Idaho Mathematics

Grade 5

Adopted 2022

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

A. Write and interpret numerical expressions. 5.OA.A

1. Use parentheses, brackets, or braces in numerical expressions, and evaluate expressions with these symbols. 5.OA.A.1
2. Write simple expressions that record calculations with numbers, and interpret numerical expressions without evaluating them. 5.OA.A.2

B. Analyze patterns and relationships. 5.OA.B

3. Generate two numerical patterns using two given rules. 5.OA.B.3
   a. Identify apparent relationships between corresponding terms. 5.OA.B.3.A
   b. Form ordered pairs consisting of corresponding terms from the two patterns. 5.OA.B.3.B
   c. Graph the ordered pairs on a coordinate plane. 5.OA.B.3.C

Number and Operations in Base Ten

A. Understand the place value system. 5.NBT.A

1. Recognize that in a multi-digit number, including decimals, a digit in any place represents ten 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. 5.NBT.A.1

Skip to main content

2. Explain patterns in the number of zeros of the product when multiplying a number by powers of ten, and explain patterns in the placement of the decimal point when a decimal is multiplied or divided by a power of ten. Use whole-number exponents to denote powers of ten. 5.NBT.A.2
3. Read, write, and compare decimals to thousandths. 5.NBT.A.3
   a. Read and write decimals to thousandths using standard form, expanded form, and word from. 5.NBT.A.3.A
   b. Compare two decimals to thousandths based on meanings of the digits in each place, and record the results of the comparisons using >, =, and <. 5.NBT.A.3.B
4. Use place value understanding to round decimals to any place. 5.NBT.A.4

B. Perform operations with multi-digit whole numbers and with decimals to hundredths. 5.NBT.B

5. Demonstrate fluency for multiplication of multi-digit whole numbers using the standard algorithm. Include two-digit × four-digit numbers and three-digit × three-digit numbers. 5.NBT.B.5
6. Find whole-number quotients of whole numbers with up to four-digit dividends and two-digit divisors. 5.NBT.B.6
   a. Use strategies based on place value, the properties of operations, and/or the relationship between multiplication and division. 5.NBT.B.6.A
   b. Illustrate and explain the calculation by using equations, rectangular arrays, and/or area models. 5.NBT.B.6.B
7. Add, subtract, multiply, and divide decimals to hundredths. 5.NBT.B.7
   a. Use concrete models or drawings and strategies based on place value, properties of operations, and/or the relationship between addition and subtraction and between multiplication and division. 5.NBT.B.7.A
   b. Relate the strategy to a written method and explain the reasoning used. 5.NBT.B.7.B

Number and Operations – Fractions

A. Use equivalent fractions as a strategy to add and subtract fractions. 5.NF.A

1. Add and subtract fractions with unlike denominators (including mixed numbers) by replacing given fractions with equivalent fractions to produce an equivalent sum or difference of fractions with like denominators. 5.NF.A.1
2. Solve word problems involving addition and subtraction of fractions referring to the same whole (the whole can be a set of objects), including cases of unlike denominators. 5.NF.A.2
   a. Justify the conclusions by using visual fraction models and/or equations to represent the problem. 5.NF.A.2.A
   b. Use benchmark fractions and number sense of fraction to estimate mentally and assess the reasonableness of answers. 5.NF.A.2.B

Skip to main content

Apply and extend previous understandings of multiplication and division to multiply and divide fractions. 5.NF.B

3. 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 and/or equations to represent the problem. 5.NF.B.3
4. Apply and extend previous understandings of multiplication to multiply a fraction or whole number by a fraction. 5.NF.B.4
    a. Interpret the product (a/b) × q as a parts of a partitions of q into b equal parts, and equivalently, as the result of the sequence of operations a × q ÷ b. 5.NF.B.4.A
    b. Find the area of a rectangle with fractional side lengths. 5.NF.B.4.B
        i. Tile it with unit squares of the appropriate unit fraction side lengths. 5.NF.B.4.B.I
        ii. Show that the area is the same by tiling as would be found by multiplying the side lengths. 5.NF.B.4.B.II
        iii. Multiply fractional side lengths to find areas of rectangles, and represent fraction products as rectangular areas. 5.NF.B.4.B.III
5. Interpret multiplication as scaling (resizing), by: 5.NF.B.5
    a. Comparing the size of a fractional product to the size of one factor on the basis of the size of the other factor, without performing the indicated multiplication. 5.NF.B.5.A
    b. Explaining why multiplying a given number by a fraction greater than 1 results in a product greater than the given number, 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. 5.NF.B.5.B
6. Solve real-world problems involving multiplication of fractions and mixed numbers by using visual fraction models and/or equations to represent the problem. 5.NF.B.6
7. Apply and extend previous understandings of division to divide unit fractions by whole numbers and whole numbers by unit fractions. 5.NF.B.7
    a. Represent division of a unit fraction by a nonzero whole number and compute such quotients using a visual fraction model. Use the relationship between multiplication and division to explain that 1/b ÷ c = 1/bc because 1/bc × c = 1/b. 5.NF.B.7.A
    b. Represent division of a whole number by a unit fraction, and compute such quotients using a visual fraction model. Use the relationship between multiplication and division to explain that a ÷ 1/b because ab × 1/b = a. 5.NF.B.7.B
    c. Solve real-world problems involving division of unit fractions by nonzero whole numbers and division of whole numbers by unit fractions by using visual fraction models and/or equations to represent the problem. 5.NF.B.7.C

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Measurement and Data

A. Convert like measurement units within a given measurement system. 5.MD.A

1. Convert among different-sized standard measurement units within a given measurement system. Use conversions in solving multi-step, real-world problems. 5.MD.A.1

B. Represent and interpret data. 5.MD.B

2. Collect, represent, and interpret numerical data, including whole numbers, and fractional and decimal values. 5.MD.B.2
   a. Interpret numerical data, with whole-number values, represented with tables or line plots. 5.MD.B.2.A
   b. Use graphic displays of data (line plots (dot plots), tables, etc.) to solve real-world problems using fractional data. 5.MD.B.2.B

C. Geometric measurement: Understand concepts of volume and relate volume to multiplication and to addition. 5.MD.C

3. Recognize volume as an attribute of solid figures and understand volume measurement in terms of cubic units. 5.MD.C.3
   a. A cube with side length 1 unit, called a "unit cube," is said to have "one cubic unit" of volume, and can be used to measure volume. 5.MD.C.3.A
   b. A solid figure which can be packed without gaps or overlaps using n unit cubes is said to have a volume of n cubic units. 5.MD.C.3.B
4. Use concrete and/or visual models to measure the volume of rectangular prisms in cubic units by counting cubic cm, cubic in, cubic ft, and nonstandard units. 5.MD.C.4
5. Relate volume to the operations of multiplication and addition and solve real-world and mathematical problems involving volume. 5.MD.C.5
   a. Find the volume of a right rectangular prism with whole-number edge lengths by packing it with unit cubes, and show that the volume is the same as would be found by multiplying the edge lengths, equivalently by multiplying the height by the area of the base. 5.MD.C.5.A
   b. Apply the formulas V = l × w × h and V = B × h (where B stands for the area of the base) for rectangular prisms to find volumes of right rectangular prisms with whole-number edge lengths, and in the context of solving real-world and mathematical problems. 5.MD.C.5.B
   c. Recognize volume as additive. 5.MD.C.5.C
      i. Find volumes of solid figures composed of two non-overlapping right rectangular prisms by adding the volumes of the non-overlapping parts. 5.MD.C.5.C.I
      ii. Apply this technique to solve real-world problems. 5.MD.C.5.C.II

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Skip to main content

Graph points on the coordinate plane to solve real-world and mathematical problems. 5.G.A

1. Describe and understand the key attributes of the coordinate plane. 5.G.A.1
    a. Use a pair of perpendicular number lines (axes) with the intersection of the lines (the origin (0,0)) arranged to coincide with the 0 on each line and a given point in the plane located by using an ordered pair of numbers, called its coordinates. 5.G.A.1.A
    b. Understand that the x-coordinate, the first number in an ordered pair, indicates movement parallel to the x-axis starting at the origin; and the y-coordinate, the second number, indicates movement parallel to the y-axis starting at the origin. 5.G.A.1.B
2. Represent real-world and mathematical problems by graphing points in the first quadrant of the coordinate plane (x and y both have positive values), and interpret coordinate values of points in the context of the situation. 5.G.A.2

B. Classify two-dimensional figures into categories based on their properties. 5.G.B

3. Understand that attributes belonging to a category of two-dimensional figures also belong to all of the subcategories of that category. 5.G.B.3
4. Classify two-dimensional figures in a hierarchy based on properties. 5.G.B.4