Maine Mathematics

Grade 4

Adopted 2020

Standards for Mathematical Practice

1. **Make sense of problems and persevere in solving them - Students will plan strategies to use and persevere in solving math problems.** MP.1
2. **Reason abstractly and quantitatively - Students will think about numbers in many ways and make sense of numerical relationships as they solve problems.** MP.2
3. **Construct viable arguments and critique the reasoning of others - Students will explain their thinking and make sense of the thinking of others.** MP.3
4. **Model with mathematics - Students will use representations to show their thinking in a variety of ways.** MP.4
5. **Use appropriate tools strategically - Students will use math tools such as tables, diagrams, and technology to explore and deepen their understanding of concepts.** MP.5
6. **Attend to precision - Students will use precise mathematical language and check their work for accuracy.** MP.6
7. **Look for and make use of structure - Students will use their current mathematical understandings to identify patterns and structure to make sense of new learning.** MP.7
8. **Look for and express regularity in repeated reasoning - Students will look for patterns and rules to help create general methods and shortcuts that can be applied to similar mathematical problems.** MP.8

Quantitative Reasoning

Numbers and Operations: Fractions

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9. Develop and extend the understanding of fractions as numbers, including equivalence and ordering. QR.C.9

    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, including fractions greater than 1. 4.NF.A.1

    2. Compare two fractions with different numerators and different denominators, e.g., by creating common denominators or numerators, 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 symbols >, =, or <, and justify the conclusions, e.g., by using a visual fraction model. 4.NF.A.2

10. Understand decimal notation for fractions, and compare decimal fractions. QR.C.10

    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 100.2. 4.NF.C.5

    6. Use decimal notation for fractions with denominators 10 or 100. 4.NF.C.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 symbols >, =, or <, and justify the conclusions, e.g., by using a visual model. 4.NF.C.7

11. Use equivalent fractions as a strategy to add and subtract fractions. QR.C.11

    3. Understand a fraction a/b with a > 1 as a sum of fractions 1/b. 4.NF.B.3

        a. Understand addition and subtraction of fractions as joining and separating parts referring to the same whole. 4.NF.B.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 to build fractions from unit fractions. 4.NF.B.3.B

        c. Add and subtract mixed numbers with like denominators, e.g., by replacing each mixed number with an equivalent fraction, and/or by using properties of operations and the relationship between addition and subtraction. 4.NF.B.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.B.3.D

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12. Apply and extend previous understandings of multiplication and division to multiply and divide fractions. QR.C.12

    4. Apply and extend previous understandings of multiplication to multiply a fraction by a whole number. 4.NF.B.4

        a. Understand a fraction a/b as a multiple of 1/b. 4.NF.B.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.B.4.B

        c. Solve word problems involving multiplication of a fraction by a whole number, e.g., by using visual fraction models and equations to represent the problem. 4.NF.B.4.C

    4. Apply and extend previous understandings of multiplication to multiply a fraction or whole number by a fraction. 5.NF.B.4

Algebraic Reasoning

Operations and Algebraic Thinking

5. Solve problems involving the four operations. AR.C.5

    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.A.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.A.2

    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 mental computation and estimation strategies including rounding. 4.OA.A.3

6. Gain familiarity with factors and multiples. AR.C.6

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

8. Identify, explain, generate and analyze patterns. AR.C.8

    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. 4.OA.C.5

Geometric Reasoning

Geometry

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3. Draw and identify lines and angles and classify shapes by properties of their lines and angles. GR.C.3
    1. Draw points, lines, line segments, rays, angles (right, acute, obtuse), and perpendicular and parallel lines. Identify these in two-dimensional figures. 4.G.A.1
    2. Classify two-dimensional figures based on the presence or absence of parallel or perpendicular lines, or the presence or absence of angles of a specified size. Recognize right triangles as a category and identify right triangles. 4.G.A.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.A.3

Statistical Reasoning

Measurement & Data

6. Represent and interpret data. SR.C.6
    4. Make a line plot to display a data set of measurements in fractions of a unit (½, ¼, 1/8). Solve problems involving addition and subtraction of fractions by using information presented in line plots. 4.MD.B.4
8. Geometric measurement: understand concept of angle and measure angles. SR.C.8
    5. Recognize angles as geometric shapes that are formed wherever two rays share a common endpoint, and understand concepts of angle measurement: 4.MD.C.5
        a. An angle is measured with reference to a circle with its center at the common endpoint of the rays, by considering the fraction of the circular arc between the points where the two rays intersect the circle. An angle that turns through 1/360 of a circle is called a "one-degree angle," and can be used to measure angles. 4.MD.C.5.A
        b. An angle that turns through n one-degree angles is said to have an angle measure of n degrees. 4.MD.C.5.B
    6. Measure angles in whole-number degrees using a protractor. Sketch angles of specified measure. 4.MD.C.6
    7. Recognize angle measure as additive. When an angle is decomposed 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, e.g., by using an equation with a symbol for the unknown angle measure. 4.MD.C.7