FAMILY MATH

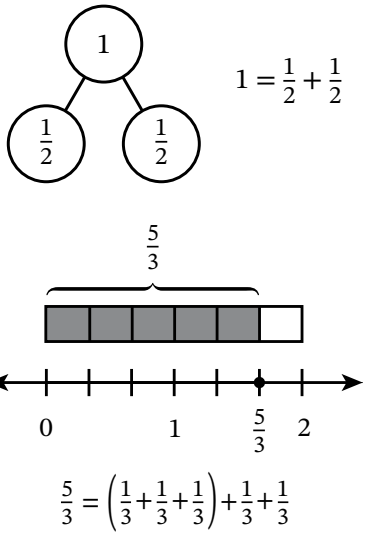
Fraction Decomposition and Equivalence

Dear Family,

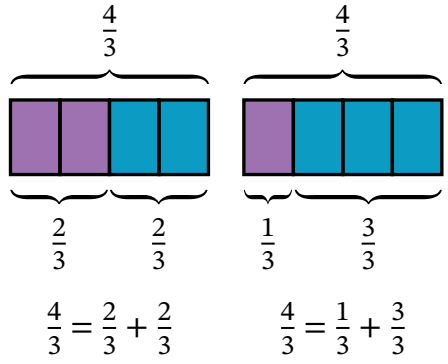
Key Term

mixed number

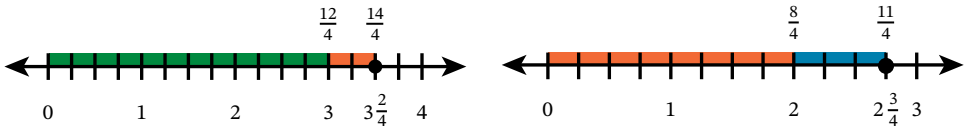
Your student is learning that fractions, like whole numbers, can be decomposed into sums of parts. For example, the whole number 4 is the sum of $1 + 3$ and the fraction $\frac{4}{5}$ is the sum of $\frac{1}{5} + \frac{3}{5}$. They break apart fractions and write addition equations with the parts. They use models to break apart whole numbers and fractions and see that fractions can be broken apart in many ways. They combine whole numbers with fractions less than 1 to write mixed numbers. Your student also learns to rename a mixed number as a fraction. Renaming fractions with models and equations prepares your student for adding and subtracting fractions in future lessons.



Students use familiar models, such as number bonds and tape diagrams, to break apart numbers into the sums of fractions.



Students use tape diagrams to see how fractions can be broken apart in different ways.



$$\frac{14}{4} = \frac{12}{4} + \frac{2}{4}$$

$$\frac{14}{4} = 3 + \frac{2}{4}$$

$$\frac{14}{4} = 3\frac{2}{4}$$

$$2\frac{3}{4} = \frac{8}{4} + \frac{3}{4}$$

$$2\frac{3}{4} = \frac{11}{4}$$

Students use number lines to support their understanding when writing a fraction as an equivalent mixed number or when writing a mixed number as an equivalent fraction.

At-Home Activity

Is This Share Equal?

Help your student practice breaking apart fractions in different ways. Start with a food item that is already divided into equal parts, such as a chocolate bar. Another option is to cut a food item, such as a piece of bread or fruit, into an even number of equal parts. Ask your student what fraction describes 1 part of the whole. Ask them what fraction of the whole each of you would get if you shared the whole equally. Then discuss an example of a share that is not equal such as the following example. This example is for a chocolate bar that has 12 sections.

- The fraction that describes 1 part would be $\frac{1}{12}$.
- To share equally between two people, each person gets $\frac{6}{12}$ of the bar. Discuss all the different ways you could decompose $\frac{6}{12}$ such as $\frac{6}{12} = \frac{1}{12} + \frac{1}{12} + \frac{1}{12} + \frac{1}{12} + \frac{1}{12} + \frac{1}{12}$ or $\frac{6}{12} = \frac{2}{12} + \frac{4}{12}$ and so on. Ask whether there is a way to share $\frac{6}{12}$ equally such as $\frac{6}{12} = \frac{3}{12} + \frac{3}{12}$.
- A share that is not equal would happen when one person gets $\frac{3}{12}$ of the whole bar and the other person gets $\frac{9}{12}$.

FAMILY MATH

Equivalent Fractions

Dear Family,

Your student is learning to write equivalent fractions by renaming the units, or denominator, of the fraction. They use models such as tape diagrams, area models, and number lines along with multiplication and division to make equivalent fractions. They also learn to write equivalent fractions for fractions greater than 1 and for mixed numbers. Finding equivalent fractions prepares your student for comparing, adding, and subtracting fractions in future lessons.

Key Terms

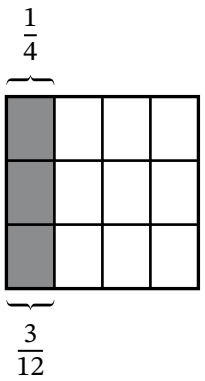
denominator

numerator

$\frac{1}{2}$ ← Numerator

$\frac{1}{2}$ ← Denominator

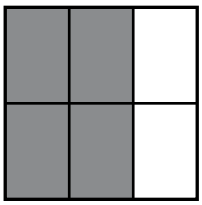
Students learn that the denominator of a fraction indicates the total number of units in the whole and the numerator indicates the number of selected parts.



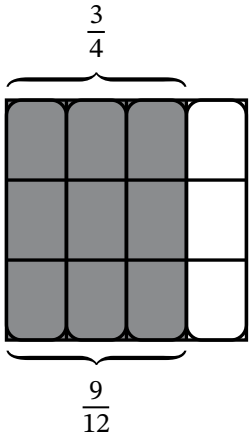
$\frac{1}{4} = \left(\frac{1}{12} + \frac{1}{12} + \frac{1}{12}\right)$

$\frac{1}{4} = \frac{3}{12}$

Students break apart fractions into smaller unit fractions. They can add the smaller unit fractions together to make equivalent fractions.

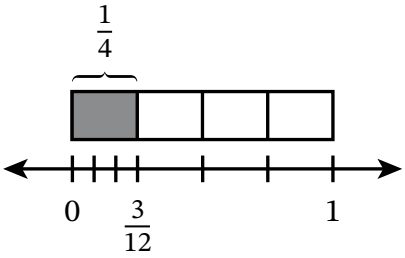


$\frac{2}{3} = \frac{2 \times 2}{2 \times 3} = \frac{4}{6}$



$\frac{9}{12} = \frac{9 \div 3}{12 \div 3} = \frac{3}{4}$

$\frac{1}{4} = \frac{3 \times 1}{3 \times 4} = \frac{3}{12}$



Area models and number lines help students see how the number of parts and the size of the parts change when multiplication or division is used to create an equivalent fraction.

At-Home Activities

Naming Numerators and Denominators

Help your student practice by using the terms *numerator* and *denominator* to describe the parts of fractions. Look for fractions in your daily activities, such as when measuring ingredients to follow recipes. Ask your student to identify the numerator, which is the number of selected parts. Ask your student to identify the denominator, which is the total number of units in the whole. Then discuss what the numerator and the denominator each represent.

What is Half?

With your student, practice naming 1 half of something in different situations. Consider using the following examples.

- There are 4 quarters in a dollar. What is half of this amount? (2 quarters) What fraction of 4 quarters is 2 quarters? $\left(\frac{2}{4} \text{ or } \frac{1}{2}\right)$
- There are 8 ounces in a measuring cup. What is half of this amount? (4 ounces) What fraction of 8 ounces is 4 ounces? $\left(\frac{4}{8} \text{ or } \frac{1}{2}\right)$
- There are 12 months in a year. How many months are in half of a year? (6 months) What fraction of 12 months is 6 months? $\left(\frac{6}{12} \text{ or } \frac{1}{2}\right)$
- There are 60 minutes in an hour. How many minutes are in half of an hour? (30 minutes) What fraction of 60 minutes is 30 minutes? $\left(\frac{30}{60} \text{ or } \frac{1}{2}\right)$

FAMILY MATH

Comparing Fractions

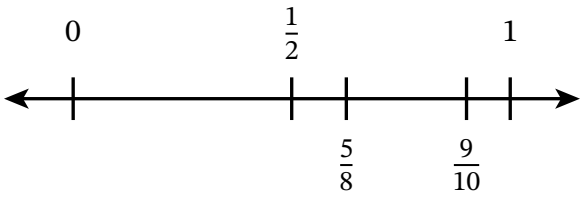
Dear Family,

Your student is using models and equations to compare fractions. Your student estimates the locations of two or more fractions on a number line. They learn to compare unlike fractions by finding a common denominator and comparing the sizes of the numerators. Your student can also compare unlike fractions by finding a common numerator and comparing the sizes of the denominators. Comparing fractions will help your student when checking the reasonableness of their answers in future lessons.

Key Terms

common denominator

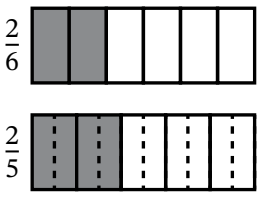
common numerator



Students may use benchmark numbers, such as 0, $\frac{1}{2}$, or 1, to help them determine where a fraction belongs on a number line. $\frac{5}{8}$ is less than $\frac{9}{10}$ because $\frac{5}{8}$ is closer to 0.

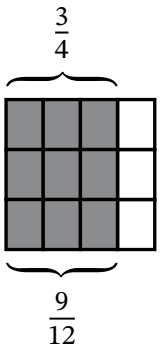
$$\frac{2}{6} < \frac{4}{10}$$

$$\frac{4}{10} = \frac{4 \div 2}{10 \div 2} = \frac{2}{5}$$

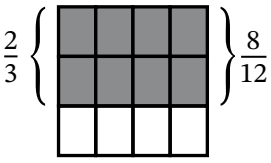


$$\frac{4}{10} = \frac{2}{5}$$

Sometimes students only have to rename one fraction to make a common numerator or denominator. When 4 tenths is renamed as 2 fifths, students can see that 2 fifths is larger because fifths are larger than sixths.



$$\frac{3}{4} = \frac{3 \times 3}{3 \times 4} = \frac{9}{12}$$



$$\frac{2}{3} = \frac{4 \times 2}{4 \times 3} = \frac{8}{12}$$

Sometimes students have to rename both fractions to make a common numerator or denominator. When both fractions have the same denominator, students can compare the numbers of units.

At-Home Activity

Who Has the Greater Fraction?

Practice comparing fractions by playing a card game.

- First, you will need to make your cards. On index cards or small pieces of paper, write 10 different fractions that have 2, 3, 4, 5, 6, 8, 10, 12, or 100 as a denominator. Then make a second set of 10 cards by using the same denominators. The second set can have the same cards as the first set, or they can be different.
- Mix up the cards in each set and give one set of fraction cards to your student. Place your set facedown in front of you and have your student do the same with their set of cards.
- Each person turns over their top card at the same time.
- Discuss which person has the fraction with the greater value. The person who has the greater fraction takes both cards and places them facedown on the bottom of their stack of cards.
- If the fractions are equal, then have each person turn over the next card in their stack. Repeat this step until the fractions are not equal. The person who has the fraction with the greater value then wins all the cards that are showing in this round. Place all these cards facedown on the bottom of the winner's deck.
- The game ends when one person has all the cards from each set.

FAMILY MATH

Adding and Subtracting Fractions

Dear Family,

Your student is learning to add and subtract fractions with like units. They use unit form, fraction form, and number lines to support their thinking. They learn to break apart a whole number so they can easily subtract. Your student also uses drawings to help them determine whether they need to add or subtract when solving word problems. They estimate to decide whether their answer is reasonable. The skills your student is learning now will support them later when they add and subtract mixed numbers.

Adding and Subtracting Fractions with Like Units

- Unit form

  4 eighths + 3 eighths = 7 eighths

  8 tenths − 6 tenths = 2 tenths

- Fraction form

  $\frac{5}{10} + \frac{2}{10} = \frac{7}{10}$

  $\frac{6}{8} - \frac{4}{8} = \frac{2}{8}$

Students use unit form and fraction form to write equations. Unit form helps students see that adding and subtracting fractions is similar to adding and subtracting whole numbers. For example, 4 ones + 3 ones = 7 ones *so* 4 eighths + 3 eighths = 7 eighths.

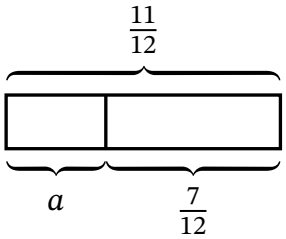
$2 - \frac{7}{10} = 1\frac{3}{10}$

1 and $\frac{10}{10}$

$\frac{10}{10} - \frac{7}{10} = \frac{3}{10}$

$1 + \frac{3}{10} = 1\frac{3}{10}$

Students learn to break apart a whole number by using fractions. 2 *is broken into* 1 *and* $\frac{10}{10}$ *because tenths is the unit that is subtracted from* 2.



$\frac{11}{12} - \frac{7}{12} = a$

$\frac{4}{12} = a$

There is $\frac{4}{12}$ of a pan of brownies left.

Drawing a model, such as a tape diagram, helps students decide whether to use addition or subtraction to solve a word problem.

At-Home Activity

Pizza Fractions

Practice adding and subtracting fractions with your student when eating pizza or any other food cut into equal pieces. You may also draw a picture to represent the pizza. Ask them questions such as the following to guide their thinking.

- "How many slices of pizza are in the whole? What fraction can we use to describe 1 slice?"
- "What fraction can we use to describe the whole pizza?"
- "What addition problem represents the fraction of pizza eaten if you eat 2 slices?"
- "What subtraction problem represents the fraction of pizza left over after we eat 3 slices of the whole pizza? What if we eat 5 slices?"

FAMILY MATH

Adding and Subtracting Mixed Numbers

Dear Family,

Your student is using a variety of familiar addition and subtraction strategies to add and subtract mixed numbers. They draw and use models and write equations to solve word problems. They apply their understanding of adding and subtracting mixed numbers to answer questions about the data in a line plot. Then they use given data to make a line plot and write their own questions.

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

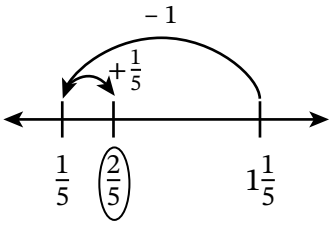
$5\frac{2}{4} \xrightarrow{+\frac{2}{4}} 6 \xrightarrow{+\frac{1}{4}} 6\frac{1}{4}$

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

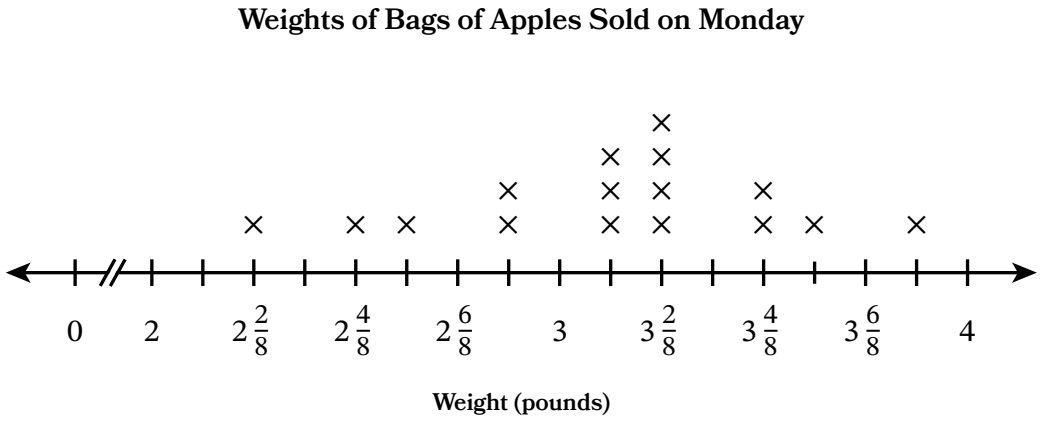
$5\frac{1}{4}$ $\quad$ $\frac{1}{4}$

Students can use different break apart strategies to add a fraction to a mixed number.

$1\frac{1}{5} - \frac{4}{5} = \underline{\quad \frac{2}{5} \quad}$



Students can subtract with mixed numbers by using a number line to help them think about the numbers.

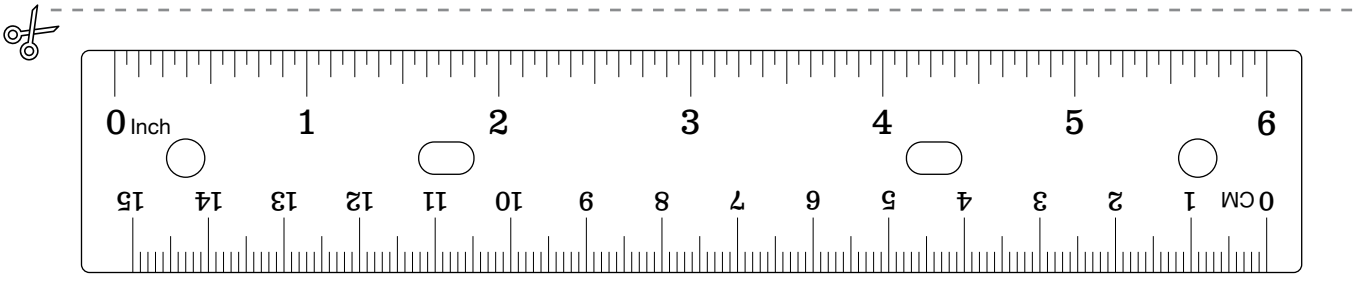


Students analyze a line plot. They answer questions related to the line plot which also includes deciding whether a claim about the data is true or false.

At-Home Activity

Measure, Add, Subtract

Ask your student to measure and record the lengths of two household objects, such as crayons, books, or shoelaces. Have them measure the items to the nearest eighth of an inch. Have them add the lengths together to determine the total length of both objects. Then have them subtract to find how much shorter one object is than the other. Encourage your student to explain their thinking to you.



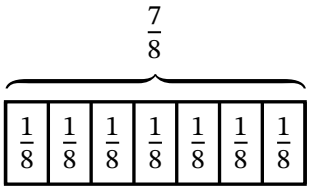
FAMILY MATH

Repeated Addition of Fractions as Multiplication

Dear Family,

Your student is using familiar models to multiply fractions and mixed numbers by a whole number. Students break apart a fraction to write repeated addition equations and a multiplication problem. They use methods that were used earlier in the year with whole numbers to break apart multiplication problems in different ways. Students solve word problems and use the context of the problem to decide when to rename a product, that is a fraction greater than 1, as a mixed number.

$$\frac{7}{8} = 7 \times \frac{1}{8}$$

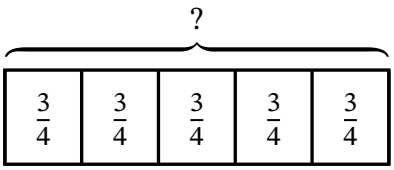


$$\frac{7}{8} = \frac{1}{8} + \frac{1}{8} + \frac{1}{8} + \frac{1}{8} + \frac{1}{8} + \frac{1}{8} + \frac{1}{8}$$

$\frac{7}{8}$ is equal to adding $\frac{1}{8}$, 7 times. Similar to whole numbers, repeated addition can be written by using multiplication.

$$\begin{aligned} 4 \times \frac{2}{5} &= 4 \times \left(2 \times \frac{1}{5}\right) \\ &= (4 \times 2) \times \frac{1}{5} \\ &= 8 \times \frac{1}{5} \\ &= \frac{8}{5} \end{aligned}$$

Grouping numbers differently may help students multiply. In this case, they multiply the whole numbers first and then the unit fraction.



$$\begin{aligned} 5 \times \frac{3}{4} &= 5 \times \left(3 \times \frac{1}{4}\right) \\ &= (5 \times 3) \times \frac{1}{4} \\ &= 15 \times \frac{1}{4} \\ &= \frac{15}{4} \end{aligned}$$

Students use tape diagrams to make sense of word problems. They write and solve multiplication equations that describe their tape diagram to answer the question in a word problem.

At-Home Activity

Mixed Number Multiplication

Help your student use a favorite recipe to practice multiplying a mixed number and a whole number. Invite your student to research a recipe for a favorite dish and record an ingredient amount that is a mixed number from the recipe. Then have your student multiply the mixed number by 2 to see how much of the ingredient would be needed to double the recipe. Repeat this process by multiplying the amount by other whole numbers to see how much of the ingredient would be needed to triple or quadruple the recipe.