**4th Grade
Fraction Computation
Table of Contents**

- **Adding Fractions with Common Denominators**
- **Adding Mixed Numbers with Common Denominators**
- **Subtracting Fractions with Common Denominators**
- **Subtracting Mixed Numbers with Common Denominators**
- **Multiplying Fractions and Whole Numbers**

1

Teacher Notes

Adding Fractions with Common Denominators

**Return to
Table of
Contents**

2

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

Write responses below:

Teacher Notes

3

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!
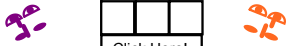
4

Adding Parts to Make a Whole

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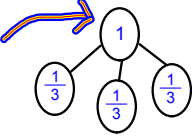How can you divide this strip into 3 equal parts?

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

What is each section now representing?

Click Here!

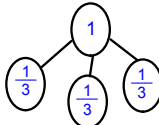We can show the relationship between these numbers by using a number bond.

1
$\frac{1}{3}$ $\frac{1}{3}$ $\frac{1}{3}$

Derived from engage^ny

5

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.

1
$\frac{1}{3}$ $\frac{1}{3}$ $\frac{1}{3}$

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!

6

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...

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

Remember me?

💡 **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}

Teacher Notes

7

Finding the Unit Fraction

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

this is the unit fraction → $\frac{1}{5}$

Number Bond:

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

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.

Teacher Notes

8

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 ⟶

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

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

9

Regrouping Fractions with Common Denominators

STOP

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

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

Nov 4-11:16 AM

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?

1

⭐ 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?

Derived from engage^{ny}

Teacher Notes

11

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

Derived from engage^{ny}

Teacher Notes

12

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.

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

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

13

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**

Teacher Notes

14

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.

$$+ \frac{3}{6}$$

0    $\frac{2}{6}$ $\frac{5}{6}$ 1

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!

15

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?

16

Adding Fractions Vertically

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

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

⭐ **Try it!**

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

Solve it!

17

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

$$\frac{2}{4}$$ $$\frac{3}{7}$$ $$\frac{5}{12}$$ $$\frac{11}{30}$$
$$+\frac{1}{4}$$ $$+\frac{1}{7}$$ $$+\frac{4}{12}$$ $$+\frac{13}{30}$$

18

Adding Mixed Numbers with Common Denominators

Return to Table of Contents

19

Improper Fractions and Mixed Numbers Review

Place each number in the appropriate column.

Mixed Numbers | Improper Fractions

$\frac{5}{4}$　$\frac{13}{10}$　$4\frac{1}{4}$

$10\frac{3}{8}$　$\frac{8}{4}$

$\frac{7}{5}$

$3\frac{2}{6}$

How are mixed numbers and improper fractions related?

20

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?
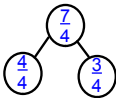
Teacher Notes

Derived from engageny

21

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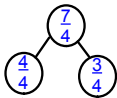
$\frac{7}{4}$
$\frac{4}{4}$ $\frac{3}{4}$

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

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

Derived from engageny

22

Number Bonds with Mixed Numbers

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

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 $\frac{7}{4}$.

Derived from engageny

23

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 $\frac{4}{3}$?

24

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.

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

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

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

⭐ **Try this:**

$$5\frac{1}{9}$$
$$+\ 2\frac{2}{9}$$

25

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.

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

$$6\frac{5}{9}$$
$$+\ 1\frac{7}{9}$$

26

Subtracting Fractions with Common Denominators

Return to Table of Contents

27

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!

28

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!

Derived from engage^ny

Teacher Notes

29

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?

Teacher Notes

30

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.

$-\frac{4}{6}$

$-\frac{4}{6}$ $-\frac{3}{6}$ $-\frac{2}{6}$ $-\frac{1}{6}$

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

Teacher Notes

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.

Derived from engage^ny

31

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.

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

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

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 |

32

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).

$\frac{5}{6}$

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

$+\frac{1}{6}$

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

33

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

$\frac{2}{4}$ $\frac{3}{7}$ $\frac{11}{12}$ $\frac{19}{30}$

$-\frac{1}{4}$ $-\frac{1}{7}$ $-\frac{3}{12}$ $-\frac{13}{30}$

34

Subtracting Mixed Numbers with Common Denominators

35

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.

$2\frac{4}{6}$ $5\frac{7}{9}$

$-1\frac{3}{6}$ $-2\frac{4}{9}$

36

Try this....

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

$$-4\frac{3}{5}$$

We can not subtract 1 - 3, so
we need to regroup.

37

$$7\frac{1}{5} = 6 + \frac{5}{5} + \frac{1}{5} = 6\frac{6}{5}$$

$$-4\frac{3}{5}$$

The 7 is regrouped into this
and then added to the 1/5.

38

$$7\frac{1}{5} = 6 + \frac{5}{5} + \frac{1}{5} = 6\frac{6}{5}$$

$$-4\frac{3}{5} \qquad -4\frac{3}{5}$$

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

Now we can subtract.

39

Multiplying
Fractions and
Whole Numbers

Return to
Table of
Contents

40

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

41

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

42