and initial value of the function from a description of a relationship or from two (x, y) values, including reading these from a table or from a graph. Interpret the rate of change and initial value of a linear function in terms of the situation it models, and in terms of its graph or a table of values.	Rate of change and initial value	Rate of change and initial value
8.F.B.5 Describe qualitatively the functional relationship between two quantities by analyzing a graph (e.g., where the function is increasing or decreasing, linear or nonlinear). Sketch a graph that exhibits the qualitative features of a function that has been described verbally.	Distance-time graphs	Distance-time graphs



For more information about Mathletics, contact our friendly team.

www.mathletics.com/contact

