

## NF Number and Operations—Fractions

- **5.NF.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 in such a way as to produce an equivalent sum or difference of fractions with like denominators.**
    - [Add fractions with unlike denominators using models \(5-L.6\)](#)
    - [Add up to 4 fractions with denominators of 10 and 100 \(5-L.7\)](#)
    - [Add fractions with unlike denominators \(5-L.8\)](#)
    - [Subtract fractions with unlike denominators using models \(5-L.9\)](#)
    - [Subtract fractions with unlike denominators \(5-L.11\)](#)
    - [Add 3 or more fractions with unlike denominators \(5-L.13\)](#)
    - [Complete addition and subtraction sentences with fractions \(5-L.16\)](#)
    - [Add mixed numbers with unlike denominators \(5-L.19\)](#)
    - [Subtract mixed numbers with unlike denominators \(5-L.20\)](#)
    - [Complete addition and subtraction sentences with mixed numbers \(5-L.23\)](#)
  - **5.NF.A.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, e.g., by using visual fraction models or equations to represent the problem. Use benchmark fractions and number sense of fractions to estimate mentally and assess the reasonableness of answers.**
    - [Add and subtract fractions with like denominators: word problems \(5-L.4\)](#)
    - [Estimate sums and differences of fractions using benchmarks \(5-L.10\)](#)
    - [Add and subtract fractions with unlike denominators: word problems \(5-L.12\)](#)
    - [Add 3 or more fractions: word problems \(5-L.14\)](#)
    - [Add and subtract mixed numbers: word problems \(5-L.21\)](#)
    - [Add and subtract fractions in recipes \(5-L.22\)](#)
- **5.NF.B 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 ( $a/b = a \div b$ ). Solve word problems involving division of whole numbers leading to answers in the form of fractions or mixed numbers, e.g., by using visual fraction models or equations to represent the problem.**
    - [Fractions review \(5-K.1\)](#)
    - [Fractions of a whole: word problems \(5-K.2\)](#)
    - [Relate division and fractions \(5-K.16\)](#)
    - [Understand fractions as division: word problems \(5-K.17\)](#)
  - **5.NF.B.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  $(a/b) \times q$  as a parts of a partition of  $q$  into  $b$  equal parts; equivalently, as the result of a sequence of operations  $a \times q \div b$ .**

- [Multiply fractions by whole numbers using arrays \(5-M.5\)](#)
    - [Multiply fractions by whole numbers I \(5-M.11\)](#)
    - [Multiply fractions by whole numbers II \(5-M.12\)](#)
    - [Multiply fractions by whole numbers: input/output tables \(5-M.14\)](#)
    - [Fractions of a number I \(5-M.15\)](#)
    - [Fractions of a number: word problems \(5-M.16\)](#)
    - [Fractions of a number II \(5-M.\)](#)
    - [Multiply two unit fractions using models \(5-M.17\)](#)
    - [Multiply two fractions using models \(5-M.19\)](#)
    - [Multiply two fractions \(5-M.20\)](#)
    - [Multiply a mixed number by a whole number \(5-M.35\)](#)
    - [Multiply a mixed number by a fraction \(5-M.36\)](#)
    - [Multiply two mixed numbers \(5-M.37\)](#)
  - **5.NF.B.4.b Find the area of a rectangle with fractional side lengths by tiling it with unit 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.**
    - [Multiply two unit fractions using models \(5-M.17\)](#)
    - [Multiply two fractions using models: fill in the missing factor \(5-M.18\)](#)
    - [Multiply two fractions using models \(5-M.19\)](#)
    - [Understand fraction multiplication and area \(5-M.29\)](#)
    - [Multiply fractions to find area \(5-M.30\)](#)
    - [Area of squares and rectangles with fractions \(5-DD.6\)](#)
    - [Area and perimeter: word problems \(5-DD.12\)](#)
- **5.NF.B.5 Interpret multiplication as scaling (resizing), by:**
  - **5.NF.B.5.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.**
    - [Scaling whole numbers by fractions \(5-M.23\)](#)
    - [Scaling fractions by fractions \(5-M.24\)](#)
    - [Scaling mixed numbers by fractions \(5-M.25\)](#)
  - **5.NF.B.5.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  $a/b = (n \times a)/(n \times b)$  to the effect of multiplying  $a/b$  by 1.**
    - [Multiply two fractions using models \(5-M.19\)](#)
    - [Scaling whole numbers by fractions: justify your answer \(5-M.22\)](#)
- **5.NF.B.6 Solve real-world problems involving multiplication of fractions and mixed numbers, e.g., by using visual fraction models or equations to represent the problem.**
  - [Multiply fractions by whole numbers: word problems \(5-M.13\)](#)
  - [Multiply two fractions: word problems \(5-M.21\)](#)

- [Multiplication with mixed numbers: word problems \(5-M.39\)](#)
- [Multiply fractions and mixed numbers in recipes \(5-M.40\)](#)
- **5.NF.B.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 Interpret division of a unit fraction by a non-zero whole number, and compute such quotients.**
    - [Divide unit fractions by whole numbers \(5-N.2\)](#)
    - [Divide unit fractions and whole numbers using area models \(5-N.5\)](#)
  - **5.NF.B.7.b Interpret division of a whole number by a unit fraction, and compute such quotients.**
    - [Divide whole numbers by unit fractions using models \(5-N.3\)](#)
    - [Divide whole numbers by unit fractions \(5-N.4\)](#)
    - [Divide unit fractions and whole numbers using area models \(5-N.5\)](#)
  - **5.NF.B.7.c Solve real-world problems involving division of unit fractions by non-zero whole numbers and division of whole numbers by unit fractions, e.g., by using visual fraction models and equations to represent the problem.**
    - [Divide unit fractions and whole numbers: word problems \(5-N.7\)](#)

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