# **Fractions Discussion Guide (for use during or after reading)**

1. What are fractions? What are numerators and denominators? (What Is a Fraction?, p. 4-7)
   1. A fraction is a number that shows equal parts of a whole. Every fraction has a numerator (the top number) and a denominator (the bottom number). A numerator is the number of parts being shown in some way, such as shaded, and a denominator is the number of equal parts in the whole. For example, the fraction represents a whole split into 5 equal-sized pieces, with 3 shaded.
2. Describe how to compare fractions with like numerators, such as and . (Compare Fractions, p. 8-9)
   1. It can often be helpful to use visual representations to compare fractions. However, we can use a strategy when both numerators are the same to efficiently find a solution. This strategy involves thinking about the size of the pieces, or the denominator. If we have the same number of pieces, we know the greater fraction will be the one with the largest pieces. In fractions, the smaller the digit in the denominator, the larger the pieces. We can say that when the numerators are the same, the greatest fraction has the smallest denominator.
   2. For example, when comparing and , we can look to the denominators. Because eighths are larger than twelfths, we can say > .
3. What are mixed fractional numbers and improper fractions? What is written as a mixed number? What is 2 written as an improper fraction? (Mixed Numbers and Improper Fractions, p. 10-11)
   1. Mixed fractional numbers are fractions greater than one whole and are written as a whole number and a fraction. written as a mixed number is 2 .
   2. Improper fractions are fractions greater than one and are written as a fraction in which the numerator is greater than the denominator. 2 written as an improper fraction is .
4. What does equivalent mean? Find three fractions equivalent to . (Equivalent Fractions, p. 12-15)
   1. In math, equivalent is used to describe two quantities that have the same value, even though they may be represented differently. For example, is equivalent to , and
   2. Note: students may use a variety of strategies to generate equivalent fractions. Focus your discussion on the various strategies they used to find equivalent fractions.
5. Order the fractions from least to greatest using what you know about equivalence to help you: . (Order Fractions, p. 16-17)
   1. In order to compare and order these fractions, it is easiest to find equivalent fractions with common denominators, that is to rewrite them so they contain pieces that are the same size and are therefore easier to compare. 15 is a common denominator, so we will find equivalent fractions for and .
   2. and
   3. We can now order the fractions from least to greatest: , which is equivalent to .
6. Describe how decimals and fractions are related. (Fractions as Decimals, p. 18-19)
   1. Fractions and decimals are related because they can both be used to represent parts of a whole. For example, the fraction is equivalent to the decimal 0.50 because both are used to represent half. Although fractions and decimals can represent the same amounts, it is important to understand both forms of thinking about numbers smaller than one whole because both can be useful in different situations. As mathematicians it is important to think flexibly about numbers like fractions and decimals to efficiently solve problems.
7. Explain how you would solve the following problem. What is your final solution? (Add and Subtract Fractions with Unlike Denominators, p. 24-25)

2 – 1

* 1. To solve this problem, we should first identify common denominators and rewrite the problem using equivalent fractions. If needed, we can convert the mixed numbers into improper fractions to make regrouping easier. Finally, we can solve by subtracting, remembering to keep the denominators constant, or the same.
  2. 2 is equivalent to 2 so we can rewrite the original problem as . Because we do not need to regroup, we can continue to solve without converting our mixed numbers into improper fractions. , or in lowest terms .

1. Why does multiplying a fraction by a fraction result in a product with a value less than both factors? Consider the picture and example on page 28 for support. (Multiply Fractions, p. 26-29)
   1. The example on page 28 models finding two-fifths of one-fourth of a cookie, or . If we start with a factor less than one whole and look for only a portion of it, we are bound to get a smaller answer. .
2. According to the text, what procedures should you follow to divide a fraction by a whole number. Show your thinking to solve the following problem: . (Divide Fractions, p. 30-31)
   1. According to the text, when you divide a fraction by a whole number, you rewrite the problem as the fraction multiplied by the reciprocal of the whole number, or which is equivalent to .

1. According to the text, what two rules should you remember about fractions and the number zero? (Fractions with Zero, p. 34-35)
   1. According to the text, any fraction with a numerator of 0 is equivalent to 0. In addition, no fraction can have a denominator of 0 because we cannot divide by 0. For example, typing the equation 3 ÷ 0 or the fraction into a calculator will result in the answer being undefined. There is no story situation that makes sense with a divisor or denominator of 0. For example, we cannot divide something into no groups. In addition, we cannot partition one whole into no parts.