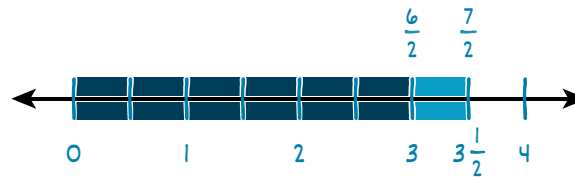


Why

Foundations for Fraction Operations

Why do fractions greater than 1 and mixed numbers appear throughout the module?

Incorporating fractions less than 1, fractions greater than 1, and mixed numbers together throughout the module solidifies for students the idea that fractions are numbers. Numbers can be decomposed, renamed flexibly, and compared. Operations, such as addition, subtraction, and multiplication, can be performed with numbers. When students perform this work seamlessly with fractions less than 1, fractions greater than 1, and mixed numbers, they can connect their understandings and build on their previous knowledge of one category of numbers and apply it to the next category.



Rename a Fraction
Greater Than 1
as a Mixed Number

$$\frac{7}{2} = \frac{6}{2} + \frac{1}{2}$$

$$\frac{7}{2} = 3 + \frac{1}{2}$$

$$\frac{7}{2} = 3\frac{1}{2}$$

Rename a Mixed
Number as a Fraction
Greater Than 1

$$3\frac{1}{2} = \frac{6}{2} + \frac{1}{2}$$

$$3\frac{1}{2} = \frac{7}{2}$$

Why are so many addition and subtraction strategies used?

The strategies used for adding and subtracting fractions and mixed numbers in topics D and E reflect the strategies students use in grades 1, 2, and 3 to add and subtract whole numbers. These strategies reinforce the idea of fractions as numbers—we can perform operations with fractions similar to the way we perform operations with whole numbers. Because fractions are numbers, they can be composed and decomposed. Students apply the part–total relationship found in addition and subtraction problems to compose and decompose the units of the parts and total.

Fluency means being accurate and efficient and flexibly applying strategies to solve problems. A strategy may be efficient for solving one problem but time consuming for another. Students analyze problems and select efficient strategies, many of which develop into mental math over time. They select a model to record their work in a way that makes sense to them. Students are not expected to master all the strategies and models taught in module 4 topics D and E. Rather, they are expected to make informed decisions about which strategy to use on a problem-by-problem basis.

<p>Add or Subtract by Counting On by Using the Arrow Way</p>	<p>Add or Subtract by Using Compensation on an Open Number Line</p>	<p>Add by Decomposing a Part or Subtract by Decomposing the Total</p>
<p>$174 + 240 = 414$</p> <p>100 60 14</p> <p>$240 \xrightarrow{+100} 340 \xrightarrow{+60} 400 \xrightarrow{+14} 414$</p>	<p>$315 + 197 = 512$</p> <p>+ 200 - 3</p>	<p>$166 + 680 = 846$</p> <p>146 20</p>
<p>$414 - 240 = \underline{\quad}$</p> <p>$240 + \underline{\quad} = 414$</p> <p>174</p> <p>$240 \xrightarrow{+60} 300 \xrightarrow{+114} 414$</p>	<p>$512 - 197 = 315$</p> <p>+ 3 - 200</p>	<p>$846 - 680 = 166$</p> <p>146 700</p>

Why is lesson 22 optional?

In grade 4, students are expected to add and subtract fractions with like units. Lesson 22 invites students to use what they know about generating equivalent fractions and to add two fractions with related units. Later in grade 4, students add tenths and hundredths. Lesson 22 introduces the idea of renaming one fraction before adding to create like units and prepares students to add tenths and hundredths in module 5.

$$\frac{2}{3} + \frac{1}{6} = \frac{4}{6} + \frac{1}{6} = \frac{5}{6}$$

$$\frac{2}{3} = \frac{2 \times 2}{2 \times 3} = \frac{4}{6}$$