Standard Addressed by these Number Talks:

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

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

4.NF.3b 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. Examples: 3/8 = 1/8 + 1/8 + 1/8 ; 3/8 = 1/8 + 2/8 ; 2 1/8 = 1 + 1 + 1/8 = 8/8 + 8/8 + 1/8.

4.NF.3c 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.4 Apply and extend previous understandings of multiplication to multiply a fraction by a whole number.

4.NF.4a Understand a fraction a/b as a multiple of 1/b. For example, use a visual fraction model to represent 5/4 as the product 5 × (1/4), recording the conclusion by the equation 5/4 = 5 × (1/4).

4.NF.4b Understand a multiple of a/b as a multiple of 1/b, and use this understanding to multiply a fraction by a whole number. For example, use a visual fraction model to express 3 × (2/5) as 6 × (1/5), recognizing this product as 6/5. (In general, n × (a/b) = (n × a)/b.)

Pose these number sentences to students and ask them to solve them mentally. The student’s role is to demonstrate fluent strategies for solving these problems. The teacher’s role is to pose the problem, give students a few minutes to solve the problems and then lead a discussion about how they solved the problems. Teachers will need to write down students’ thinking using number sentences that will show how students solved the problems. You need not pose all at once, but instead do a few each week during the unit (posing one problem in one setting, or a string of problems that build on each other in one setting or over the course of a week). Conversations may range from 10-20 minutes in length. See the article *Number Talks Build Numerical Reasoning (***October 2011 •** teaching children mathematics) for more information.

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| Standard | Number Talk Problem Sets | Rationale |
| 4.NF.3a Understand addition and subtraction of fractions as joining and separating parts referring to the same whole. | ½ + ½⅓ + ⅓ + ⅓⅓ + ⅔ | Review of unit fractions. Students need to be able to see that a fraction can be broken down into its unit parts. |
| 4.NF.3b 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. Examples: 3/8 = 1/8 + 1/8 + 1/8 ; 3/8 = 1/8 + 2/8 ; 2 1/8 = 1 + 1 + 1/8 = 8/8 + 8/8 + 1/8. | ¼ + ¼ ¼ + ¼ + ¼ ¼ + ¼ + ¼ + ¼ ¾ + ¼ ⅙ + ⅙ + ⅙⅙ + ⅙ + ⅙ + ⅙⅙ + ⅙ + ⅙ + ⅙ + ⅙ + ⅙⅚ + ⅙ | Decomposing fractions into different fractional parts helps students make connections between fraction and whole number operations.  |
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| 4.NF.3b 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. Examples: 3/8 = 1/8 + 1/8 + 1/8 ; 3/8 = 1/8 + 2/8 ; 2 1/8 = 1 + 1 + 1/8 = 8/8 + 8/8 + 1/8. | ⅓ + ⅓ + ⅓ + ⅓ ⅔ +⅔¼ + ¼ + ¼ + ¼ + ¼ + ¼ ¾ + ¾ ¾ + ¾ + ¼  | In this case, the answers are improper fractions, but there is no need to introduce “proper” and “improper fractions" initially; 4/3 is the quantity you get by combining4 parts together when the whole is divided into 3 equal parts. 4/3 is an acceptable answer and leads to more in depth understanding later on.  |
| 4.NF.3c 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. | 1 + ½ + ½1 ½ + ½1 ½ + ½ + ½ 1 ¼ + ¼ 2 ¼ + ¾  | Start with fractions that students are familiar with and build from there. Ask questions that will encourage students to see 1 as two-halves, and 1 ½ as three halves.  |
| 4.NF.4a Understand a fraction a/b as a multiple of 1/b. For example, use a visual fraction model to represent 5/4 as the product 5 × (1/4), recording the conclusion by the equation 5/4 = 5 × (1/4). | 2 x ½4 x ½8 x ½ 4 x ¼8 x ¼ 9 x ¼  | Engaging students in seeing groups of fractional parts (i.e. 2 groups of ½ ) will connect the repeated addition concepts they used in 4.NF.3b to the multiplicative relationships stated in this standard (i.e. 9 x ¼ is the same as 9/4). |
| 4.NF.4b Understand a multiple of a/b as a multiple of 1/b, and use this understanding to multiply a fraction by a whole number. For example, use a visual fraction model to express 3 × (2/5) as 6 × (1/5), recognizing this product as 6/5. (In general, n × (a/b) = (n × a)/b.) | 2 x ¼2 x ½2 x ¾2 x ⅖3 x ⅖ | These number talks will help students extend the use of the properties of operations from previous units with whole number to fractions. Focus discussion on how students can use the associative property to solve these problems. |