Module 1: Composing and Decomposing

TOPIC 2: POSITIVE RATIONAL NUMBERS
The focus of this topic is fraction division. Students review fraction and decimal comparisons and multiplying with fractions prior to working with fraction division. Algorithms for fraction division are addressed in this topic, but bear in mind that students may not achieve fluency within the timeline allowed for this topic. Fluency requires time and practice. Although this topic represents the culmination of students’ learning about operations with fractions, they will continue to develop fluency with fraction operations throughout the course.

Where have we been?
Students began their formal study of fractions in grade 3. They understand fractions as numbers and can reason about relative sizes of fractions. They have learned to add, subtract, and multiply fractions. Students also know how to divide whole numbers by unit fractions (e.g., \( 6 \div \frac{1}{2} \)) and unit fractions by whole numbers (e.g., \( \frac{1}{4} \div 3 \)).

Where are we going?
By learning multiple division strategies and using estimation and mental strategies, students can choose the most efficient strategy for a given problem.

Throughout grade 6, students will operate with positive rational numbers. Students who have mastered plotting and ordering positive rational numbers on a number line will be prepared to plot and order the full set of rational numbers on a number line and as pairs on a coordinate plane.

Using Bar Models to Represent Quotients with Fractions
A bar model can show the quotient of two fractions, such as \( \frac{3}{4} \div \frac{1}{4} \). The division expressions asks, how many \( \frac{1}{4} \)’s are in \( \frac{3}{4} \)?

There are 3 one-fourths in \( \frac{3}{4} \), so \( \frac{3}{4} \div \frac{1}{4} = 3 \).
Myth: "If I can get the right answer, then I should not have to explain why."

Sometimes you get the right answer for the wrong reasons. Suppose a student is asked “What is 4 divided by 2?” and she confidently answers “2!” If she does not explain any further, then it might be assumed that she understands how to divide whole numbers. But, what if she used the following rule to solve that problem? “Subtract 2 from 4 one time.” Even though she gave the right answer, she has an incomplete understanding of division.

However, if she is asked to explain her reasoning, by drawing a picture, creating a model, or giving a different example, the teacher has a chance to remediate her flawed understanding. If teachers aren’t exposed to their students’ reasoning for both right and wrong answers, then they won’t know about or be able to address misconceptions. This is important because mathematics is cumulative: new lessons build upon previous understandings.

Ask your student to explain his or her thinking, when possible, even if you don’t know whether the explanation is correct. When children (and adults) explain something to someone else, it helps them learn. Just the process of trying to explain is helpful.

#mathmythbusted

Talking Points
You can support your student’s learning by practicing with them. Students are learning to divide with fractions. This involves dividing whole numbers by fractions, fractions by fractions, and fractions by whole numbers.

Some Things to Look For
When comparing two fractions, students often assume that the fraction with the smaller denominator must be the smaller fraction. This is not always true!

Remind your student to take their time as they work with fractions. Fractions can be tricky!

Key Terms

**benchmark fraction**
Benchmark fractions are common fractions, like \( \frac{1}{2} \) or \( \frac{1}{4} \), you can use to estimate the value of other fractions.

**complex fraction**
A fraction is complex if it has a fraction in numerator, denominator, or both.

**multiplicative inverse**
The multiplicative inverse of a number \( \frac{a}{b} \) is the number \( \frac{b}{a} \), where \( a \) and \( b \) are nonzero numbers.