New Jersey Center for Teaching and Learning
Progressive Mathematics Initiative®

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4th Grade

Fraction Computation

2015-03-13

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Adding Fractions with Common Denominators

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Addin
with
Den

Teacher Notes

For this section you will need to prepare cut strips of paper for each student in your class. They need to be long enough to divide into 3rds and then 6ths.

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What are the important concepts we need to remember about fractions?

Write responses below:

Teacher Notes

What are the ways we can write or visualize fractions?

Remember fractions can be written:

1. By writing words for the fractional parts
2. Drawing a picture, such as a circle or square showing equal parts
3. Writing an equation or number sentence
4. Representing the fractional parts on a number line

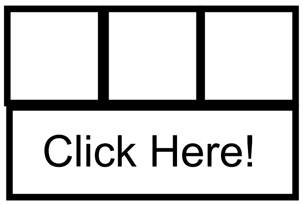
We will use all of these different ways as we learn how to add fractions with common denominators!

Adding Parts to Make a Whole

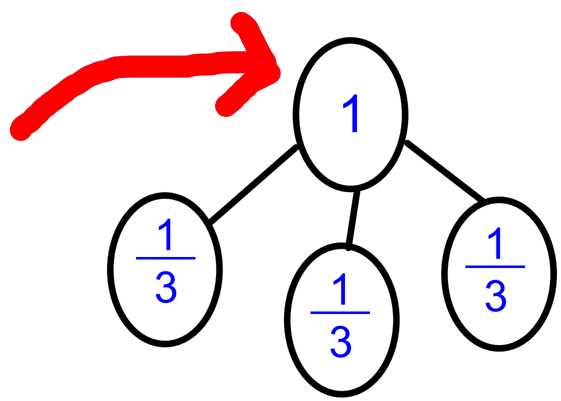
Take out one strip of paper you were given.
This paper represents a whole.
How can you divide this strip into 3 equal parts?

Fold the paper into equal parts and draw lines on the creases.

What is each section now representing?



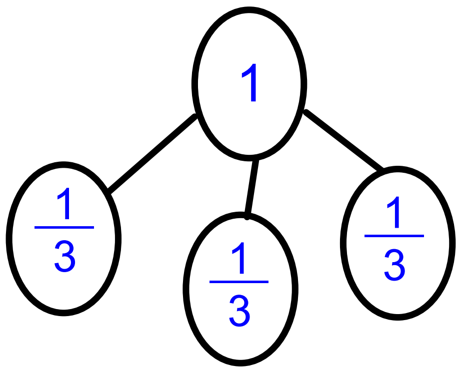
We can show the relationship between these numbers by using a number bond.



Derived from engage^ny

Number Bonds

Number bonds are a tool you can use to show how a WHOLE is broken into parts. The numbers are "bonded" to the whole (or number 1) to show how all the individual parts together equal 1. By using a number bond, you can easily see how the "parts" added together equal the whole. You can use this to compose an addition sentence with fractions.



If we know that our strip is equal to one whole. Can we write an addition sentence showing how our thirds add up to one whole? How?

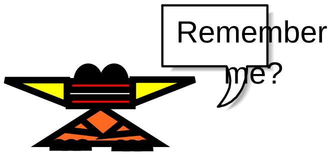
1 = Click Here!

Continued...

When you take a part a whole, it is called decomposing. Previously, we decomposed our whole strip of paper into thirds. We discovered 1/3 is the unit fraction and you can add those thirds together to compose, or make, the whole. A number bond helps us see how the fractions are related to each other when creating an equation.

When we write the addition sentence, we are creating an algebraic equation using fractions...

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



Important Fact:

Fractions that have a common (the same) denominator, can be added together by calculating the numerators and leaving the denominator the same!

Derived from engageny

Continued...

When you take[...]sing.
Previously, we d[...] thirds.
We discovered 1/3[...]se thirds
together to compo[...]helps us
see how the fract[...]ating an

When we write t[...]
algebraic equatio[...]

Teacher Notes

Guide students in the language of composing and decomposing parts of a whole. They need to understand that decomposing is breaking it a part into the addition sentence, and composing is the actually action of adding the fractions together.

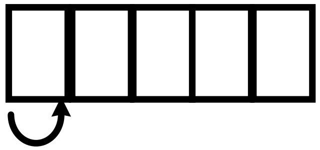
Important Fact:

Fractions that have a common (the same) denominator, can be added together by calculating the numerators and leaving the denominator the same!

Derived from engage^ny

Finding the Unit Fraction

Look at the tape diagram below. What is the unit fraction?

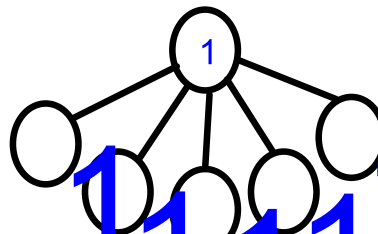


this is the unit fraction

$\frac{1}{5}$

...because the unit fraction represents the number of pieces the whole has been divided into. It always has the number 1 in the numerator.

Number Bond:



$\frac{1}{5}$ $\frac{1}{5}$ $\frac{1}{5}$ $\frac{1}{5}$ $\frac{1}{5}$

Look at the number bond. How can we compose an addition sentence to equal the shaded parts using our unit fraction?

★ How could you write an addition sentence if a whole was composed of 8 equal parts? Use a tape diagram to show your work.

Finding the Unit Fraction

Look at the tap ... ion?

this is the unit fraction

Teacher Notes

The definition of a unit fraction goes beyond what this unit is currently teaching. For now, students need to have a firm understanding the unit fraction is the smallest unit the whole has been divided into - the denominator represents those parts, the numerator is representing one of them!

The addition sentence should be:

1 or 5/5 = 1/5 + 1/5 + 1/5 + 1/5 + 1/5

For challenge question:

1 or 8/8 = 1/8 + 1/8 + 1/8 + 1/8 + 1/8 + 1/8 + 1/8 + 1/8

...because the ... represents the ... pieces the whol... divided into. It al... number 1 in the n...

$\frac{1}{5}$

Look at the number bond. How can we compose an addition sentence to equal the shaded parts using our unit fraction?

★ How could you write an addition sentence if a whole was composed of 8 equal parts? Use a tape diagram to show your work.

Regrouping Fractions with Common Denominators

Let's look at composing fractions another way:

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

If we add parenthesis...

$$1 = \left(\frac{1}{3} + \frac{1}{3}\right) + \frac{1}{3}$$

Can we say $\longrightarrow$

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

Yes!

We regrouped the fractions to add them in a different way but the answer is still the same!

Regrouping Fractions with Common Denominators

For a quick review!

Do you remember our properties of addition? What property is being represented when we added the parenthesis?

A. Commutative Property
B. Associative Property
C. Distributive Property

Click for answer

Remember, fractions with a common denominator, can be added together. Calculate the numerators and leave the denominators the same!

Partner Up!

Previously, we wrote addition sentences for a whole made up of 5 equal parts and 8 equal parts (two slides ago).

$$1 = \frac{1}{5} + \frac{1}{5} + \frac{1}{5} + \frac{1}{5} + \frac{1}{5}$$

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

Can you write a new addition sentence regrouping these fractions for each one?

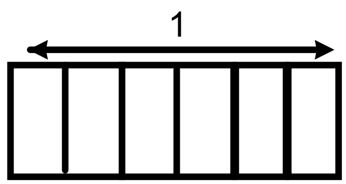
How are your answers different from others around you?

Are the different regrouping equations still correct?

Let's Practice!

Let's double the units of our whole. Fold your strip of paper on the creases and then fold it one more time in half. Open it up.

How many pieces are in our strip now? What is the unit fraction?



★ What does each unit section of the strip represent? Label each part on your strip.

Write an addition sentence to show how you decomposed the whole into smaller parts.

What is one way you can regroup the fractions to show another way to add them together to equal 1?

Let's
the

Teacher Notes

You should guide students through the questions on this page. The following are the answers:

Each section represents 1/6

1 = 1/6 + 1/6 + 1/6 + 1/6 + 1/6 + 1/6

1 (1/6 + 1/ 6 + 1/6) + (1/6 + 1/6 + 1/6)

1 = 3/6 + 3/6

(This is one example of grouping, students may come up with other answers as well. Challenge them by having them find more than one way!)

strip of paper on
half. Open it up.

What is the unit

Wh represent? Label each part on your strip.

Write an addition sentence to show how you decomposed the whole into smaller parts.

What is one way you can regroup the fractions to show another way to add them together to equal 1?

Practice Continued...

Let's shade five sixths of the strip.

Decompose the fraction $\frac{5}{6}$ into 5 units of 1 sixth.

Unit Fraction
Click here!

1. Write an addition sentence to equal $\frac{5}{6}$ using your decomposed units.

2. Now, write an addition sentence regrouping the unit fractions using parenthesis and equaling $\frac{5}{6}$

Click Here for #1

Click here for #2

Practice Continued...

Let's shade five si

Decompose

Teacher Notes

Students answers will vary on regrouping. It is suggested to cover the different ways you could regroup the numbers. Students may find this confusing at first, remind them of the associative and commutative properties and how numbers can socialize with one another but create the same solution/answer.

5/6 = (1/6 + 1/6) + (1/6 + 1/6 + 1/6)
5/6 = (1/6 + 1/6 + 1/6) + (1/6 + 1/6) etc.

1. Write an additio ... posed units.

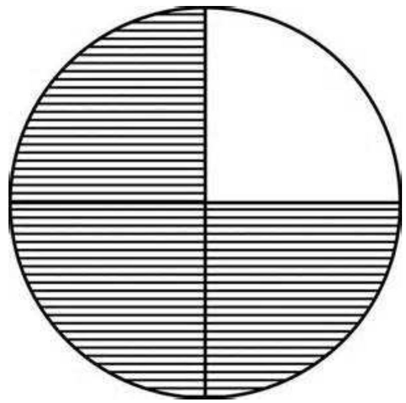
2. Now, write an add ... actions using parenthesis and equaling

$\frac{5}{6}$

Click Here for #1

Click here for #2

With a partner complete the following:



1. Copy this shape then identify how many parts are shaded in the circle
2. What is the unit fraction? Write an addition sentence using the unit fraction to equal the shaded parts.
3. How can you regroup the fractions to make a new addition sentence equaling 3 fourths?
4. Complete: 3 2 ?

1 **Look at the picture below. If this rectangle represents 1 whole, what is the unit fraction?**

- A $\frac{1}{3}$
- B $\frac{1}{2}$
- C $\frac{1}{5}$
- D $\frac{1}{1}$

1 **Look at the picture below. If this rectangle represents 1 whole, what is the unit fraction?**

A $\frac{1}{3}$

B $\frac{1}{2}$

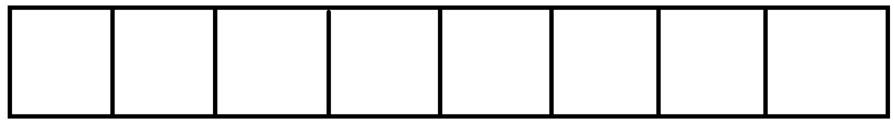
C $\frac{1}{4}$

D $\frac{1}{5}$

Answer

A

2 **The rectangle represents one whole. Based on the units within this picture, which of the following addition equations shows how you can decompose the whole.**



○ A $1 = 1$

○ B $1 = \frac{1}{2} + \frac{1}{3}$

○ C $1 = \frac{1}{8} + \frac{1}{8} + \frac{1}{8} + \frac{1}{8} + \frac{1}{8} + \frac{1}{8} + \frac{1}{8} + \frac{1}{8}$

○ D $1 = \frac{4}{8} + \frac{5}{8}$

○ E $1 = \frac{1}{\ } + \frac{3}{\ } + \frac{4}{\ } + \frac{5}{\ }$

2 **The rectangle represents one whole. Based on the units within this pict addition equations decompose the wh**

Answer

C

A 1 = 1

B 1 = $\frac{1}{2}$ +

C 1 = 2 1 3

8 8 8 8 8 8 8 8

D 1 = 4 5

E 1 = 1 3 4 5

8 8

3 What are possible ways you can regroup these fractions for a new addition sentence still equaling the whole (multiple answers!)?

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

☐ **A** $1 = \frac{3}{8} + \frac{4}{8}$

☐ **B** $1 = \frac{5}{8} + \frac{3}{8}$

☐ **C** $1 = \frac{1}{8} + \frac{1}{8}$

☐ **D** $1 = \frac{4}{\;} + \frac{4}{\;}$

3 **What are possible w... fractions for a new... the whole (multiple...**

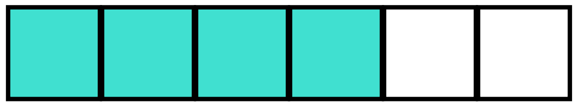
1 =

Answer

B and D

- A 1 =
- B 1 =
- C 1 =
- D 1 =

4 Look at the tape diagram below. Based on how many parts are shaded, which of the following addition sentences correctly decomposes the shaded parts?



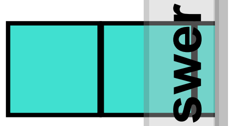
A 4 1 1 1 1

B 6 6 6 6 6 1 1

C 6 6 6 6 6 6 6

D 6 2 6 4

4 **Look at the tape diagram below. Based on how many parts are sha… addition sentences… shaded parts?**

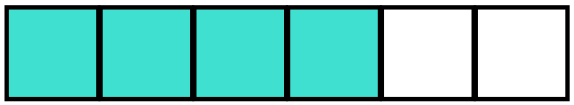


Answer

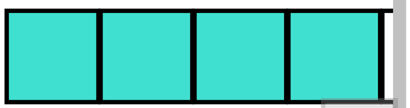
A

- A
- B
- C
- D

5 What is the unit fraction of this from the previous question?



5 **What is the unit fraction of this from the previous question?**



Answer

$$\frac{1}{6}$$

6 Is 2/6 + 4/6 one way to regroup ?

$$\frac{1}{6} \quad \frac{1}{6} \quad \frac{1}{6} \quad \frac{1}{6}$$

- True
- False

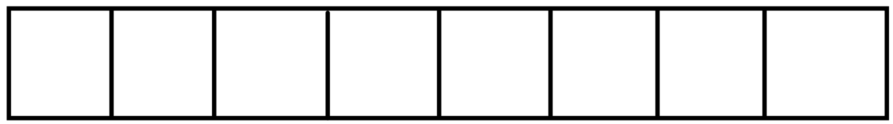
6 Is 2/6 + 4/6 one way to

- True
- False

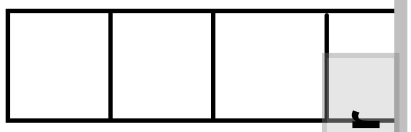
Answer

False

7 What is the unit fraction pictured below?



7 What is the unit fraction pictured below?



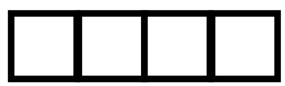
Answer

$$\frac{1}{8}$$

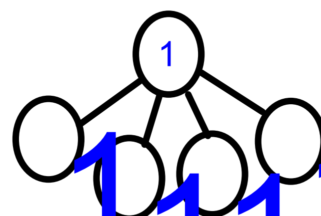
Visuals are Vital

Being able to create a picture with fractions is important, not only for your own understanding but so you can also show your work on assignments and tests!

So far we have used the tape diagram and number bonds to visualize how to decompose, compose (add) fractions.



$\frac{1}{4}+\frac{1}{4}+\frac{1}{4}+\frac{1}{4}=1$



$\frac{1}{4}$ $\frac{1}{4}$ $\frac{1}{4}$ $\frac{1}{4}$

Now we are going to learn to use number lines to continue practicing adding fractions in various ways!

Adding Fractions on a Number Line

In the previous unit, you learned how to count and label fractions on a number line.

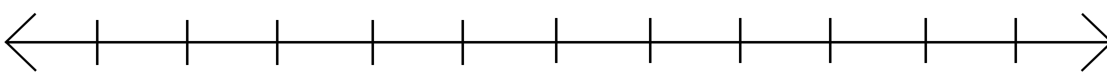
Answer the questions below for a quick review on how to use a number line.

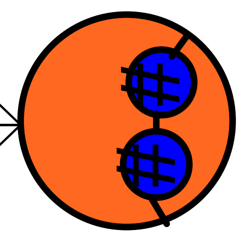
1. The intervals have to be equally spaced when creating a number line. **True or False**

2. You label the number line starting with the largest number first. **True or False**

3. When placing points on the number line you can put them anywhere you want. **True or False**

4. Intervals on a number line need to be in sequential order, with each section the same measurement? **True or False**





Adding Fractions on a Number Line

In th ... to count and label
... .

Ans ... ew on how to use a
num ...

... en creating a number

2. ... argest number

3. ... u can put them
a ...

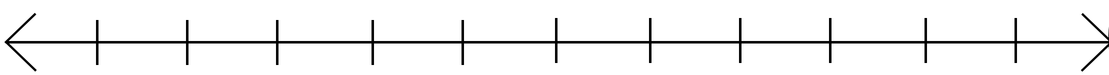
Teacher Notes

Students can answer these simple T or F questions whole group, small group, or independently.

As you go through the answers, discuss the importantance of how to label number lines, the equal spacing of lines, as well as the equal sequential numbering of the parts.

1. T 2. F 3. F 4. T

4. Intervals on a number line need to be in sequential order, with each section the same measurement? **True or False**

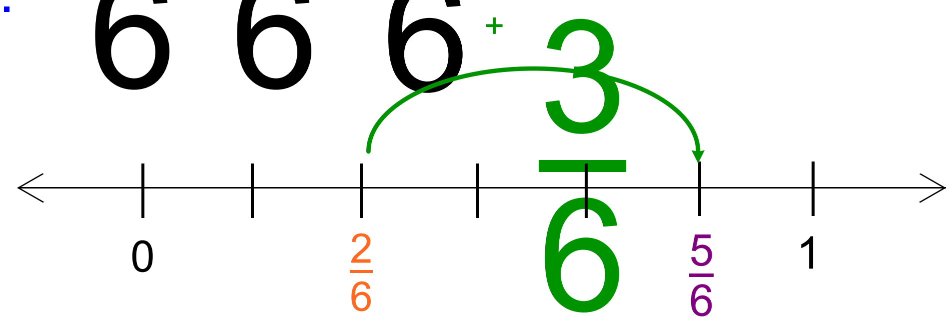


The Number Line in Action

The number line is another way we can show our work when adding fractions.

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

1. Draw the number line with enough sections to represent the total parts.



2. Put your finger on two sixths.

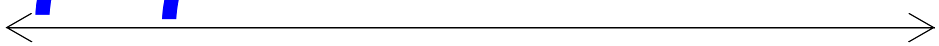
3. Add the 3 sixths, counting one sixth, two sixths, three sixths

4. You can SEE how two sixths plus three sixths equals five sixths on the number line!

Try this:

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

Show your work using a number line.

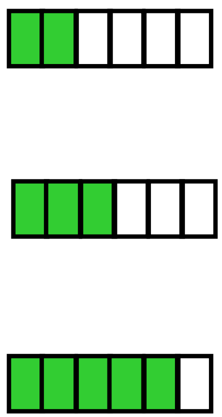


Do you prefer to draw tape diagrams or use number lines to show your work with fractions?

Adding Fractions Vertically

You can rewrite fractions vertically (up and down the paper) when adding and still get the same answer!

$$\begin{array}{r} \frac{2}{6} \\ +\ \frac{3}{6} \\ \hline \frac{5}{6} \end{array}$$



Try it!

How can you rewrite $\frac{4}{8} + \frac{3}{8} = ?$

Solve it!

Try these!

Click the boxes to see work and answers.
Be sure to simplify all answers.

$$\frac{2}{4} + \frac{1}{4}$$

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

$$\frac{5}{12} + \frac{4}{12}$$

$$\frac{11}{30} + \frac{13}{30}$$

11

$$\begin{array}{r} \dfrac{3}{10} \\ + \dfrac{2}{10} \\ \hline \end{array}$$

12

$$\frac{7}{14}$$

$$+\ \frac{3}{14}$$

$$\overline{}$$

12

$$\begin{array}{r} \dfrac{7}{14} \\ + \dfrac{3}{14} \\ \hline \end{array}$$

Answer

$$\frac{9}{14}$$

13 $\frac{5}{12} + \frac{2}{12}$

13 $\frac{5}{12} + \frac{2}{12}$

Answer

$$\frac{7}{12}$$

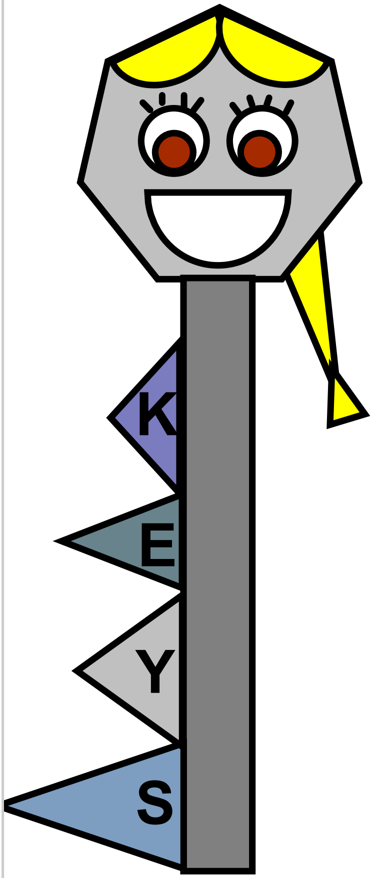
14 $\frac{8}{20} + \frac{6}{20}$

14 $\frac{8}{20} + \frac{6}{20}$

Answer

$$\frac{14}{20} = \frac{7}{10}$$

Kaylee the Key to is here to help solve fraction word problems!



The **K.E.Y.S.** to Problem Solving

K: Know the important information in the problem.
Read the problem (more than once) and first find the main idea.
(MAIN IDEA = What is the problem asking you to find?)
Find all the important information that supports the main idea.

E: Equation (or equations) is created to plan your strategy and organize the important information.
Use equations to develop a strategy (i.e. algorithm, diagram).
Strategy must be organized and easy to follow.

Y: Yes, I have checked over my strategy and my answer is reasonable (makes sense).
Use an estimate to check if your answer is reasonable.

S: Solution is written in a complete sentence with the correct label.

15 **Lisa poured one-fifth of a bucket of water into a plastic wading pool. A few minutes later she poured 3/5 of a bucket into the wading pool. How much water did Lisa pour into the pool?**

15 **Lisa poured one-fifth of a bucket of water into a plastic wading pool. A few minutes later she poured 3/5 of a bucket** [...] **much water did Lisa** [...]

Answer

$$\frac{4}{5}$$

16 **Of the shirts in John's closet, 1/8 are green and another 5/8 are purple. What fraction of the shirts are green and purple?**

17 An athlete drank one-third of a bottle of sports drink in the beginning of a tennis match and another 1/3 of a bottle at the end of the tennis match. How much did she drink in all?

Adding Mixed Numbers with Common Denominators

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Improper Fractions and Mixed Numbers Review

Place each number in the appropriate column.

$\frac{5}{4}$ $\frac{13}{10}$ $4\frac{1}{4}$ $10\frac{3}{8}$ $\frac{8}{4}$ $3\frac{2}{6}$ $\frac{7}{5}$

<u>Mixed Numbers</u>	<u>Improper Fractions</u>

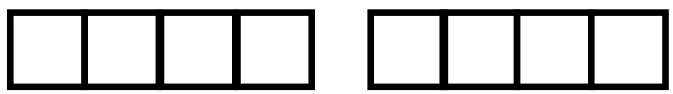
How are mixed numbers and improper fractions related?

Decomposing Improper Fractions

Improper fractions can be decomposed just like a regular fraction.

Let's look at the improper fraction $\frac{7}{4}$

Get out your 2 strips of paper. Divide each strip into 4 equal parts.



Shade $\frac{7}{4}$ using both strips of paper.

How much is shaded on the first strip in fraction form?

How much is shaded on the second strip in fraction form?

Decomposing Improper Fractions

Improper fractions action.

Let's lo

Get out your 2 st ual parts.

Shade

Teacher Notes

Help students to identify that they have shaded an entire whole and some additional parts. In the first section they shaded 4/4 and in the second they shaded 3/4. Students have began to decompose the improper fraction 7/4 into smaller parts.

$\frac{7}{4}$

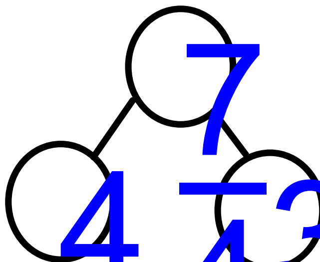
How much is shaded on the first strip in fraction form?

How much is shaded on the second strip in fraction form?

Continued...

You shaded $\frac{4}{4}$ in the first strip and $\frac{3}{4}$ in the second strip.

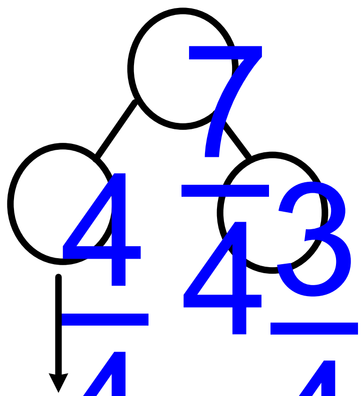
We've decomposed the improper fraction into 2 parts which can also be represented by a number bond.



So we can say: $\frac{4}{4} + \frac{3}{4} = \frac{7}{4}$

If each strip equals one whole, what is the unit fraction?

Number Bonds with Mixed Numbers



What is another way we can write $\frac{4}{4}$?

You can rewrite your addition sentence using 1.

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

★ Compare and contrast $1\frac{3}{4}$ to $\frac{7}{4}$.

Practice Decomposing Improper Fractions

How can you decompose $\frac{4}{3}$? Use the space below and a tape diagram to show your work.

What addition sentence can you create from this visual?

What is another way you can represent $\frac{3}{3}$?

What mixed number is equivalent to $\frac{4}{}$?

Adding Mixed Numbers with Common Denominators

To add mixed numbers with common denominators, add the fractions then add the whole numbers. Make sure your answer is in simplest form.

$$\begin{array}{r} 2\frac{1}{6} \\ +\ 1\frac{4}{6} \\ \hline 3\frac{5}{6} \end{array} \qquad \begin{array}{r} \frac{1}{6} \\ +\ \frac{4}{6} \\ \hline \frac{5}{6} \end{array} \qquad \begin{array}{r} 2 \\ +\ 1 \\ \hline 3 \end{array}$$

$$3 + \frac{5}{6} = \boxed{3\frac{5}{6}}$$

☆ **Try this:**

$$\begin{array}{r} 5\frac{1}{9} \\ +\ 2\frac{2}{9} \\ \hline \end{array}$$

18 **Is the equation below true or false?**

- True
- False

$$
\begin{array}{r}
1\frac{1}{4} \\
+\ 3\frac{2}{4} \\
\hline
4\frac{3}{4}
\end{array}
$$

18 Is the equation below true or false?

- True
- False

$$\begin{array}{r} 1\frac{1}{4} \\ +\ 3\frac{2}{4} \\ \hline 4\frac{3}{4} \end{array}$$

Answer

True

19 Is the equation below true or false?

True

False

$$
\begin{array}{r}
4\frac{1}{4} \\
+\ 4\frac{1}{4} \\
\hline
8\frac{2}{4}
\end{array}
$$

19 Is the equation below true or false?

- True
- False

$$\begin{array}{r} 4\frac{1}{4} \\ +\ 4\frac{1}{4} \\ \hline 8\frac{2}{4} \end{array}$$

Answer

True

20 Find the sum.

$$2\frac{5}{12} + 3\frac{2}{12}$$

20 Find the sum.

$$2\frac{5}{12} + 3\frac{2}{12}$$

Answer

$$5\frac{7}{12}$$

21 **Find the sum.**

$$5\frac{3}{10} + 7\frac{5}{10}$$

21 **Find the sum.**

$$5\frac{3}{10} + 7\frac{5}{10}$$

Answer

$$12\frac{8}{10} = 12\frac{4}{5}$$

Adding Mixed Numbers with Common Denominators

Sometimes after you add the mixed numbers, the fraction is improper. When this occurs, you must rename the improper fraction as a mixed number and add it to the whole number.

$$\begin{array}{r} 3\frac{3}{5} \\ +\ 2\frac{4}{5} \\ \hline \end{array} \qquad \begin{array}{r} 6\frac{5}{9} \\ +\ 1\frac{7}{9} \\ \hline \end{array}$$

22 **Is the equation below true or false?**

- True
- False

$$\begin{array}{r} 1\frac{8}{12} \\ +\ 1\frac{5}{12} \\ \hline 3\frac{1}{12} \end{array}$$

22 Is the equation below true or false?

- True
- False

$$\begin{array}{r} 1\frac{8}{12} \\ +\ 1\frac{5}{12} \\ \hline 3\frac{1}{12} \end{array}$$

Answer

True

$$2\frac{13}{12} = 3\frac{1}{12}$$

23 **Find the sum.**

$$
\begin{array}{r}
2\,\frac{4}{9} \\
+\ 5\,\frac{7}{9} \\
\hline
\end{array}
$$

23 Find the sum.

$$\begin{array}{r} 2\frac{4}{9} \\ +\ 5\frac{7}{9} \\ \hline \end{array}$$

Answer

$$7\frac{11}{9} = 8\frac{2}{9}$$

24 Find the sum.

$$\begin{array}{r} 3\,\frac{3}{14} \\ +\ 2\,\frac{4}{14} \\ \hline \end{array}$$

24 **Find the sum.**

$$\begin{array}{r} 3\,\frac{3}{14} \\ +\ 2\,\frac{4}{14} \\ \hline \end{array}$$

Answer

$$5\frac{7}{14}$$

25 Find the sum.

$$4\frac{5}{8} + 2\frac{3}{8}$$

26 Madison's school is having a fun run during gym class. How many total miles did she run during weeks 4 and 5?

Week	Miles
Week 1	$2\frac{3}{5}$
Week 2	$1\frac{4}{5}$
Week 3	$2\frac{1}{5}$
Week 4	$3\frac{4}{5}$
Week 5	$1\frac{2}{5}$

Answer

27 Madison's school is having a fun run during gym class. How many total miles did she run during weeks 2 and 3?

Week	Miles
Week 1	$2\frac{3}{5}$
Week 2	$1\frac{4}{5}$
Week 3	$2\frac{1}{5}$
Week 4	$3\frac{4}{5}$
Week 5	$1\frac{2}{5}$

Answer

28 Madison's school is having a fun run during gym class. How many total miles did she run during the whole five weeks?

Week	Miles
Week 1	$2\frac{3}{5}$
Week 2	$1\frac{4}{5}$
Week 3	$2\frac{1}{5}$
Week 4	$3\frac{4}{5}$
Week 5	$1\frac{2}{5}$

Answer

Subtracting Fractions with Common Denominators

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What are the ways we can write or visualize fractions?

Remember fractions can be written:

1. By writing words for the fractional parts
2. Drawing a picture, such as a tape diagram or circle
3. Writing an equation
4. Representing the fractional parts on a number line

We will use all of these different ways as we learn how to subtract fractions with common denominators!

Subtraction with Fractions

Let's practice a few basic subtraction problems:

What is 5 - 4 = ?

What is 5 dogs - 4 dogs = ?

What is 5 inches - 4 inches = ?

If, we know how to subtract whole numbers, we can use this knowledge to subtract fractions with a common denominator!

Try this: What is 5 sixths - 4 sixths = ?

Click here!

Subtraction with Fractions

Let's practice a fe

What is

What is

What is

Teacher Notes

Guide students to say the number answer attached with the units. 1 dog, 1 inch, etc. You could give more examples if they are struggling with the unit labeling concept!

If, we know how … this knowledge to sub… …ator!

★ **Try this:** What is 5 sixths - 4 sixths = ?

Click here!

Subtracting Fractions with Common Denominators

Subtracting fractions with a common denominator is similar to when we added fractions with a common denominator.

Let's Talk:

Think about the problem 5 sixths minus four sixths:

1. What do you think is different when we subtract fractions from when we added fractions?

2. What do you think is the same?

Subtracting Fractions with Con

Teacher Notes

Encourage students to discuss the questions about similarities and differences with a partner or small group. You should guide the conversation to recognize that the denominators stay the same when we add and subtract, but the math function changes (the difference).

The denominator indicates the number of parts of the whole. If the fractions have a common denominator, they are the same "size" so we can subtract the numerators (or number of parts). We are taking away parts instead of adding more.

Subtracting frac ilar to when we ad or.

Let's Talk:

Think about t ns:

1. What do you think is different when we subtract fractions from when we added fractions?

2. What do you think is the same?

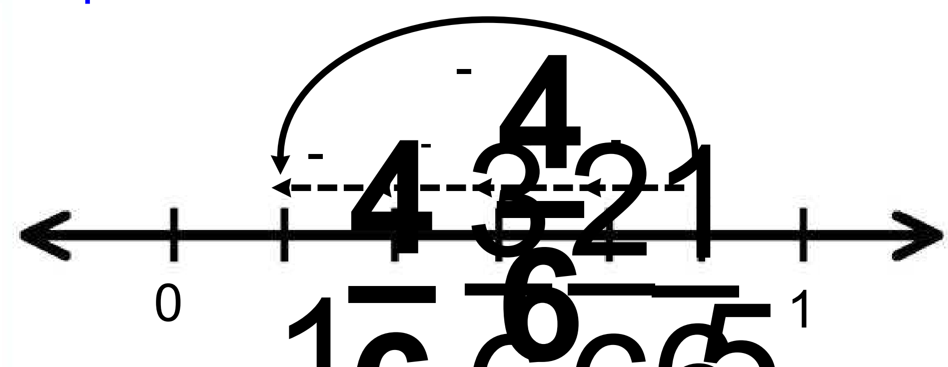
Subtract Fractions using the Number Line

We said 5 sixths minus 4 sixths = 1 sixth

How can we write that in fraction form?

Click here

Good! Now, let's represent it on a number line.



When we put it on the number line, we start at 5 sixths, then count backwards, one sixth at a time, to subtract 4 sixths and arrive at the answer of one sixth.

Subtract Fractions using the Number Line

We said 5 sixths m

How can we writ

Good! Now

Teacher Notes

Students should write and draw the depictions of subtracting 5 sixths from 4 sixths. They should be able to compose the fractions in an equation and construct the number line with 6 equal parts independently, but may need some guidance showing how you count backwards 4 sixths. You may need to revisit how each section between "ticks" is worth 1 part of the whole. Make sure students are counting between marks appropriately to account for each part.

0 1

$\frac{1}{6}$ $\frac{5}{6}$

When we put it on the number line, we start at 5 sixths, then count backwards, one sixth at a time, to subtract 4 sixths and arrive at the answer of one sixth.

Subtracting Related to Addition

On the previous slide we demonstrated how to use the number line to subtract fractions. Remember, you can use the same process when adding fractions. All of your equations are part of the same family. Let's look at this a little closer.

We know that 5/6 - 4/6 = 1/6. If this is true, then 1/6 + 4/6 should also equal 5/6. Let's show how this is true using a number line.

You can create a "family" relating these equations using your knowledge of addition and subtraction properties:

1/6 + 4/6 = 5/6   5/6 - 1/4 = 4/6

4/6 + 1/6 = 5/6   5/6 - 4/6 = 1/6

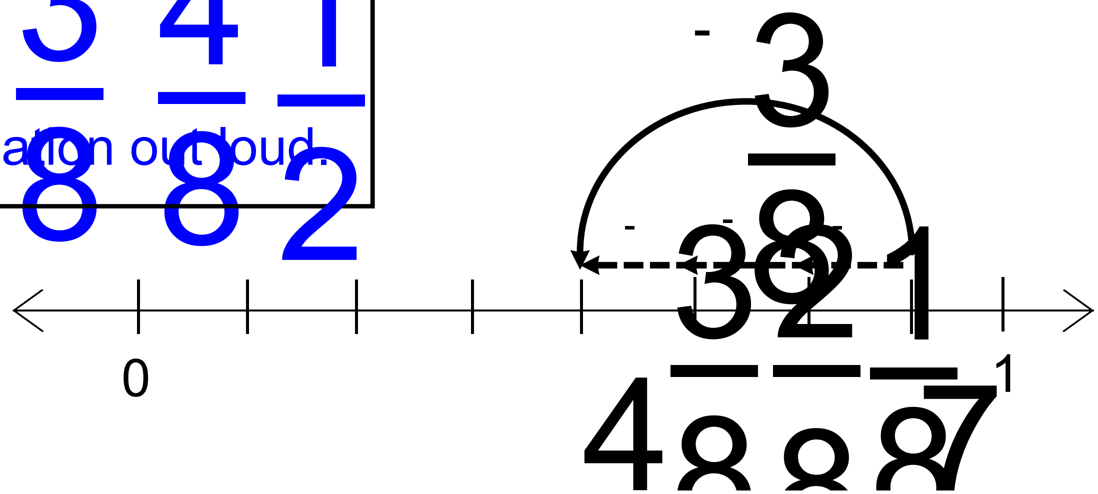
Practice One More

Solve $\frac{7}{8} - \frac{3}{8}$ and draw a number line to represent this problem.

Remember we only subtract the numerators! Leave the denominators the same.

$\frac{7}{8} - \frac{3}{8} = \frac{4}{8}$ or $\frac{1}{2}$

Read the equation out loud.



Writing Fractions Vertically

Just like when adding fractions, you can also subtract fractions by writing them vertically. Remember, the denominator indicates the number of parts of the whole. If the fractions have a common denominator, they are the same "size" so we can subtract the numerators (or number of parts).

$$\frac{5}{6} - \frac{4}{6} = \frac{1}{6}$$

$$\begin{array}{r} \frac{5}{6} \\ -\ \frac{4}{6} \\ \hline \frac{1}{6} \end{array}$$

★ How could you write an addition sentence using these fractions?

Try these!
Click the boxes to see work and answers.
Be sure to simplify all answers.

$$\frac{2}{4} - \frac{1}{4}$$

$$\frac{3}{7} - \frac{1}{7}$$

$$\frac{11}{12} - \frac{3}{12}$$

$$\frac{19}{30} - \frac{13}{30}$$

29

$$\frac{7}{8} - \frac{4}{8} = \underline{\qquad}$$

29

$$\frac{7}{8} - \frac{4}{8}$$

Answer

$$\frac{3}{8}$$

$$30 \quad \frac{7}{10}$$

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

$$\overline{}$$

31

$$\begin{array}{r} \dfrac{5}{6} \\[6pt] -\ \dfrac{3}{6} \\ \hline \end{array}$$

32 $\frac{9}{14} - \frac{5}{14}$

33 $\dfrac{7}{9} - \dfrac{5}{9}$

33 $\frac{7}{9} - \frac{5}{9}$

Answer

$$\frac{2}{9}$$

34 Joel made a batch of fresh cookies with 5/6 of a pound of butter and 1/6 of a pound of sugar. How much more butter than sugar was used?

34 Joel made a batch of fresh cookies with 5/6 of a pound of butter and 1/6 of a pound of sugar. How much more butter th

Answer

$$\frac{4}{6}=\frac{2}{3}\,pound$$

35 The pizza place puts three-fourths of a cup of sauce on a large pizza and one-fourth of a cup of sauce on a personal pizza. How much more sauce is on a large pizza?

35 The pizza place puts three-fourths of a cup of sauce on a large pizza and one-fourth of a cup of sauce on a personal pizza. How much more sauce is on a large p

Answer

$$\frac{2}{4}=\frac{1}{2}cup$$

Subtracting Mixed Numbers with Common Denominators

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Subtracting Mixed Numbers with Common Denominators

To subtract mixed numbers with common denominators, subtract the fractions then subtract the whole numbers. Make sure your answer is in simplest form.

$$\begin{array}{r} 2\frac{4}{6} \\ -\ 1\frac{3}{6} \\ \hline \end{array}$$

$$\begin{array}{r} 5\frac{7}{9} \\ -\ 2\frac{4}{9} \\ \hline \end{array}$$

36 **Is the equation below true or false?**

- True
- False

$$\begin{array}{r} 4\frac{5}{9} \\ -\quad \frac{3}{9} \\ \hline 3\frac{2}{9} \end{array}$$

36 **Is the equation below true or false?**

○ **True** ○ **False**

$$\begin{array}{r} 4\frac{5}{9} \\ -\ \frac{3}{9} \\ \hline 3\frac{2}{9} \end{array}$$

Answer

False

37 Is the equation below true or false?

- True
- False

$$\begin{array}{r} 2\frac{7}{9} \\ -\ 1\frac{1}{9} \\ \hline 1\frac{2}{3} \end{array}$$

37 **Is the equation below true or false?**

- True
- False

$$\begin{array}{r} 2\,\frac{7}{9} \\ -\;1\,\frac{1}{9} \\ \hline 1\,\frac{2}{3} \end{array}$$

Answer

True

38 Find the difference.

$$4\frac{7}{8} - 2\frac{3}{8}$$

38 Find the difference.

$$4\frac{7}{8} - 2\frac{3}{8}$$

Answer

$$2\frac{4}{8} = 2\frac{1}{2}$$

39 Find the difference.

$$6\frac{7}{12} - 1\frac{4}{12}$$

39 **Find the difference.**

$$6\frac{7}{12} - 1\frac{4}{12}$$

Answer

$$5\frac{3}{12} = 5\frac{1}{4}$$

40 Find the difference.

$$13\frac{5}{8} - 5\frac{2}{8}$$

40 **Find the difference.**

$$13\,\frac{5}{8} - 5\,\frac{2}{8}$$

Answer

$$8\,\frac{3}{8}$$

41 How many inches more of rain was there in January than March?

Month	Inches of Precipitation
January	$12\frac{5}{6}$
February	$8\frac{4}{6}$
March	$2\frac{1}{6}$
April	$9\frac{2}{6}$
May	$1\frac{1}{6}$

Answer

42 **How many inches more of rain was there in April than May?**

Month	Inches of Precipitation
January	$12\frac{5}{6}$
February	$8\frac{4}{6}$
March	$2\frac{1}{6}$
April	$9\frac{2}{6}$
May	$1\frac{1}{6}$

Answer

43 How many inches more of rain was there in February than March?

Month	Inches of Precipitation
January	$12\frac{5}{6}$
February	$8\frac{4}{6}$
March	$2\frac{1}{6}$
April	$9\frac{2}{6}$
May	$1\frac{1}{6}$

Answer

44 Which one correctly would regroup $10\frac{1}{7}$?

- A $10\frac{7}{7}$
- B $10\frac{8}{7}$
- C $9\frac{8}{7}$
- D $9\frac{8}{8}$

44 Which one correctly would regroup $10\frac{1}{7}$?

A $10\frac{7}{7}$

B $10\frac{8}{7}$

Answer

C

45 Which one correctly would regroup $8\frac{1}{5}$ **?**

- ○ **A** $8\frac{6}{5}$
- ○ **C** $7\frac{5}{5}$
- ○ **B** $7\frac{6}{5}$
- ○ **D** $9\frac{6}{5}$

45 Which one correctly would regroup $8\frac{1}{5}$?

A $8\frac{6}{5}$

B $7\frac{6}{5}$

Answer

B

46 Which one correctly would regroup $3\frac{2}{9}$?

- A $2\frac{11}{9}$
- C $2\frac{9}{9}$
- B $2\frac{10}{9}$
- D $2\frac{5}{9}$

46 Which one correctly would regroup $3\frac{2}{9}$?

- A $2\frac{11}{9}$
- B $2\frac{10}{9}$

Answer

A

47 Find the difference.

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

47 Find the difference.

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

Answer

$$8\frac{2}{4}=8\frac{1}{2}$$

48 Find the difference.

$$5\frac{2}{7} - 2\frac{3}{7} =$$

48 Find the difference.

$$5\frac{2}{7} - 2\frac{3}{7} =$$

Answer

$$2\frac{6}{7}$$

50 Find the difference.

$$1\frac{4}{9} - \frac{8}{9} =$$

50 Find the difference.

$$1\frac{4}{9} - \frac{8}{9} =$$

Answer

$$\frac{5}{9}$$

51 Victoria's hair is twenty two and three-eighths inches long. Miranda's hair is nine and five-eighths inches long. How much longer is Victoria's hair than Miranda's hair?

51 Victoria's hair is twenty two and three-eighths inches long. Miranda's hair is nine and five-eighths inches long. How muc

hair than Miranda's

Answer

$$12\frac{6}{8} = 12\frac{3}{4}$$

Multiplying Fractions and Whole Numbers

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To multiply fractions with whole numbers, write the whole number as a fraction (over 1) then multiply the two fractions.

Make sure you write your answer in simplest form.

$$6 \times \frac{4}{9} =$$

Alternate Method of canceling components

$$\frac{3}{5}(7) = \boxed{}$$

52

$$5 \times \frac{1}{2} = \frac{5}{1} \times \frac{1}{2}$$

- True
- False

52

$5 \times \frac{1}{2} = \frac{5}{1} \times$

- True
- False

Answer

True

53 $3 \times \frac{4}{7}$

A $\frac{12}{21}$

B $\frac{12}{7}$

C $1\frac{5}{7}$

D $3\frac{5}{7}$

53

$$3 \times \frac{4}{7}$$

A $\frac{12}{21}$

B $\frac{12}{7}$

Answer

C

54

$$12 \times \frac{8}{9}$$

A $\frac{32}{3}$

C $\frac{96}{9}$

B $11\frac{1}{3}$

D $10\frac{2}{3}$

54

$$12 \times \frac{8}{9}$$

A $\frac{32}{3}$

B $11\frac{1}{3}$

Answer

D

57

$$10 \times \frac{4}{9} =$$

57

$$10 \times \frac{4}{9} =$$

Answer

$$\frac{40}{9} = 4\frac{4}{9}$$

59

What is $\frac{7}{9}$ of 12?

60

What is $\frac{3}{5}$ of 8?

60

What is $\frac{3}{5}$ **of 8?**

Answer

$$\frac{24}{5} = 4\frac{4}{5}$$

61

What is $\frac{4}{9}$ of 9?

62

What is $\frac{2}{3}$ of 7?

62

What is $\frac{2}{3}$ of 7?

Answer

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