Grades K-6 Counting & Cardinality, Number and Operations (Base Ten & Fractions), Ratio & Proportion and Number System Coherence Card Sort

Grades K-6 Counting & Cardinality, Number and Operations (Base Ten & Fractions), Ratio & Proportion and Number System Standards	Grades K-6 Counting & Cardinality, Number and Operations (Base Ten & Fractions), Ratio & Proportion and Number System Standards
Understand the relationship between numbers and quantities; connect counting to cardinality. a. When counting objects, say the number names in the standard order, pairing each object with one and only one number name and each number name with one and only one object. b. Understand that the last number name said tells the number of objects counted. The number of objects is the same regardless of their arrangement or the order in which they were counted. c. Understand that each successive number name refers to a quantity that is one larger.	Given a number from 1-20, count out that many objects. a. Count to answer "how many?" questions with as many as 20 things arranged in a line, a rectangular array, or a circle. b. Count to answer "how many?" questions with as many as 10 things in a scattered configuration.
Understand the two-digits of a two-digit number represent amounts of tens and ones. Understand the following as special cases: a. 10 can be thought of as a bundle of ten ones — called a "ten." b. The numbers from 11 to 19 are composed of a ten and one, two, three, four, five, six, seven, eight, or nine ones. c. The numbers 10, 20, 30, 40, 50, 60, 70, 80, 90 refer to one, two, three, four, five, six, seven, eight, or nine tens (and 0 ones).	Add within 100 including adding a two-digit number and a one digit number. Add a two-digit number and a multiple of 10 a. Add within 100 using… • concrete models or drawings; • strategies based on place value; • properties of operations; • the relationship between addition and subtraction. b. Relate the strategy to a written method and explain the reasoning used. Understand that in adding two-digit numbers, one adds tens and tens, ones and ones; and sometimes it is necessary to compose a ten.

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Compose and decompose numbers from 11 to 19 using quantities (numbers with units) of ten ones and some further ones. Understand that these numbers are composed of ten ones and one, two, three, four, five, six, seven, eight, or nine ones.	Represent numbers. a. Write numbers from 0-20. b. Represent a number of objects with a written numeral 0-20 (with 0 representing a count of no objects).
Count a. Count to 100 by ones and tens. b. Count backwards from 30 by ones.	Count forward beginning from a given number within the known sequence within 100 (instead of having to begin at 1).
Identify whether the number of objects in one group is greater than, less than or equal to the number of objects in another group.	Compare two numbers between 1 and 10 presented as written numerals.

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Count and represent number. a. Count forward and backward from 120, starting at any number less than 120. b. In this range, read and write numerals and represent a number of objects with a written numeral.	Compare two two-digit numbers based on meanings of the tens and ones digits, recording the results of comparisons with the symbols >, = and <.
Subtract multiples of 10 in the range 10-90 from multiples of 10 in the range 10-90 (positive or zero differences). a. Subtract using ● concrete models or drawings; ● strategies based on place value; ● properties of operations; ● the relationship between addition and subtraction b. Relate the subtraction strategy to a written method and explain the reasoning used.	Understand that the three digits of a three-digit number represent amounts of hundreds, tens, and ones. Understand the following as special cases: a. 100 can be thought of as a bundle of ten tens — called a “hundred.” b. The numbers 100, 200, 300, 400, 500, 600, 700, 800, 900 refer to one, two, three, four, five, six, seven, eight, or nine hundreds (and 0 tens and 0 ones).
Given a two-digit number, mentally find 10 more or 10 less than the number, without having to count; explain the reasoning used.	Count forwards and backwards within 1000; skip-count by 5s, 10s, and 100s.

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Read and write numbers to 1000 using base-ten numerals, number names, and expanded form.	Compare two three-digit numbers based on meanings of the hundreds, tens, and ones digits, using >, = and < symbols to record the results of comparisons.
Fluently add and subtract within 100 using strategies based on place value, properties of operations, and/or the relationship between addition and subtraction.	Add up to four two-digit numbers using strategies based on place value and properties of operations.
Add and subtract within 1000. a. Represent and solve addition and subtraction problems using… • concrete models or drawings; • strategies based on place value; • properties of operations; • the relationship between addition and subtraction; • relate drawings and strategies to expressions or equations. b. Understand that in adding or subtracting three-digit numbers, one adds or subtracts hundreds and hundreds, tens and tens, ones and ones; and sometimes it is necessary to compose or decompose tens or hundreds.	Divide up to four-digit dividends by one-digit divisors. Find whole number quotients and remainders using • strategies based on place value • the properties of operations • the relationship between multiplication and division Illustrate and explain the calculation by using equations, rectangular arrays, and/or area models.

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Mentally add 10 or 100 to a given number 100–900, and mentally subtract 10 or 100 from a given number 100–900.	Explain why addition and subtraction strategies work, using place value and the properties of operations.
Multiply one-digit whole numbers by multiples of 10 in the range 10–90 using strategies based on place value and properties of operations.	Recognize in a multi-digit whole number, a digit in one place represents ten times what it represents in the place to its right.
Use place value understanding to round whole numbers to the nearest 10 or 100.	Fluently add and subtract within 1000 using strategies and algorithms based on place value, properties of operations, and/or the relationship between addition and subtraction.

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Represent and compare multi-digit whole numbers a. Read and write multi-digit whole numbers using base-ten numerals, number names, and expanded form. b. Compare two multi-digit numbers based on meanings of the digit in each place, using >, = and < symbols to record the results of comparisons.	Multiply whole numbers ● up to four digits by a one-digit whole number ● two-digit number by two-digit number Multiply using strategies based on place value and the properties of operations. Illustrate and explain the calculation by using equations, rectangular arrays, and/or area models.
Use place value understanding to round multi-digit whole numbers to any place.	Fluently add and subtract multi-digit whole numbers using an algorithm.
Recognize that in a multi-digit number, a digit in one place represents 10 times as much as it represents in the place to its right and 1/10 of what it represents in the place to its left.	Multiply and divide by powers of 10. ● Explain patterns in the number of zeros of the product when multiplying a number by powers of 10 ● Explain patterns in the placement of the decimal point when a decimal is multiplied or divided by a power of 10. ● Use whole-number exponents to denote powers of 10.

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Fluently multiply multi-digit whole numbers (not to exceed four-digit by two-digit multiplication) using an algorithm.	Divide up to four-digit dividends by two-digit divisors. a. Find whole-number quotients of whole numbers with up to four-dividends and two-digit divisors using… • strategies based on place value • the properties of operations • the relationship between multiplication and division b. Illustrate and explain the calculation by using equations, rectangular arrays, and/or area models.
Read, write, and compare decimals to thousandths. a. Read and write decimals to thousandths using base-ten numerals, number names, and expanded form. b. Compare two decimals to thousandths based on meanings of the digits in each place, using >, = and < symbols to record the results of comparisons.	Use place value understanding to round decimals to any place.
Operations with decimals to hundredths. a. Add, subtract, multiply, and divide decimals to hundredths using… • concrete models or drawings • strategies based on place value • properties of operations • the relationship between addition and subtraction b. Relate the strategy to a written method and explain the reasoning used.	Interpret and compute quotients of fractions and solve word problems involving division of fractions by fractions.

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Fluently divide multi-digit numbers using an algorithm. a. Convert a rational number to a decimal using long division. b. Know that the decimal form of a rational number terminates in 0s or eventually repeats.	Fluently add, subtract, multiply, and divide multi-digit decimals using an algorithm for each operation.
Use the distributive property to express a sum of two whole numbers 1 – 100 with a common factor as a multiple of a sum of two whole numbers with no common factor.	Understand that positive and negative numbers are used together to describe quantities having opposite directions or values; use positive and negative numbers to represent quantities in real-world contexts, explaining the meaning of 0 in each situation.
Understand a fraction 1/*b* as the quantity formed by 1 part when a whole is partitioned into *b* equal parts; understand a fraction *a*/*b* as the quantity formed by *a* parts of size 1/*b*.	Compare two fractions with different numerators and different denominators using the symbols >, = or <. Recognize comparisons are valid only when the two fractions refer to the same whole. Justify the conclusions.

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Solve real world problems involving multiplication of fractions and mixed numbers.	Understand and generate equivalent fractions. a. Use visual fraction models to recognize and generate equivalent fraction that have different numerators/denominators even though they are the same size. b. Explain why a fraction a/b is equivalent to a fraction $(n \times a)/(n \times b)$.
Use decimal notation for fractions with denominators 10 or 100.	Convert and add fractions with denominators of 10 and 100. a. Convert a fraction with a denominator of 10 as an equivalent fraction with denominator 100. b. Add two fractions with respective denominators 10 and 100.
Understand a fraction as a number on the number line; represent fractions on a number line diagram. a. Represent a fraction $1/b$ (unit fraction) on a number line diagram by defining the interval from 0 to 1 as the whole and partitioning it into b equal parts. ● Recognize that each part has size $1/b$. ● a unit fraction, $1/b$ is located $1/b$ whole unit from 0 on the number line. b. Represent a non-unit fraction a/b on a number line by marking off a lengths of $1/b$ (unit fractions) from 0. Recognize that the resulting interval has size a/b and that its endpoint locates the non-unit fraction a/b on the number line.	Understand ordering and absolute value of rational numbers. a. Interpret statements of inequality as statements about the relative position of two numbers on a number line diagram. b. Write, interpret, and explain statements of order for rational numbers in real-world contexts. c. Understand the absolute value of a rational number as its distance from 0 on the number line; interpret absolute value as magnitude for a positive or negative quantity in a real-world situation. d. Distinguish comparisons of absolute value from statements about order.

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Understand a rational number as a point on the number line. Extend number line diagrams and coordinate axes, using appropriate range and intervals, to represent points on the line and in the plane that include negative numbers and coordinates. a. Recognize opposite signs of numbers as indicating locations on opposite sides of 0 on the number line; recognize 0 is its own opposite and the opposite of a negative number is a positive, and the opposite of a negative number is the number itself, such as –(–3) = 3. b. Find and position integers and other rational numbers on a horizontal or vertical number line diagram; find and position pairs of integers and other rational numbers on a coordinate plane. c. Understand signs of numbers in ordered pairs as indicating locations in quadrants of the coordinate plane; recognize the similarity between whole numbers, their negative opposites and their positions on a number line, ordered pairs differ only by signs and their locations on one or both axes.	Explain equivalence of fractions in special cases and compare fractions by reasoning about their size. a. Understand two fractions as equivalent (equal) if they are the same size, or the same point on a number line. b. Recognize and generate simple equivalent fractions. Explain why the fractions are equivalent through writing or drawing. c. Express whole numbers as fractions and recognize fractions that are equivalent to whole numbers. Compare two fractions with the same numerator or the same denominator by reasoning about their size. Recognize that comparisons are valid only when the two fractions refer to the same whole. Record the results of comparisons with the symbols >, =, or <, and justify the conclusions.
Apply and extend previous understandings of multiplication to multiply a fraction by a whole number a. Understand a fraction a/b as a multiple of $1/b$. b. Understand a multiple of a/b as a multiple of $1/b$ and use this understanding to multiply a fraction by a whole number. c. Solve word problems involving multiplication of a fraction by a whole number.	Compare two decimals to hundredths. a. Compare two decimals to hundredths by reasoning about their size. b. Recognize that comparisons are valid only when the two decimals refer to the same whole. c. Record the results of comparisons with the symbols >, = or < and justify the conclusions.

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Efficiently add and subtract fractions with unlike denominators (including mixed numbers) by… ● using reasoning strategies, such as counting up on a number line or creating visual fraction models ● finding common denominators	Solve word problems involving addition and subtraction of fractions. a. Solve word problems involving addition and subtraction of fractions referring to the same whole, including cases of unlike denominators. b. Use benchmark fractions and number sense of fractions to estimate mentally and assess the reasonableness of answers.
Understand the concept of a ratio and use ratio language to describe a ratio relationship between two quantities.	Interpret a fraction as division of the numerator by the denominator (a/b = a ÷ b). Solve word problems involving division of whole numbers leading to answers in the form of fractions or mixed numbers by using visual fraction models or equations to represent the problem.

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Interpret multiplication as scaling (resizing), by: a. Comparing the size of a product to the size of one factor on the basis of the size of the other factor, without performing the indicated multiplication. b. Explaining why multiplying a given number by a fraction greater than 1 results in a product greater than the given number (recognizing multiplication by whole numbers greater than 1 as a familiar case); explaining why multiplying a given number by a fraction less than 1 results in a product smaller than the given number; and relating the principle of fraction equivalence a/b = (n×a)/(n×b) to the effect of multiplying a/b by 1.	Understand a fraction a/b with $a > 1$ as a sum of fractions $1/b$. a. Understand addition and subtraction of fractions as joining and separating parts referring to the same whole. b. Decompose a fraction into a sum of fractions with the same denominator in more than one way, recording each decomposition by an equation. Justify decompositions. c. Add and subtract mixed numbers with like denominators. d. Solve word problems involving addition and subtraction of fractions referring to the same whole and having like denominators.
Understand the concept of a unit rate a/b associated with a ratio $a:b$ with $b \neq 0$ and use rate language in the context of a ratio relationship.	Use ratio and rate reasoning to solve real-world and mathematical problems. a. Make tables of equivalent ratios relating quantities with whole-number measurements, find missing values in the tables, and plot the pairs of values on the coordinate plane. Use tables to compare ratios. b. Solve rate problems including those involving unit pricing and constant speed. c. Use ratio reasoning to convert measurement units; manipulate and transform units appropriately when multiplying or dividing quantities.

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Apply and extend previous understandings of multiplication to multiply a fraction or whole number by a fraction. a. Interpret the product $(a/b) \times q$ as a parts of a partition of q into b equal parts; equivalently, as the result of a sequence of operations $a \times q \div b$. b. Find the area of a rectangle with fractional side lengths by tiling it with squares of the appropriate unit fraction side lengths and show that the area is the same as would be found by multiplying the side lengths. Multiply fractional side lengths to find areas of rectangles and represent fraction products as rectangular areas.	Apply and extend previous understandings of division to divide unit fractions by whole numbers and whole numbers by unit fractions. a. Interpret division of a unit fraction by a non-zero whole number and compute such quotients. b. Interpret division of a whole number by a unit fraction and compute such quotients. c. Solve real world problems involving division of unit fractions by non-zero whole numbers and division of whole numbers by unit fractions.
	Solve real-world and mathematical problems by graphing points in all four quadrants of the coordinate plane. Include use of coordinates and absolute value to find distances between points with the same first coordinate or the same second coordinate.