Kansas Mathematics

Grade 4

Adopted 2017

Standards for Mathematical Practice

1. **Make sense of problems and persevere in solving them.** MP.1
2. **Reason abstractly and quantitatively.** MP.2
3. **Construct viable arguments and critique the reasoning of others.** MP.3
4. **Model with mathematics** MP.4
5. **Use appropriate tools strategically** MP.5
6. **Attend to precision.** MP.6
7. **Look for and make use of structure.** MP.7
8. **Look for and express regularity in repeated reasoning.** MP.8

Operations and Algebraic Thinking

Use the four operations with whole numbers to solve problems.

1. Interpret a multiplication equation as a comparison, (e.g. interpret 35 = 5·7 as a statement that 35 is 5 times as many as 7 and 7 times as many as 5.) Represent verbal statements of multiplicative comparisons as multiplication equations. 4.OA.1
2. Multiply or divide to solve word problems involving multiplicative comparison, (e.g. by using drawings and equations with a symbol for the unknown number to represent the problem, distinguishing multiplicative comparison from additive comparison.) 4.OA.2
3. Solve multi-step word problem 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 situation equations and/or solution equations with a letter or symbol standing for the unknown quantity. Assess the reasonableness of answers using mental computation and estimation strategies including rounding. 4.OA.3

Gain familiarity with factors and multiples.

4. Find all factor pairs for a whole number in the range 1 to 100. Recognize that a whole number is a multiple of each of its factors. Determine whether a given whole number in the range 1 to 100 is a multiple of a given one-digit number. Determine whether a given whole number in the range 1 to 100 is prime or composite. 4.OA.4

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enerate and analyze patterns.

5. Generate a number or shape pattern that follows a given rule. Identify apparent features of the pattern that were not explicit in the rule itself. For example, given the rule "Add 3" and the starting number 1, generate terms in the resulting sequence and observe that the terms appear to alternate between odd and even numbers. Explain informally why the numbers will continue to alternate in this way. 4.OA.5

Number and Operations in Base Ten

Generalize place value understanding for multi-digit whole numbers.

1. Recognize that in a multi-digit whole number, a digit in one place represents ten times what it represents in the place to its right. 4.NBT.1
2. Read and write multi-digit whole numbers using base-ten numerals, number names, expanded form, and unit form. Compare two multi-digit numbers based on meanings of the digits in each place, using >, <, =, and ≠ symbols to record the results of comparisons. 4.NBT.2
3. Use place value understanding to round multi-digit whole numbers to any place. 4.NBT.3

Use place value understanding and properties of operations to perform multi-digit arithmetic.

4. Fluently (efficiently, accurately, and flexibly) add and subtract multi-digit whole numbers using an efficient algorithm (including, but not limited to: traditional, partial-sums, etc.), based on place value understanding and the properties of operations. 4.NBT.4
5. Multiply a whole number of up to four digits by a one-digit whole number, and multiply two two-digit numbers, 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. 4.NBT.5
6. Find whole-number quotients and remainders with up to four-digit dividends and one-digit divisors, using strategies based on place value, the properties of operations, and/or the relationship between multiplication and division. Illustrate and explain the calculation by using equations, rectangular arrays, and/or area models. 4.NBT.6

Measurement and Data

Represent and interpret data.

4. Make a data display (line plot, bar graph, pictograph) to show a set of measurements in fractions of a unit (½, ¼, 1/8, 1/16). Solve problems involving addition and subtraction of fractions by using information presented in the data display. 4.MD.4

Solve problems involving measurement and conversion of measurements from a larger unit to a smaller unit.

1. Know relative sizes of measurement units within one system of units including km, m, cm; kg, g; lb, oz; l, ml; hr, min, sec. Within a single system of measurement, express measurements in a larger unit in terms of a smaller unit. Record measurement equivalents in a two-column table. 4.MD.1

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2. Use the four operations to solve word problems involving distances, intervals of time, liquid volumes, masses of objects, and money, including problems involving simple fractions or decimals, and problems that require expressing measurements given in a larger unit in terms of a smaller unit. Represent measurement quantities using diagrams such as number line diagrams that feature a measurement scale. 4.MD.2
3. Apply the area and perimeter formulas for rectangles in real world and mathematical problems explaining and justifying the appropriate unit of measure. 4.MD.3

Geometry

Draw and identify lines and angles, and classify shapes by properties of their lines and angles.

1. Draw points, lines, line segments, rays, angles (right, acute, obtuse, straight, reflex), and perpendicular and parallel lines. Identify these in two-dimensional figures. 4.G.1
2. Classify two-dimensional figures based on the presence or absence of parallel or perpendicular lines, or the presence or absence of angles (right, acute, obtuse, straight, reflex). Recognize and categorize triangles based on angles (acute, obtuse, equiangular, and right) and/or sides (scalene, isosceles, and equilateral). 4.G.2
3. Recognize a line of symmetry for a two-dimensional figure as a line across the figure such that the figure can be folded along the line into matching parts. Identify line-symmetric figures and draw lines of symmetry. 4.G.3

Number and Operations—Fractions

Extend understanding of fraction equivalence and ordering.

1. Explain why a fraction a/b is equivalent to a fraction ((n·a))/((n·b)) by using visual fraction models, with attention to how the number and size of the parts differ even though the two fractions themselves are the same size. Use this principle to recognize and generate equivalent fractions. 4.NF.1
2. Compare two fractions with different numerators and different denominators, (e.g. by creating common numerators or denominators, or by comparing to a benchmark fraction such as ½.) Recognize that comparisons are valid only when the two fractions refer to the same whole. Record the results of comparisons with relational symbols >, <, =, or ≠, and justify the conclusions, (e.g. by using visual fraction models.). 4.NF.2

Build fractions from unit fractions by applying and extending previous understandings of operations on whole numbers.

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3. Understand a fraction a/b with a > 1 as a sum of fractions 1/b. 4.NF.3
    a. Understand addition and subtraction of fractions as joining and separating parts referring to the same whole. 4.NF.3.A
    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, e.g. by using a visual fraction model. 4.NF.3.B
    c. Add and subtract mixed numbers with like denominators, e.g. by replacing each mixed number with an equivalent fraction (simplest form is not an expectation), and/or by using properties of operations and the relationship between addition and subtraction. 4.NF.3.C
    d. Solve word problems involving addition and subtraction of fractions referring to the same whole and having like denominators, e.g. by using visual fraction models and equations to represent the problem. 4.NF.3.D
4. Apply and extend previous understandings of multiplication to multiply a fraction by a whole number. 4.NF.4
    a. Understand a fraction a/b as a multiple of 1/b. 4.NF.4.A
    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. 4.NF.4.B
    c. Solve word problems involving multiplication of a fraction by a whole number. 4.NF.4.C

Understand decimal notation for fractions, and compare decimal fractions.

5. Express a fraction with denominator 10 as an equivalent fraction with denominator 100, and use this technique to add two fractions with respective denominators 10 and 100. 4.NF.5
6. Use decimal notation for fractions with denominators 10 or 100. 4.NF.6
7. Compare two decimals to hundredths by reasoning about their size. Recognize that comparisons are valid only when the two decimals refer to the same whole. Record the results of comparisons with the relational symbols >, < =, or ≠, and justify the conclusions, (e.g. by using a visual model.). 4.NF.7