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Changing Between Improper Fraction and Mixed Number Form

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Learn how to turn an improper fraction into a mixed number as well as how to turn a mixed number into an improper fraction. Practice these skills with examples.

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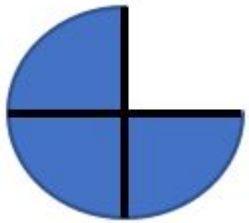
What are Improper Fractions and Mixed Numbers?

A fraction is a number that is composed of two parts, the numerator and the denominator, which are separated by a horizontal line. The **numerator** is the top number of the fraction, and the **denominator** is the bottom number of the fraction. The horizontal line is called the **fraction bar**, however it means the same thing as a division symbol. Fractions can be classified as proper, improper, and mixed fractions, and it is possible to change improper fractions to mixed numbers and to change mixed numbers to improper fractions.

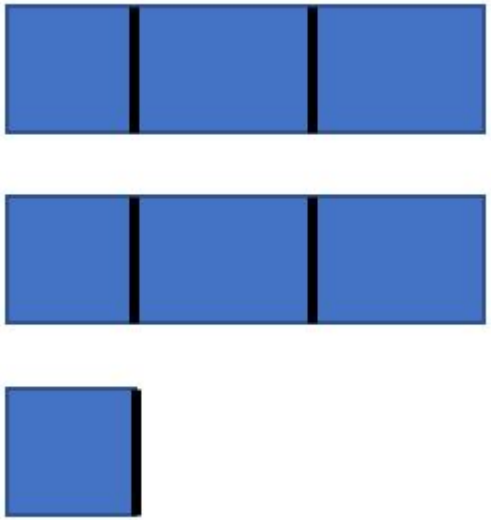
In a **proper fraction**, the numerator is smaller than the denominator. A diagram of a proper fractions shows that only a portion of a whole is represented.

This fraction $\frac{3}{4}$ illustrated in the diagram is proper because 3 is smaller than 4. The number is read as "three-fourths" and it means 3 divided by 4. The image shows that 3 out of 4 pieces are shaded. In general, a proper fraction is less than 1 whole, and this is demonstrated for $\frac{3}{4}$ in the diagram, where the full circle would represent a whole.



Three-fourths is a proper fraction.

In an **improper fraction**, the numerator is greater than the denominator, and therefore an improper fraction is greater than one. The diagram of an improper fraction shows that there are enough fractional parts to make at least one whole number.



Improper fraction 7/3.

We see that the number $\frac{7}{3}$ is greater than 1 whole from the diagram, where one bar would represent a whole. This can also be seen by performing the division indicated by the fraction bar. That is, 7 divided by 3 is equivalent to $2.\overline{3}$, which is greater than 1.

A **mixed number** has a whole number and a fractional part. A diagram shows that there is at least one whole part and a fractional part.

Notice that the diagram representing an improper fraction could also be used to represent a mixed number. Similarly, the diagram used to represent a mixed number could also be used to represent an improper fraction. This is because these two types of numbers are essentially the same, and we have different sets of steps that demonstrate how to turn an improper fraction into a mixed number and how to turn a mixed number into an improper fraction.

Converting an Improper Fraction to a Mixed Number

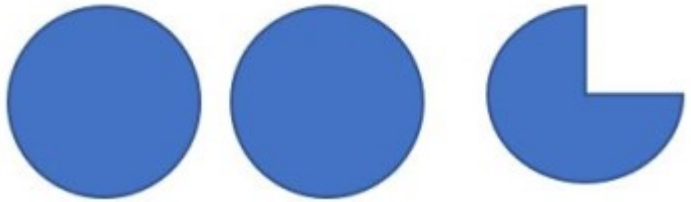
An improper fraction and a mixed number are different representations of the same quantity. Every improper fraction is equivalent to a mixed number, and can therefore be converted to a mixed number. We can use images of equivalent improper fractions and mixed numbers to demonstrate that the quantities are equal as shown for the equivalent numbers $1\frac{1}{3}$ and $\frac{4}{3}$.

The mixed fraction 1 and 1/3.

to Mixed Numbers

To understand how to convert an improper fraction to a mixed number, it is important to remember that the fraction bar means to divide. To turn an improper fraction into a mixed number, follow these steps:

- **Step 1:** Divide the numerator by the denominator.



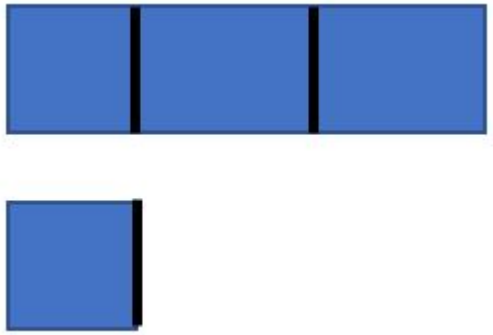
The number two and three-fourths is a mixed number.

There are many instances when it is beneficial to understand how to turn an improper fraction into a mixed number. Some of these instances are as follows:

- In real life, a mixed number often conveys more meaning than an improper fraction.
- Some measuring tools, such as rulers, use mixed numbers.
- Often, answers to mathematical problems require a mixed number as the final answer to be accurate and complete.

Steps to Converting Improper Fractions

- **Step 2:** Keep the result as a whole number with a remainder. The whole number will be the whole number of the mixed number.
- **Step 3:** Create a new fraction with the remainder as the numerator over the original denominator. This fraction will be the fractional part of the mixed number.
- **Step 4:** Write the answer with the whole number before the fractional part.



The improper fraction 4/3

Example One: What is 43/10 as a mixed number?

In this example, we will demonstrate how to turn an improper fraction into a mixed number by taking the example of $\frac{43}{10}$ through our steps.

- **Step 1:** $\frac{43}{10}$ means 43 divided by 10.
- **Step 2:** Carrying out the division yields 4 remainder 3, so the whole number part of our mixed number will be 4.
- **Step 3:** The fractional part of our mixed number will be the remainder (3) over the original denominator (10) so it is $\frac{3}{10}$.
- **Step 4:** We write the whole number first followed by the fractional part to get that the answer is $4\frac{3}{10}$.

Example Two: What is 9/5 as a mixed number?

As with the first example of changing an improper fraction to a mixed number, we will demonstrate how to turn an improper fraction into a mixed number by taking the example of $\frac{9}{5}$ through our steps.

- **Step 1:** We can write the fraction as the division problem of $9 \div 5$.
- **Step 2:** The solution to this division is 1 remainder 4, so the whole number part of our mixed number is 1.

- **Step 3:** The fractional part will be the remainder of 4 over the original denominator of 5. This gives $\frac{4}{5}$.
- **Step 4:** Lastly, we write our mixed number in the correct form as $1\frac{4}{5}$

Converting a Mixed Number to an Improper Fraction

While the representation of a mixed number and an improper fraction are equivalent, there are times when it is better to use, or is necessary to use, an improper fraction. Some of these instances are as follows:

- Adding and subtracting mixed numbers is sometimes easier when the numbers are in the form of improper fractions in order to find common denominators.
- To multiply and divide numbers, it is easier when mixed numbers are in the form of improper fractions.
- In formulas, fractions are often left as improper fractions.

In these instances, it is useful to know how to change mixed numbers to improper fractions.

Steps to Converting Mixed Numbers to Improper Fractions

To convert a mixed number to an improper fraction, It is important to remember that a whole number can always be broken into fractional parts. Therefore to change mixed numbers to improper fractions the whole number part must be changed to a fraction and then the fractional part added to that result. The shorthand method for this process is explained by the following steps:

- **Step 1:** Multiply the whole number by the denominator of the fraction.
- **Step 2:** Add the product from step 1 to the numerator of the fractional part of the mixed number.
- **Step 3:** Put the result from step 2 over the original denominator. This is the mixed number written as an equivalent improper fraction.

Example One: What is 1 and 3/4 as an improper fraction?

In this example, we will demonstrate how to change a mixed number to an improper fraction using the example of $1\frac{3}{4}$. Taking this mixed number through our steps goes as follows:

- **Step 1:** Multiply the denominator (4) by the whole number (1): $4 \times 1 = 4$
- **Step 2:** Add the result from step 1 (4) to the numerator (3): $4 + 3 = 7$
- **Step 3:** Write the result from step 2 (7) over the original denominator (4): $\frac{7}{4}$

The final answer is $\frac{7}{4}$.

Example Two: What is 1 and 2/3 as an improper fraction?

For this second example, we will demonstrate how to change a mixed number to an improper fraction by taking $1\frac{2}{3}$ through our steps.

- **Step 1:** We multiply the whole number part by the denominator of the fractional part: $1 \times 3 = 3$
- **Step 2:** We add the result from step 1 to the numerator of the fractional part: $3 + 2 = 5$
- **Step 3:** We place the result from step 2 over the original denominator to get $\frac{5}{3}$.

The final answer is $\frac{5}{3}$.

Lesson Summary

A fraction is composed of a **numerator**, the top number, and a **denominator,** the bottom number. The numerator and denominator are separated by a **fraction bar**, which means division.

- A **proper fraction** has a numerator that is less than the denominator.
- A **mixed number** is greater than 1, and there is a whole number part and a fractional part.
- An **improper fraction** has a numerator that is greater than the denominator.

Mixed numbers and improper fractions are different representations of the same quantity. It is possible to convert between these representations.

- To convert a mixed number to an improper fraction, we multiply the denominator by the whole number, add that to the numerator of the fraction, and put the result over the original denominator.
- To convert an improper fraction to a mixed number, we divide the numerator by the denominator with a result of a whole number and a remainder. We then put the remainder over the original denominator, and write the result after the whole number.

In mathematics and in real life, there are times when an improper fraction is more appropriate to use and times when a mixed number is more appropriate to use. Therefore, it is important to know how to convert an improper fraction to a mixed number and how to convert a mixed number to an improper fraction.

Video Transcript

What Is an Improper Fraction?

An **improper fraction** is a fraction where the numerator is larger than the denominator. An example of this would be the fraction 12/8.

Improper fractions represent a value that is greater than the total value of one set. Often times, it's easier to leave your fraction in the improper fraction form to work with fractions. When multiplying and dividing fractions, you must use an improper fraction rather than mixed numbers.

What Is a Mixed Number?

Mixed numbers are fractions that contain a numerator, a denominator, and a whole number. These types of fractions contain whole sets and a fraction of the remaining set. An example of a mixed number would be 4 3/4.

Mixed numbers are used to represent the final answer when working with fractions. They are also helpful when adding and subtracting fractions.

Changing From an Improper Fraction to a Mixed Number

The challenge with these two different forms of fractions is being able to convert between them easily. When converting an improper fraction to a mixed number, we will think of the fraction bar as division. For example, using the improper fraction 12/8, we would divide the numerator 12 by the denominator 8.

To convert an improper fraction to a mixed number, we will start by dividing the numerator by the denominator. Once you are finished dividing, your quotient will become your whole number. Your remainder will also become your numerator, and you will keep the same denominator.

Looking at the example, 12 will divide into 8 one time, with 4 left as our remainder. This will make our mixed number 1 4/8.

Improper to Mixed Example

Let's check with a friend of mine, Adam, who works at a local cookie factory. Adam spends his day stacking delicious cookies into boxes that can hold 10 cookies each.

As he works steadily, the machine suddenly speeds up. Adam realizes that he has run out of boxes. In a panic, he presses the emergency stop button. Adam must go get enough boxes to pack the overflow of cookies. He counts the cookies and sees that there are 78 cookies to fit in the boxes that only hold 10 cookies each. Adam knows that the fraction to represent this would be 78/10.

Adam needs to change this improper fraction to a mixed number so that he can see how many boxes he needs. Adam begins by dividing the numerator 78 by the denominator 10. 10 will divide into 78 7 times. After subtracting, the remainder will be 8.

Adam can now see that the quotient 7 will become his whole number, the remainder 8 will become the numerator, and the denominator will stay 10.

Adam's mixed number is 7 8/10. Adam can see that he will be able to fill 7 full boxes and 8 out of 10 cookies in the next box. As he packs the last cookie, he presses the start button, and the machine starts sending more cookies down the line.

Changing From a Mixed Number to an Improper Fraction

Occasionally when working with fractions, you will need to use an improper fraction. To change a mixed number to an improper fraction, we will multiply the whole number times the denominator. Next, we'll add that value and the numerator. This value will become your new numerator, and you will keep the same denominator.

Mixed to Improper Example

Let's visit the local soccer fields where James is setting up the youth soccer league. James puts 8 kids on each team and has 3 kids left over. He currently has 9 3/8 teams. James knows that this means he has 9 full teams and 3 kids out of 8 left over.

James wants to know what number of kids signed up for soccer if he has 9 3/8 teams. To begin, James multiplies the whole number 9 times the denominator 8, which equals 72.

Now, using that value, 72, he will add the numerator, 3, which equals 75.

James know that he will keep the same denominator. So, the fraction that would represent the number of players playing soccer this season is 75/8.

Lesson Summary

So, in review, an **improper fraction** is a fraction where the numerator is larger than the denominator. **Mixed numbers** are fractions that contain numerators, denominators, and whole numbers.

To convert an improper fraction to a mixed number, we will start by dividing the numerator by the denominator. Once you are finished dividing, your quotient will become your whole number, your remainder will become your numerator, and you will keep the same denominator.

To change a mixed number to an improper fraction, multiply the whole number times the denominator. Next, you'll need to add that value and the numerator. This new value will become your numerator, and you will also keep the same denominator.

Learning Outcomes

Following this lesson, you will be able to:

- Define improper fraction and mixed number
- Convert between improper fractions and mixed numbers
- Understand when it is appropriate to use each

Frequently Asked Questions

How do you write a fraction as a mixed number?

To change an improper fraction to a mixed number follow these steps. First, divide the numerator by the denominator to obtain a whole number with a remainder. Next, put the remainder over the original denominator to form the fractional part. Finally, write the whole number followed by the fractional part.

How do you change a mixed number into an improper fraction?

To change a mixed number into an improper fraction follow these steps. First, multiply the denominator times the whole number. Then, add this result to the numerator of the fraction. Finally, put the result over the original denominator using a fraction bar.

What is 1 and 2/3 as an improper fraction?

As an improper fraction, 1 and 2/3 is 5/3. To get the answer, multiply the denominator of 3 by the whole number 1 to get 3. Add the 3 to the numerator of 2 to get 5. Place the 5 over the denominator of 3 to get 5/3.

What is 1 and 3/4 as an improper fraction?

As an improper fraction, 1 and 3/4 is 7/4. This answer is obtained by following these steps. Multiply the whole number 1 by the denominator 4 to obtain 4. Add the 4 to the numerator of 3 to get 7. Put the 7 over the denominator of 4.