Kentucky Mathematics

Grade 4

Adopted 2019

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. Represent verbal statements of multiplicative comparisons as multiplication equations. KY.4.OA.1
2. Multiply or divide to solve word problems involving multiplicative comparisons by using drawings and equations with a symbol for the unknown number to represent the problem, distinguishing multiplicative comparison from additive comparison. KY.4.OA.2
3. Solve multistep problems. KY.4.OA.3
   a. Perform operations in the conventional order when there are no parentheses to specify a particular order. KY.4.OA.3.A
   b. 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 mental computations and estimation strategies including rounding. KY.4.OA.3.B

Gain familiarity with factors and multiples.

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4. Find factors and multiples of numbers in the range 1-100. KY.4.OA.4
    a. Find all factor pairs for a given whole number. KY.4.OA.4.A
    b. Recognize that a whole number is a multiple of each of its factors. KY.4.OA.4.B
    c. Determine whether a given whole number is a multiple of a given one-digit number. KY.4.OA.4.C
    d. Determine whether a given whole number is prime or composite. KY.4.OA.4.D

Generate and analyze patterns.

5. Generate a number or shape pattern that follows a given rule. Identify apparent features of the pattern not explicit in the rule itself. KY.4.OA.5

Numbers and Operations in Base Ten

Generalize place value understanding for multi-digit whole numbers.

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

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

4. Fluently add and subtract multi-digit whole numbers using an algorithm. KY.4.NBT.4
5. Multiply whole numbers
Up to four digit number by a one-digit 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. KY.4.NBT.5
6. 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. KY.4.NBT.6

Numbers and Operations-Fractions

Extend understanding of fraction equivalence and ordering.

1. Understand and generate equivalent fractions. KY.4.NF.1
    a. Use visual fraction models to recognize and generate equivalent fractions that have different numerators/denominators even though they are the same size. KY.4.NF.1.A
    b. Explain why a fraction a/b is equivalent to a fraction (n × a)/(n × b). KY.4.NF.1.B

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2. 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. KY.4.NF.2

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

3. Understand a fraction a/b with a > 1 as a sum of fractions 1/b. KY.4.NF.3
   a. Understand addition and subtraction of fractions as joining and separating parts referring to the same whole. KY.4.NF.3.A
   b. Decomposing a fraction into a sum of fractions with the same denominator in more than one way, recording each decomposition by an equation. Justify decompositions. KY.4.NF.3.B
   c. Add and subtract mixed numbers with like denominators. KY.4.NF.3.C
   d. Solve word problems involving addition and subtraction of fractions referring to the same whole and having like denominators. KY.4.NF.3.D
4. Apply and extend previous understandings of multiplication to multiply a fraction by a whole number. KY.4.NF.4
   a. Understand a fraction a/b as a multiple of 1/b. KY.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. KY.4.NF.4.B
   c. Solve word problems involving multiplication of a fraction by a whole number. KY.4.NF.4.C

Understand decimal notation for fractions and compare decimal fractions.

5. Convert and add fractions with denominators of 10 and 100. KY.4.NF.5
   a. Convert a fraction with a denominator of 10 to an equivalent fraction with a denominator of 100. KY.4.NF.5.A
   b. Add two fractions with respective denominators 10 and 100. KY.4.NF.5.B
6. Use decimal notation for fractions with denominators 10 or 100. KY.4.NF.6
7. Compare two decimals to hundredths. KY.4.NF.7
   a. Compare two decimals to hundredths by reasoning about their size. KY.4.NF.7.A
   b. Recognize that comparisons are valid only when the two decimals refer to the same whole. KY.4.NF.7.B
   c. Record the results of comparisons with the symbols >, =, or < and justify the conclusions. KY.4.NF.7.C

Measurement and Data

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

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1. Know relative size of measurement units (mass, weight, liquid volume, length, time) within one system of units (metric system, U.S. standard system and time). KY.4.MD.1
    a. Understand the relationship of measurement units within any given measurement system. KY.4.MD.1.A
    b. Within any given measurement system, express measurements in a larger unit in terms of a smaller unit. KY.4.MD.1.B
    c. Record measurement equivalents in a two-column table. KY.4.MD.1.C
2. Use the four operations to solve word problems involving distances, intervals of time, liquid volumes, masses of objects and money. KY.4.MD.2
    a. Solve measurement problems involving whole number, simple fractions or decimals. KY.4.MD.2.A
    b. Solve problems that require converting a given measurement from a larger unit to a smaller unit within a common measurement system, such as 2 km = 2,000 m. KY.4.MD.2.B
    c. Visually display measurement quantities using representations such as number lines that feature a measurement scale. KY.4.MD.2.C
3. Apply the area and perimeter formulas for rectangles in real world and mathematical problems. KY.4.MD.3

Understand and apply the statistics process.

4. Use dot plots to analyze data to a statistical question. KY.4.MD.4
    a. Identify a statistical question focused on numerical data. KY.4.MD.4.A
    b. Make a dot plot to display a data set of measurements in fractions of a unit (½, ¼, 1/8). KY.4.MD.4.B
    c. Solve problems involving addition and subtraction of fractions by using information presented in dot plots. KY.4.MD.4.C

Geometric measurement: understand concepts of angle and measure angles.

5. Recognize angles as geometric shapes that are formed wherever two rays share a common endpoint and understand concepts of angle measurement. KY.4.MD.5
6. Measure angles in whole-number degrees using a protractor. Sketch angles of specified measure. KY.4.MD.6
7. Recognize angle measure as additive. When an angle is into non-overlapping parts, the angle measure of the whole is the sum of the angle measures of the parts. Solve addition and subtraction problems to find unknown angles on a diagram in real world and mathematical problems. KY.4.MD.7

Geometry

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

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Draw points, lines, line segments, rays, angles (right, acute, obtuse) and perpendicular and parallel lines. Identify these in two-dimensional figures. KY.4.G.1

2. Classify two-dimensional figures based on the presence or absence of parallel or perpendicular lines, or the presence of absence of angles of a specified size. Recognize right triangles as a category and identify right triangles. KY.4.G.2
3. Identify lines of symmetry. KY.4.G.3
    a. Recognize a line of symmetry for a two-dimensional figure. KY.4.G.3.A
    b. Identify line-symmetric figures and draw lines of symmetry. KY.4.G.3.B