Grades 5-8 Operations & Algebraic Thinking, Expressions & Equations and Functions Coherence Card Sort

Grades 5-8 Operations & Algebraic Thinking, Expressions & Equations and Functions Standards	Grades 5-8 Operations & Algebraic Thinking, Expressions & Equations and Functions Standards
Construct a function to model a linear relationship between two quantities. a. 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. b. 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.	Use parentheses, brackets, or braces in numerical expressions, and evaluate expressions that include symbols.
Write simple expressions with numbers and interpret numerical expressions without evaluating them.	Generate numerical patterns for situations. a. Generate a rule for growing patterns, identifying the relationship between corresponding terms (x, y). b. Generate patterns using one or two given rules (x, y). c. Use tables, ordered pairs, and graphs to represent the relationship between the quantities.
Apply the properties of operations to generate equivalent expressions.	Identify when two expressions are equivalent, when the two expressions name the same number regardless of which value is substituted into them.

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Write and evaluate numerical expressions involving whole-number exponents.	Know and apply the properties of integer exponents to generate equivalent numerical expressions.
Write, read and evaluate expressions in which letters stand for numbers. a. Write expressions that record operations with numbers and with letters standing for numbers. b. Identify parts of an expression using mathematical terms (sums, term, product, factor, quotient, coefficient); view one or more parts of an expression in a single entity. c. Evaluate expressions for specific values of their variables, including values that are non-negative rational numbers. Include expressions that arise from formulas used in real-world problems. Perform arithmetic operations, including whole-number exponents, in the conventional order when there are no parentheses to specify a particular order (Order of Operations).	Use variables to represent quantities in a real-world or mathematical problem and construct equations and inequalities to solve problems by reasoning about the quantities. a. Solve word problems leading to equations of the form $px + q = r$ and $p(x + q) = r$, where p, q, and r are specific rational numbers. Solve equations of these forms fluently. Graph the solution set of the equality and interpret it in the context of the problem. b. Solve word problems leading to inequalities of the form $px+q > r$, $px + q < r$, $px + q \geq r$, $px+q \leq r$; where p, q, and r are specific rational numbers. Graph the solution set of the inequality and interpret it in context of the problem.

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Analyze and solve a system of two linear equations. 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; understand that a system of two linear equation may have one solution, no solution, or infinitely many solutions. b. Solve systems of two linear equations in two variables algebraically by using substitution where at least one equation contains at least one variable whose coefficient is 1 and by inspection for simple cases. c. Solve real-world and mathematical problems leading to two linear equations in two variables.	Use graphs to represent functions. a. Describe qualitatively the functional relationship between two quantities by analyzing a graph. b. Sketch a graph that exhibits the qualitative features of a function that has been described verbally.
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.	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.
Use square root and cube root symbols to represent solutions to equations of the form $x^2 = p$ and $x^3 = p$, where p is a positive rational number. Evaluate square roots of small perfect squares and cube roots of small perfect cubes. Know that perfect squares and perfect cubes are rational.	Use numbers expressed in the form of a single digit times an integer power of 10 (Scientific Notation) to estimate very large or very small quantities and express how many times larger or smaller one is than the other.

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Solve real-world and mathematical problems by writing and solving equations of the form $x + p = q$ and $px = q$ for cases in which p, q and x are all nonnegative rational numbers.	Write an inequality of the form $x > c$, $x < c$, $x \geq c$, or $x \leq c$ to represent a constraint or condition in a real-world or mathematical problem. Recognize that inequalities of these forms have infinitely many solutions; represent solutions of such inequalities on vertical and horizontal number lines.
Understand that rewriting an expression in different forms in a problem context can clarify the problem and how the quantities in it are related.	Solve real-life and mathematical problems posed with positive and negative rational numbers in any form, 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.
Perform operations with numbers expressed in scientific 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. Interpret scientific notation that has been generated by technology.	Graph proportional relationships, interpreting the unit rate as the slope of the graph. Compare two different proportional relationships represented in different ways.

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Use similar triangles to explain why the slope, m, is the same between any two distinct points on a non-vertical line in the coordinate plane; know the equation $y = mx$ for a line through the origin and the equation $y = mx + b$ for a line intercepting the vertical axis at b.	Solve linear equations in one variable. 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). b. Solve linear equations with rational number coefficients, including equations whose solutions require expanding expressions using the distributive property and combining like terms.
Use variables to represent two quantities in a real-world problem that change in relationship to one another; a. Appropriately recognize one quantity as the dependent variable and the other as the independent variable. b. 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. c. Analyze the relationship between the dependent and independent variables using graphs and tables and relate these to the equation.	Apply properties of operations as strategies to add, subtract, factor, and expand linear expressions with rational coefficients.
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.	Compare properties of two functions each represented in a different way (algebraically, graphically, numerically in tables, or by verbal descriptions).

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Understand properties of linear functions. a. Interpret the equation y = mx + b as defining a linear function, whose graph is a straight line. b. Identify and give examples of functions that are not linear.	