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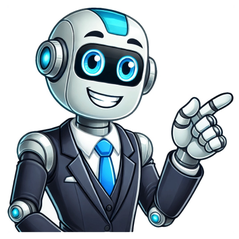

Simplifying a fraction means reducing a fraction to its simplest form. A fraction is in its simplest form if its numerator and denominator have no common factors other than 1. An important step that we do while we solve fraction problems is to reduce them to the simplest form. Though we simplify them, the value of the fraction is going to remain unchanged. This means the simplified fraction and the actual fraction form a pair of equivalent fractions. In this article, we will learn a few easy ways of simplifying fractions. How to Simplify Fractions? Simplifying a fraction implies reducing a fraction to its lowest form. A fraction is in its simplest form if its numerator and denominator are co-prime or have no common factors except 1. The simplest form of a fraction is equivalent to the given fraction. For example, the fraction 3/4 is in the simplest form because 3 and 4 have no common factor except 1. Let's try simplifying the fraction 8/24 step by step. Simplifying Fractions Step by Step Here is a step-by-step process for you to understand the process of simplifying a fraction. Consider the fraction, 8/24 and follow the steps mention below to understand how to simplify the fraction 8/24. Step 1: Write the factors of numerator and denominator. The factors of 8 and 24 are Factors of 8: 1, 2, 4, and 8 Factors of 24: 1, 2, 3, 4, 6, 8, 12, and 24 Step 2: Determine the common factors of numerator and denominator. The common factors of 8 and 24 are 1, 2, 4, and 8. Step 3: Divide the numerator and denominator by the common factors until they have no common factor except 1. The fraction so obtained is in the simplest form. Let's start dividing by 2, then 8/24 = (8/2)/(24/2) = 4/12. We will continue to divide by 2 until we can't go any further. So, we have (4/2)/(12/2) = 2/6 = (2/2)/(6/2) = 1/3. Thus, 1/3 is the simplest form of the fraction 8/24. Now, let us also discuss an easy way to simplify fractions. We can make a complicated fraction as simple as possible by following the process of simplifying the fraction. In order to find the simplified form of a fraction, take a look at an easy way to simplify the fraction. Here we have three-sixths of a pizza. Why say three-sixths when you really mean half? Simplifying a fraction means making a fraction as simple as possible. A quick way to find the simplest form of a fraction is to work out with the highest common factor. Follow the steps given below to learn the shortest way. Step 1: Write the factors of numerator and denominator. Step 2: Determine the highest common factor of numerator and denominator. Step 3: Divide the numerator and denominator by their highest common factor (HCF). The fraction so obtained is in the simplest form. Let's get back to the same problem of simplifying the fraction 8/24. The highest common factor of 8 and 24 is 8. Dividing the numerator 8 and the denominator 24 by 8 will directly give us the simplest form of the fraction, that is, 1/3. So, the shortest way to break down a fraction into its simplest form is to divide the numerator and denominator by its highest common factor. Simplifying Fractions with Variables You can also simplify the fraction containing variables in the numerator and denominator. Use the expanded form of each term in the numerator and denominator to make it easy for you to simplify the fraction with variables. Let's simply the fraction (x2y)/(xy). Express the numerator and denominator as the product of variables. (x2y)/(xy) = (x × x × y)/(x × y) Cancel out the common variables. (x2y)/(xy) = (x × x × y)/(x × y) = x We hope simplifying fractions with variables have been easy for you. Simplifying Fractions with Exponents You can simplify the fraction containing exponents in the numerator and denominator. Use the expanded form of exponents in the numerator and denominator to make it easy for you to simplify the fraction with exponents. To make a number easy to read, we sometimes make use of exponents. Suppose we have the fraction 35/32. We will express the numerator and denominator as the product of numbers and then cancel out the common numbers. 35/32 = (3 × 3 × 3 × 3 × 3)/(3 × 3) = 3 × 3 × 3 = 27 So, you finally learned the way of simplifying fractions with exponents. Simplifying Mixed Fractions A mixed fraction is a mixture of a whole and a proper fraction. In order to simplify a mixed fraction, you need to simplify the fractional part only. For that write the numerator and the denominator in factored form and cancel out the common factors. The resultant will be the new numerator and the new denominator of the mixed fraction. For example: Simplify the mixed fraction \(3\dfrac{4}{10}\). To simplify the mixed fraction \(3\dfrac{4}{10}\), simplify only the fractional part. Write the numerator and denominator of the fractional part in factored form and cancel out the common factors. 4/10 = (2 × 2)/(2 × 5) = 2/5 Therefore, the mixed fraction \(3\dfrac{4}{10}\) can be simplified as \(3\dfrac{2}{5}\). Simplifying Improper Fractions Improper fractions are those in which the numerator is greater than or equal to the denominator. To simplify improper fractions we need to convert them to mixed fractions, and for that, we need to divide the numerator by the denominator. Then, we write it in the mixed number form by placing the quotient as the whole number, the remainder as the numerator, and the divisor as the denominator. Let us go through the following example to understand this better. For example, to simplify the improper fraction 11/4, we need to divide 11 by 4 and get the values of quotient and remainder after performing division. When we divide 11/4, we get 2 as the quotient and 3 as the remainder. Therefore, the simplified form of the improper fraction 11/4 is \(2\dfrac{3}{4}\). Related Articles Check these interesting articles related to simplifying fractions. Example 1: Sally loves growing flowers in her garden. Can you tell which flowers she grows the most? Express the part of those flowers in the form of the simplest fraction. Solution: The large area of the garden is filled with red flowers. So, Sally loves to grow red flowers the most. Red flowers cover 8/12 of her garden. Let's express the fraction 8/12 in its simplest form using the HCF method. Factors of 8: 1, 2, 4, and 8. And, factors of 12: 1, 2, 3, 4, 6, and 12. The highest common factor of 8 and 12 is 4, so divide 8 and 12 by 4, i.e. 8/12 = (8 ÷ 4)/(12 ÷ 4) = 2/3. Since 2 and 3 have no common factors except 1, 2/3 is the simplest form of 8/12. So, Sally loves growing red flowers the most. It is represented as 2/3. Example 2: Jolly is playing with her magic disc. The disc is divided into 16 equal parts as shown. What part of the disc is colored blue? Can you express this fraction in the simplest form? Solution: The fraction representing the blue shaded region in the disc is 8/16. Let's find the highest common factor of 8 and 16. Factors of 8: 1, 2, 4, and 8, and factors of 16: 1, 2, 4, 8, and 16. We observe the highest common factor of 8 and 16 is 8. For simplifying the fraction, let's divide the numerator and the denominator of 8/16 by the highest common factor, that is (8/8)/(16/8) = 1/2. This means half of the disc is colored blue. So, the simplest form of 8/16 is 1/2. Example 3: Find the simplest form of the fraction 11/33. Solution: Let us use the HCF method of simplifying fractions to solve this question. The highest common factor of 11 and 33 is 11. So, divide both numerator and denominator by 11, i.e 11/33 = (11 ÷ 11)/(33 ÷ 11) = 1/3. Therefore, the simplest form of 11/33 is 1/3. Show Solution > go to slidego to slidego to slide Create logical thinkers and build their confidence! With a flexible curriculum, Cuemath goes beyond traditional teaching methods. We make math exciting. Check out how! Book a Free Trial Class FAQs on Simplifying Fractions Simplifying fractions mean reducing the fraction in its lowest form. It helps us to do calculations involving fractions much easily. For an instance, it is easier to add 1/2 and 1/2 as compared to 2/4 + 4/8. What is the Rule for Simplifying Fractions? The rule of simplifying fractions is to cancel out the common factors in the numerator and the denominator of the given fraction. In other words, we have to make sure that the numerator and denominator should be co-prime numbers. What are the Steps in Simplifying Fractions? Follow the steps mentioned below to reduce a fraction to its simplest form: Find the highest common factor of the numerator and denominator. Divide the numerator and denominator by the highest common factor. The fraction so obtained is in the simplest form. How do you Simplify Large Fractions? Large fractions can be simplified by dividing the numerator and denominator by the common prime factors to reduce it to the simplest form. How to Teach Simplifying Fractions? Simplifying fractions usually come in grade 5 or 6. To teach simplifying fractions, follow the points given below: Allow learners to work on hands-on activities including rectangular or circular fraction models to arrive at an understanding that 2/4 is the same as 1/2. Use real-life examples of simplifying fractions. Use simplifying fractions worksheets. How to Explain Simplifying Fractions? A fraction is said to be in the simplest form when there is no common factor of numerator and denominator other than 1. For example, 11/23 is a simplified fraction as 11 and 23 do not have any common factors. How to Convert an Improper Fraction to its Simplified Form? Divide the numerator by denominator to obtain quotient and remainder. Then, the mixed fraction or the simplified fraction can be written as \(\text{Quotient}\dfrac{\text{Remainder}}{\text{Divisor}}\). How are Fractions Reduced to their Simplified Form? To reduce a fraction into its simplest form, divide the numerator and denominator by their highest common factor. What is the Easiest way to Simplifying Fractions? One of the quickest ways to reduce a fraction to its simplest form is to divide the numerator and denominator of the fraction by their highest common factor. We simplify the fraction 24 / 60 by dividing the numeratorThe number on the top of the fraction, above the dividing line. and denominatorThe number on the bottom of the fraction, below the dividing line. by their highest common factorThe biggest number that divides into both numbers. In this case, the biggest number that divides into both 24 and 60.The highest common factor is 12, so we will divide the top of the fraction and the bottom of the fraction by 12.24 ÷ 12 = 2 and 60 ÷ 12 = 5.The fraction 24 / 60 is simplified to 2 / 5.Alternatively, we can simplify our fraction in steps by dividing by any number that goes into both numbers.Both 24 and 60 are in the six times table so we can divide by six first. 24 / 60 simplifies to 4 / 10.However we can see that 4 and 10 are both even and can both be halved.The fraction is fully simplified to 2 / 5. We know that the fraction is fully simplified because there is no other number that divides into 2 and 5. We know this because 2 and 5 are both prime numbersNumbers that can only be divided exactly by themself and 1. They are not divisible by any other number.. Simplifying a fraction means to write a fraction as an equivalent fraction with a smaller numerator and denominator. To simplify a fraction, divide the numerator and denominator by the same number. A fraction is fully simplified if it cannot be simplified any further. For example, we will simplify the fraction 2/6 . The numerator is the number on top of the fraction. The numerator is 2. The denominator is the number on the bottom of the fraction. The denominator is 6. To simplify a fraction, divide the numerator and denominator by the same number. The division must be exact because we cannot have a decimal number as the numerator or denominator. 2 and 6 are both even so we can divide them both by 2. To simplify a fraction, you must divide the numerator and denominator by the same value. Since we have divided the numerator by 2, we also need to divide the denominator by 2. 2/6 simplifies to the fraction 1/3 . A fraction written in its simplest form means that it cannot be simplified any further. This means that there is no equivalent fraction with a smaller numerator and denominator. We cannot divide 1 and 3 by another number exactly. This means that the fraction of 1/ 3 is fully simplified. The process of simplifying a fraction is also known as reducing a fraction. Reducing a fraction to its lowest terms means that the fraction has been simplified fully. A fully reduced fraction does not have an equivalent fraction with a smaller numerator or denominator. How to Simplify Fractions Step-by-Step To simplify a fraction fully, follow these steps: Write all of the factors of the numerator and the denominator in two separate lists. Divide the numerator by the largest number to appear in both lists. Divide the denominator by the same number. For example, fully simplify the fraction 24/60 . The first step is to list all of the factors of the numerator and then list all of the factors of the denominator. The largest number in both lists is 12. 12 is the highest common factor (greatest common factor) of 24 and 60. The highest common factor of two numbers is the largest number that can divide exactly into both numbers. The next step is to divide the numerator by the highest common factor. 24 ÷ 12 = 2 and so, our new simplified numerator is 2. The final step is to divide the denominator by the highest common factor. 60 ÷ 12 = 5 and so, our new simplified denominator is 5. 24/60 fully simplified equals 2/5 . To reduce a fraction to its lowest terms, divide the numerator and denominator by the greatest common factor. No number, other than 1, will divide into both 2 and 5, so we have fully simplified the fraction into its simplest form. The denominator is '5' which is a prime number. We know a fraction is fully simplified if both the numerator and denominator are prime numbers. A fraction is fully simplified if the denominator is a prime number and the numerator is a smaller number than this. These are not the only ways to know if a fraction is fully simplified but they are two useful checks. We can also see that the numerator can only be divided by 2 and that the denominator of '5' is odd and therefore cannot be divided by 2. Why do we Simplify Fractions? Fractions are simplified to make calculations easier. The simplified fraction is the same value as the original fraction but it has smaller numbers. Smaller numbers are easier to work with. For example, here is the fraction 150/350 . If you had to multiply or add this fraction to another, the numbers would be quite large and could take longer to work out than if looking at smaller numbers. A fraction does not need to be fully simplified in one step. Several steps can be used to fully simplify a fraction by dividing by any factor of both the numerator and the denominator each time. We can see that both 150 and 350 end in a zero. This is a big clue that both numbers are divisible by 10. We will simplify the fraction 150/350 to 15/35 by dividing the numerator and denominator by 10. The fraction has been reduced but it can be reduced further with another step. Both 15 and 35 end in a 5, which tells us that both numbers are divisible by 5. We will simplify the fraction 15/35 to 3/7 by dividing the numerator and denominator by 5. We can see that the fraction is now reduced to its lowest terms because both 3 and 7 are prime. They cannot be divided by a number apart from one and themselves. There is no number that divided exactly into both 3 and 7 to make them smaller. We can see that the fraction 3/7 is much simpler to use than 150/350 . We reduce fractions to their lowest terms because it is easier to appreciate their size and compare them. It is also easier to use reduced fractions in calculations. For example 3/7 is easier to visualise than 150/350 even though they represent the same number. How to Simplify a Mixed Number To simplify a mixed number, follow these steps: Leave the whole number part the same. Find the greatest common factor of the numerator and the denominator. Divide the numerator and denominator by the greatest common factor. Write the simplified fraction immediately after the whole number part. To simplify a mixed fraction, only simplify the fraction part. Leave the whole number part the same. For example, simplify 5 2/4 . The first step is to leave the whole number part the same. 5 remains as 5. We can simplify 2/4 to 1/2 by dividing both the numerator and the denominator by 2. To simplify the mixed number 2 9/15 , we leave the whole number part the same and simplify 9/15 . We write down the 2 and simplify 9/15 to 3/5 by dividing the numerator and denominator by 3. The mixed fraction of 2 9/15 simplifies to 2 3/5 . How to Simplify an Improper Fraction To simplify an improper fraction, simply divide the numerator and denominator by their greatest common factor. Simplify an improper fraction in exactly the same way as simplifying a proper fraction. An improper fraction behaves in the same way as a proper fraction. An improper fraction is simply a fraction with a larger numerator on the top than its denominator on the bottom. For example, simplify the fraction 20/8 . The greatest common factor of 20 and 8 is 4. 4 is the largest number that divides exactly into both 20 and 8. The improper fraction of 20/8 simplifies to 5/2 when the numerator and denominator are both divided by 4. Here is the example of reducing the improper fraction of 42/18 . The greatest common factor of 42 and 18 is 6. 6 is the largest number that divides exactly into both 42 and 18. We divide the numerator and denominator by 6 to simplify 42/18 to 7/3 . When we simplify an improper fraction, the answer is still an improper fraction. Learn How to Simplify Fractions in 3 Easy Steps One of the most important math skills related to fractions is understanding how to simplify fractions.While simplifying fractions can seem tricky at first, it is a math skill that most math students can master with a good amount of practice combined with a strong conceptual and procedural understanding of fractions. This free Step-by-Step Guide on How to Simplify Fractions will teach you everything you need to know about simplifying fractions, including proper fractions, improper fractions, and mixed fractions. Together, we will use a simple 3-step process for simplifying fractions that you can use to solve any problem where you have to simplify a fraction!You can use the quick-links below to jump to any section of this guide, or you can continue on and follow it step-by-step:Before we start working on any practice problems, let’s do a quick review of some important math vocabulary terms related to fractions that you will need to understand well to make the most out of this guide. Before you learn how to simplify fractions, it’s important that you have a strong foundational understanding of what fractions are in general.For starters, let’s review the difference between the numerator of a fraction and the denominator of a fraction. The numerator of a fraction is the top number and the denominator of a fraction is the bottom number. For example, the fraction 3/5 has a numerator of 3 and a denominator of 5.In this guide, whenever we reference the numerator of a fraction, we are talking about the top number. Conversely, whenever we reference the denominator of a fraction, we are talking about the bottom number. Figure 01: The fraction 3/5 has a numerator of 3 and a denominator of 5 Next, let’s recap the difference between the three types of fractions:Proper FractionsImproper FractionsMixed FractionsProper FractionsDefinition: A proper fraction is a fraction with a numerator that is smaller than the denominator. For example, 3/8 is a proper fraction because 3 < 8. The value of a proper fraction is always less than one whole.Improper FractionsDefinition: An improper fraction is a fraction with a numerator that is greater than the denominator. For example, 7/5 is an improper fraction because 7 > 5. The value of an improper fraction is always greater than one whole.Examples: 5/2, 12/11, 9/4Mixed FractionsDefinition: A mixed fraction is a fraction that is a combination, or sum, of a whole number and a proper fraction. For example, 4 1/2 is a mixed fraction that represents the sum of 4 and 1/2. Examples: 3 1/3, 7 5/8, 2 3/4Figure 02 below illustrates examples of these three types of fractions. Figure 02: What is the difference between a proper fraction, an improper fraction, and a mixed fraction? Note that this guide will only focus on teaching you how to simplify a fraction that is proper. When we refer to simplifying fractions, we are talking about taking a fraction and reducing it down to its simplest form. Note that not all fractions can be simplified. If the numerator and the denominator of a fraction have no common factors other than 1, then the fraction is already in simplest form and, thus, can’t be simplified. Whenever we have to simplify a fraction, you are trying to reduce it down to the point where it can no longer be simplified. The act of simplifying a given fraction down to its most reduced form is the main objective of this guide. Whenever we simplify a fraction, we are not changing the value of the fraction. Rather, we are rewriting a new equivalent fraction that is in its simplest form (i.e. he numerator and the denominator of a fraction have no common factors other than 1).Does this sound confusing? If so, a simple example may help. Let’s consider the fractions 1/2 and 3/6. Figure 03: The fractions 3/6 and 1/2 are equivalent. Figure 03 above compares the fractions 1/2 (one-half) and 3/6 (three-sixths).We should already know that 1/2 and 3/6 are equivalent since each represent one half (i.e. one is half of two and three is half of six).Simplifying fractions means reducing the fraction to its most reduced form whenever possible. We can say that a fraction is in its simplest form if both the numerator and the denominator have no common factors other than 1. This is the case for 1/2, since 1 and 2 do not have any common factors other than 1, meaning that 1/2 is in its lowest possible form and it’s the simplest way of expressing one half.But what about 3/6? Let’s consider the factors of the numerator 3 and the denominator 6:Factors of 3: 1, 3Factors of 6: 1, 2, 3, 6Both 3 and 6 share a common factor of 3. So, if we can divide both the numerator and the denominator by 3 to find a new equivalent fraction that is in simplified form (which we already know should be 1/2). Let’s go ahead and do the math to see if our result checks out:3/6 → (3 ÷ 3) / (6 ÷ 3) = 1/2As expected, our result is 1/2. This way of mathematically proving that 3/6 and 1/2 are equivalent fractions and that 1/2 is the most simplified form of 3/6 is illustrated in Figure 04 below. The strategy that we used will serve as the basis for the 3-step method for simplifying fractions that you will learn in the next section. Figure 04: The simplest form of a fraction is equivalent to the original fraction. Before moving on, the key takeaway here is that any fraction in simplest form will be equivalent to whatever fraction you started with. However, this new simplified fraction is in its lowest form and can not be simplified further. For example, 3/5 is in simplest form because 3 and 5 do not share a greatest common factor other than 1.Now let’s move onto working through some sample problems using a simple 3-step process for how to simplify fractions. To solve this first example as well as any problem where you have to simplify a fraction, we will use the following 3-step method for simplifying fractions:Step One: List the factors of both the numerator and the denominatorStep Two: Determine the value of the greatest common factor shared by both the numerator and the denominatorStep Three: Divide both the numerator and the denominator by the greatest common factor to find a new equivalent fraction that is in simplest form.Let’s go ahead and apply these three steps to the fraction 8/32 as follows:Step One: List the factors of both the numerator and the denominator.For this first step, we will list out all of the factors of 8 (the numerator) and 32 (the denominator) as follows:Factors of 8: 1, 2, 4, 8Factors of 32: 1, 2, 4, 8, 16, 32Step Two: Determine the value of the greatest common factor shared by both the numerator and the denominatorNotice that 8 and 32 have three shared common factors: 2, 4, and 8. However, the greatest common factor shared by 8 and 32 is 8.The greatest common factor shared by 8 and 32 is 8. Figure 05: 8 and 32 share a greatest common factor of 8 Step Three: Divide both the numerator and the denominator by the greatest common factor to find a new equivalent fraction that is in simplest form.For the final step, we have to divide both the numerator and the denominator by 8 as follows:8/32 → (8 ÷ 8) / (32 ÷ 8) = 1/4Our result, 1/4 is in simplest form because both 1 and 4 do not share any factors other than 1, so we can conclude that:Final Answer: The fraction 8/32 can be simplified to 1/4.That’s all there is to it! Go ahead and review the Example #1 recap shown in Figure 06 below before moving onto the next example. Figure 06: How to Simplify Fractions in 3 Easy Steps. Just like the previous example, we will again use our 3-step method to simplify the fraction 18/27 as follows:Step One: List the factors of both the numerator and the denominator.First, let’s list all of the factors of 18 and 27:Factors of 18: 1, 2, 3, 6, 9, 18Factors of 27: 1, 3, 9, 27Step Two: Determine the value of the greatest common factor shared by both the numerator and the denominatorIn this case, 18 and 27 share a greatest common factor of 9. Figure 07: How to Simplify a Fraction: Start by finding the greatest common factor shared by the numerator and the denominator. Step Three: Divide both the numerator and the denominator by the greatest common factor to find a new equivalent fraction that is in simplest form.Finally, the last step is to divide both the numerator and the denominator by 9:18/27 → (18 ÷ 9) / (27 ÷ 9) = 2/3The resulting fraction, 2/3, is in simplest form because both 2 and 3 do not share any factors other than 1.Final Answer: The fraction 18/27 can be simplified to 2/3.Our entire approach to solving Example #2 is recapped in Figure 08 below. Figure 08: How to Simplify a Fraction Now, let’s work through one more example of how to simplify a fraction that is proper. We can simplify 66/93 using our 3-step process as follows:Step One: List the factors of both the numerator and the denominator.Start by listing all of the factors of 66 and 93:Factors of 66: 1, 2, 3, 6, 11, 22, 33, 66Factors of 93: 1, 3, 31, 93Step Two: Determine the value of the greatest common factor shared by both the numerator and the denominatorNow that all of the factors are listed, we can see that 66 and 93 share a greatest common factor of 3. Figure 09: 66 and 93 share a greatest common factor of 3. Step Three: Divide both the numerator and the denominator by the greatest common factor to find a new equivalent fraction that is in simplest form.For the final step, we have to divide both the numerator and the denominator by 3:66/93 → (66 ÷ 3) / (93 ÷ 3) = 22/31The result, 22/31, is in simplest form because both 22 and 31 do not share any factors other than 1.Final Answer: The fraction 66/93 can be simplified to 22/31. Figure 10: How to simplify a fraction by finding a greatest common factor. Whenever you have to simplify a fraction, you have to reduce the fraction down to its simplest form, meaning that the new fraction’s numerator and denominator have no common factors besides 1. When you simplify a fraction, you are finding a new reduced form fraction that is equivalent to the original fraction. For example, 3/6 can be simplified as 1/2 and both are equivalent to “one half".”You can solve any problem where you have to simplify a fraction by following this easy 3-step method:How to Simplify Fractions in 3 Easy StepsStep One: List the factors of both the numerator and the denominatorStep Two: Determine the value of the greatest common factor shared by both the numerator and the denominatorStep Three: Divide both the numerator and the denominator by the greatest common factor to find a new equivalent fraction that is in simplest form.To gain some more practice using these steps, we recommend that you go back and work through the practice problems in this guide on your own a second time or to work on some of the free Simplifying Fractions Worksheets available on our math worksheet libraries page.Keep Learning: Search Tags: how to add fractions, how to add fractions with different denominators, how to add fraction , how to add fractions with unlike denominators, how to. add fractions, how to add fractions with, how to add a fraction Comment A fraction is a part of a whole. It has a numerator and a denominator. For example: 12 here 1 is the numerator and 2 is the denominator. It is represented by the figure given below: Here, the shape is divided into 2 equal parts, therefore the denominator is 2 and 1 out of 2 parts is shaded, therefore the numerator is 1. A fraction is said to be in its simplest form if 1 is the only common factor of its numerator and denominator. For example,89,because 1 is the only common factor of 8 and 9 in this fraction. We simplify fractions because it is always to work or calculate when the fractions are in the simplest form. More Worksheets Steps: Find the highest common factor (HCF) of the numerator and denominator. Divide both the numerator and denominator by HCF. Example 1: Check if the fraction 715 is in its simplest form? Solution: Factors of numerator 7 = 1, 7 Factors of denominator 15 = 1, 3, 5, 15 We can see that 1 is the only common factor of 7 and 15 Therefore, 715 in its simplest form. Example 2: Reduce 1218 in its simplest form. Solution: Factors of 12 = 1, 2, 3, 4, 6, 12 Factors of 18 = 1, 2, 3, 6, 9, 18 Highest common factor (HCF) of 12 and 18 = 6 Dividing the numerator and the denominator by 6 (HCF), we get 12÷6 18÷6 = 2 3 Hence, 23 is the simplest form of the fraction 1218. Steps: Find the highest common factor (HCF) of numerator and denominator of the fraction. Divide both the numerator and the denominator by HCF to get the simplified fraction. Write the whole and the simplified fraction together. Example 4: Matthew has31216of ice cream. How much ice cream does he have in its simplest form? Solution: Factors of 3 12 16 = 1 4 12 = 1, 2, 3, 4, 6, 12 Factors of 16 = 1, 2, 4, 8, 16 Highest common factor (HCF) of 12 and 16 = 4 Dividing the numerator and denominator by 4 (HCF), we get 12÷4 16÷4 = 3 4 Hence, Matthew has 31216of ice cream with him in its simplest form. Fun Facts:The word fraction comes from the Latin word ‘Fractio’ which means to break. Every whole number can be written as a fraction. For example, 2 can be written as 21 Simplifying a fraction means reducing a fraction to its simplest form. A fraction is in its simplest form if its numerator and denominator have no common factors other than 1. An important step that we do while we solve fraction problems is to reduce them to the simplest form. Though we simplify them, the value of the fraction is going to remain unchanged. This means the simplified fraction and the actual fraction form a pair of equivalent fractions. In this article, we will learn a few easy ways of simplifying fractions. How to Simplify Fractions? Simplifying a fraction implies reducing a fraction to its lowest form. A fraction is in its simplest form if its numerator and denominator are co-prime or have no common factors except 1. The simplest form of a fraction is equivalent to the given fraction. For example, the fraction 3/4 is in the simplest form because 3 and 4 have no common factor except 1. Let's try simplifying the fraction 8/24 step by step. Simplifying Fractions Step by Step Here is a step-by-step process for you to understand the process of simplifying a fraction. Consider the fraction, 8/24 and follow the steps mention below to understand how to simplify the fraction 8/24. Step 1: Write the factors of numerator and denominator. The factors of 8 and 24 are Factors of 8: 1, 2, 4, and 8 Factors of 24: 1, 2, 3, 4, 6, 8, 12, and 24 Step 2: Determine the common factors of numerator and denominator. The common factors of 8 and 24 are 1, 2, 4, and 8. Step 3: Divide the numerator and denominator by the common factors until they have no common factor except 1. The fraction so obtained is in the simplest form. Let's start dividing by 2, then 8/24 = (8/2)/(24/2) = 4/12. We will continue to divide by 2 until we can't go any further. So, we have (4/2)/(12/2) = 2/6 = (2/2)/(6/2) = 1/3. Thus, 1/3 is the simplest form of the fraction 8/24. Now, let us also discuss an easy way to simplify fractions. We can make a complicated fraction as simple as possible by following the process of simplifying the fraction. In order to find the simplified form of a fraction, take a look at an easy way to simplify the fraction. Here we have three-sixths of a pizza. Why say three-sixths when you really mean half? Simplifying a fraction means making a fraction as simple as possible. A quick way to find the simplest form of a fraction is to work out with the highest common factor. Follow the steps given below to learn the shortest way. Step 1: Write the factors of numerator and denominator. Step 2: Determine the highest common factor of numerator and denominator. Step 3: Divide the numerator and denominator by their highest common factor (HCF). The fraction so obtained is in the simplest form. Let's get back to the same problem of simplifying the fraction 8/24. The highest common factor of 8 and 24 is 8. Dividing the numerator 8 and the denominator 24 by 8 will directly give us the simplest form of the fraction, that is, 1/3. So, the shortest way to break down a fraction into its simplest form is to divide the numerator and denominator by its highest common factor. Simplifying Fractions with Variables You can also simplify the fraction containing variables in the numerator and denominator. Use the expanded form of each term in the numerator and denominator to make it easy for you to simplify the fraction with variables. Let's simply the fraction (x2y)/(xy). Express the numerator and denominator as the product of variables. (x2y)/(xy) = (x × x × y)/(x × y) Cancel out the common variables. (x2y)/(xy) = (x × x × y)/(x × y) = x We hope simplifying fractions with variables have been easy for you. Simplifying Fractions with Exponents You can simplify the fraction containing exponents in the numerator and denominator. Use the expanded form of exponents in the numerator and denominator to make it easy for you to simplify the fraction with exponents. To make a number easy to read, we sometimes make use of exponents. Suppose we have the fraction 35/32. We will express the numerator and denominator as the product of numbers and then cancel out the common numbers. 35/32 = (3 × 3 × 3 × 3 × 3)/(3 × 3) = 3 × 3 × 3 = 27 So, you finally learned the way of simplifying fractions with exponents. Simplifying Mixed Fractions A mixed fraction is a mixture of a whole and a proper fraction. In order to simplify a mixed fraction, you need to simplify the fractional part only. For that write the numerator and the denominator in factored form and cancel out the common factors. The resultant will be the new numerator and the new denominator of the mixed fraction. For example: Simplify the mixed fraction \(3\dfrac{4}{10}\). To simplify the mixed fraction \(3\dfrac{4}{10}\), simplify only the fractional part. Write the numerator and denominator of the fractional part in factored form and cancel out the common factors. 4/10 = (2 × 2)/(2 × 5) = 2/5 Therefore, the mixed fraction \(3\dfrac{4}{10}\) can be simplified as \(3\dfrac{2}{5}\). Simplifying Improper Fractions Improper fractions are those in which the numerator is greater than or equal to the denominator. To simplify improper fractions we need to convert them to mixed fractions, and for that, we need to divide the numerator by the denominator. Then, we write it in the mixed number form by placing the quotient as the whole number, the remainder as the numerator, and the divisor as the denominator. Let us go through the following example to understand this better. For example, to simplify the improper fraction 11/4, we need to divide 11 by 4 and get the values of quotient and remainder after performing division. When we divide 11/4, we get 2 as the quotient and 3 as the remainder. Therefore, the simplified form of the improper fraction 11/4 is \(2\dfrac{3}{4}\). Related Articles Check these interesting articles related to simplifying fractions. Example 1: Sally loves growing flowers in her garden. Can you tell which flowers she grows the most? Express the part of those flowers in the form of the simplest fraction. Solution: The large area of the garden is filled with red flowers. So, Sally loves to grow red flowers the most. Red flowers cover 8/12 of her garden. Let's express the fraction 8/12 in its simplest form using the HCF method. Factors of 8: 1, 2, 4, and 8. And, factors of 12: 1, 2, 3, 4, 6, and 12. The highest common factor of 8 and 12 is 4, so divide 8 and 12 by 4, i.e. 8/12 = (8 ÷ 4)/(12 ÷ 4) = 2/3. Since 2 and 3 have no common factors except 1, 2/3 is the simplest form of 8/12. So, Sally loves growing red flowers the most. It is represented as 2/3. Example 2: Jolly is playing with her magic disc. The disc is divided into 16 equal parts as shown. What part of the disc is colored blue? Can you express this fraction in the simplest form? Solution: The fraction representing the blue shaded region in the disc is 8/16. Let's find the highest common factor of 8 and 16. Factors of 8: 1, 2, 4, and 8, and factors of 16: 1, 2, 4, 8, and 16. We observe the highest common factor of 8 and 16 is 8. For simplifying the fraction, let's divide the numerator and the denominator of 8/16 by the highest common factor, that is (8/8)/(16/8) = 1/2. This means half of the disc is colored blue. So, the simplest form of 8/16 is 1/2. Example 3: Find the simplest form of the fraction 11/33. Solution: Let us use the HCF method of simplifying fractions to solve this question. The highest common factor of 11 and 33 is 11. So, divide both numerator and denominator by 11, i.e 11/33 = (11 ÷ 11)/(33 ÷ 11) = 1/3. Therefore, the simplest form of 11/33 is 1/3. Show Solution > go to slidego to slidego to slide Create logical thinkers and build their confidence! With a flexible curriculum, Cuemath goes beyond traditional teaching methods. We make math exciting. Check out how! Book a Free Trial Class FAQs on Simplifying Fractions Simplifying fractions mean reducing the fraction in its lowest form. It helps us to do calculations involving fractions much easily. For an instance, it is easier to add 1/2 and 1/2 as compared to 2/4 + 4/8. What is the Rule for Simplifying Fractions? The rule of simplifying fractions is to cancel out the common factors in the numerator and the denominator of the given fraction. In other words, we have to make sure that the numerator and denominator should be co-prime numbers. What are the Steps in Simplifying Fractions? Follow the steps mentioned below to reduce a fraction to its simplest form: Find the highest common factor of the numerator and denominator. Divide the numerator and denominator by the highest common factor. The fraction so obtained is in the simplest form. How do you Simplify Large Fractions? Large fractions can be simplified by dividing the numerator and denominator by the common prime factors to reduce it to the simplest form. How to Teach Simplifying Fractions? Simplifying fractions usually come in grade 5 or 6. To teach simplifying fractions, follow the points given below: Allow learners to work on hands-on activities including rectangular or circular fraction models to arrive at an understanding that 2/4 is the same as 1/2. Use real-life examples of simplifying fractions. Use simplifying fractions worksheets. How to Explain Simplifying Fractions? A fraction is said to be in the simplest form when there is no common factor of numerator and denominator other than 1. For example, 11/23 is a simplified fraction as 11 and 23 do not have any common factors. How to Convert an Improper Fraction to its Simplified Form? Divide the numerator by denominator to obtain quotient and remainder. Then, the mixed fraction or the simplified fraction can be written as \(\text{Quotient}\dfrac{\text{Remainder}}{\text{Divisor}}\). How are Fractions Reduced to their Simplified Form? To reduce a fraction into its simplest form, divide the numerator and denominator by their highest common factor. What is the Easiest way to Simplifying Fractions? One of the quickest ways to reduce a fraction to its simplest form is to divide the numerator and denominator of the fraction by their highest common factor. Find all of the factors of the numerator and denominator. Determine the greatest common factor between the numerator and denominator. Divide the numerator by the greatest common factor—that’s the new numerator. Divide the denominator by the greatest common factor—that’s the new denominator. 1 List the factors of the numerator and denominator. Factors are numbers that you multiply together to get another number. For example, 3 and 4 are both factors of 12, because you can multiply them together to get 12. To list the factors of a number, you simply have to list all of the numbers that can be multiplied to get that number, and which therefore can be evenly divided into that number.[1] List the factors of that number from smallest to largest, not forgetting to include 1 or that number. For example, this is how you would list the factors of the numerator and denominator of the fraction, 24/32: 24: 1, 2, 3, 4, 6, 8, 12, 24. 32: 1, 2, 4, 8, 16, 32. 2 Find the greatest common factor (GCF) of the numerator and denominator. The GCF is the highest number that divides evenly into two or more numbers. Once you've listed all of the factors of that number, all you have to do is find the largest number that is repeated in both lists.[2] 24: 1, 2, 3, 4, 6, 8, 12, 24. 32: 1, 2, 4, 8, 16, 32. The GCF of 24 and 32 is 8, because 8 is the largest number that evenly divides into both 24 and 32. Advertisement 3 Divide the numerator and denominator by the GCF. Now that you've found your GCF, all you have to do is to divide the numerator and denominator by that number to reduce your fraction to its lowest terms. Here's how to do it:[3] 24/8 = 3 32/8 = 4 The simplified fraction is 3/4. EXPERT TIP Joseph Meyer Math Teacher Joseph Meyer is a High School Math Teacher based in Pittsburgh, Pennsylvania. He is an educator at City Charter High School, where he has been teaching for over 7 years. Joseph is also the founder of Sandbox Math, an online learning community dedicated to helping students succeed in Algebra. His site is set apart by its focus on fostering genuine comprehension through step-by-step understanding (instead of just getting the correct final answer), enabling learners to identify and overcome misunderstandings and confidently take on any test they face. He received his MA in Physics from Case Western Reserve University and his BA in Physics from Baldwin Wallace University. Simplifying a fraction just changes the way the fraction is written. To simplify a fraction, you can cancel out the greatest common factor from the numerator and denominator or convert an improper fraction to a mixed number. This doesn't change the inherent value of the fraction. 4 Check your work. If you'd like to make sure that you've simplified the fraction correctly, you can simply multiply the new numerator and new denominator by the GCF to make sure that you can return to the original fraction. Here's how to do it:[4] 3 * 8 = 24 4 * 8 = 32 You have returned to the original fraction, 24/32. You can also examine the fraction to make sure that it cannot be reduced any more. Since 3 is a prime number, it can only be divisible by 1 and itself, and four is not divisible by 3, so the fraction cannot be reduced further. Advertisement 1 Pick a small number. Using this method, you simply have to choose a small number, such as 2, 3, 4, 5, or 7, to get started. Look at the fractions to make sure that each one is divisible by the number you choose at least once.[5] For example, if you're looking at the fraction 24/108, don't pick the number 5, because it won't go into either number. However, if you're looking at the fraction 25/60, 5 will be a great number to use. For the fraction 24/32, the number 2 works well. Since both numbers are even, they will be divisible by 2. 2 Divide the numerator and denominator of a fraction by that number.[6] The new fraction will be comprised of the new numerator and denominator you get after dividing the top and bottom of the fraction 24/32 by 2. Here's how to do it: 24/2 = 12 32/2 = 16 Your new fraction is 12/16. 3 Repeat. Continue this process. Since both numbers are still even, you can keep dividing them by 2. If just one or both of your new numerators and denominators are odd, then you can try to divide them by a new number. Here's how the process will work if you're sticking with the fraction 12/16: 12/2 = 6 16/2 = 8 Your new fraction is 6/8. 4 Keep dividing by that number until you can't go any further. Both the new numerator and the new denominator are still even, so you can keep dividing them by 2. Here's how to do it: 6/2 = 3 8/2 = 4 Your new fraction is 3/4. 5 Make sure the fraction cannot be reduced further. In the fraction 3/4, 3 is a prime number, so its only factors are 1 and itself, and 4 is not divisible by three, so the fraction has been simplified as much as possible. If the numerator or denominator of the fraction can no longer be divisible by the number you've chosen, you may still be able to divide it by using a new number.[7] For example, if you have the fraction 10/40, and are dividing the numerator and denominator by 5, you will be left with 2/8. You cannot keep dividing the numerator and denominator by 5, but you can divide both by 2 to get the final answer of 1/4. 6 Check your work. Work backwards to multiply 3/4 by 2/2 three times, to make sure that you get the original answer of 24/32. Here's how you do it: 3/4 * 2/2 = 6/8 6/8 * 2/2 = 12/16 12/16 * 2/2 = 24/32. Note that you've divided 24/32 by 2 * 2 * 2, which is the same as dividing it by 8, the greatest common factor (GCF) of 24 and 32. Advertisement 1 Write out your fraction. Leave a large space to the right hand side of your paper -- you'll need it to write out the factors. 2 List the factors of the numerator and the denominator. Keep them in separate lists. It may be easiest if the lists line up on top of each other. Start with 1 and work your way up, listing them in pairs. For example, if your fraction is 24/60, start off with 24.You'd write: 24 -- 1, 2, 3, 4, 6, 8, 12, 24 Then, move onto 60.You'd write: 60 -- 1, 2, 3, 4, 5, 6, 10, 12, 15, 20, 30, 60 3 Find and divide by the greatest common factor. This may be referred to as the GCF in your textbook. What's the biggest number that goes into both the numerator and the denominator? Whatever it is, divide both numbers by that. For our example, the biggest number that is a factor of both numbers is 12. Therefore, we divide 24 by 12 and 60 by 12, leaving us with 2/5 -- our reduced fraction! Advertisement 1 Find the prime factors of the numerator and the denominator. A "prime" number is a number that cannot be divided by any other number and stay whole (apart from itself and 1, of course). 2, 3, 5, 7, and 11 are examples of prime numbers.[8] Start with the numerator. From 24, branch off into 2 and 12. Since 2 is a prime number already, you're done with that branch! Then take 12 into two more numbers: 2 and 6. 2 is a prime number -- great! Now divide 6 into two numbers: 2 and 3. You now have 2, 2, 2, and 3 as your prime numbers. Move onto the denominator. From 60, branch off your tree to 2 and 30. 30 will then split into 2 and 15. Then split 15 into 3 and 5,both prime. You now have 2, 2, 3 and 5 as your prime numbers. 2 Write the prime factorization of each number. Take the list of prime numbers you have for each number and write them out to be multiplied. You don't actually have to do the math -- this just makes it easier to see. So, for 24, you have 2 x 2 x 2 x 3 = 24. For 60, you have 2 x 2 x 3 x 5 = 60 3 Cancel out the common factors. Any numbers that you see that are part of both numbers can be eliminated. In this case, what we have in common is a pair of twos and a 3. Goodbye! What we are left with is 2 and 5 -- or 2/5! The same answer we got with the above method. if both numerator and denominator are even numbers, just think of splitting the number in half. keep on doing it to both until they are to small to split any more. Advertisement Add New Question Question How do I reduce a fraction with an odd number? If either the numerator or the denominator -- or both -- is odd, you will have to find some low, odd number that will divide evenly into both numbers. If you can't do so, the fraction may be irreducible. Question Can I reduce fractions if the denominator is larger than the numerator? The fact that a fraction's denominator is larger than its numerator means it's a proper fraction. It has no bearing on whether the fraction can be reduced. A reducible fraction is one whose numerator and denominator are both divisible by the same number. Question Can you give three fractions that are in lower terms than 8/12? 8/12 reduces only to 4/6 and 2/3. See more answers Ask a Question Advertisement Thanks Advertisement This article was co-authored by David Jia. David Jia is an Academic Tutor and the Founder of LA Math Tutoring, a private tutoring company based in Los Angeles, California. With over 10 years of teaching experience, David works with students of all ages and grades in various subjects, as well as college admissions counseling and test preparation for the SAT, ACT, ISEE, and more. After attaining a perfect 800 math score and a 690 English score on the SAT, David was awarded the Dickinson Scholarship from the University of Miami, where he graduated with a Bachelor’s degree in Business Administration. Additionally, David has worked as an instructor for online videos for textbook companies such as Larson Texts, Big Ideas Learning, and Big Ideas Math. This article has been viewed 233,042 times. Co-authors: 30 Updated: February 8, 2025 Views: 233,042 Categories: Fractions Print Send fan mail to authors Thanks to all authors for creating a page that has been read 233,042 times. "It helped me learn a little bit more about reducing fractions." Share your story aNQXhknSwrI To simplify a fraction, divide the top and bottom by the highest number that can divide into both numbers exactly. Simplifying (or reducing) fractions means to make the fraction as simple as possible. Why say four-eighths (48) when we really mean half (12) ? 48 = 24 = 12 (Four-Eighths) (Two-Quarters) (One-Half) = = There are two ways to simplify a fraction: Method 1 Try to exactly divide (only whole number answers) both the top and bottom of the fraction by 2, 3, 5, 7 ,... etc. Keep going until we can't go any further. Dividing by 2 doesn't work because 35 can't be exactly divided by 2 (35/2 = 17½) Likewise we can't divide exactly by 3 (10/3 = 3 1 3 and also 35/3=11 2 3) No need to check 4 (we checked 2 already, and 4 is just 2×2). But 5 does work! ÷ 5 1035 = 27 ÷ 5 That is as far as we can go. The fraction simplifies to 2 7 Notice that after checking 2 we didn't need to check 4 (4 is 2×2)? We also don't need to check 6 when we have checked 2 and 3 (6 is 2x3). In fact, when checking from smallest to largest we only need to use prime numbers (our secret weapon): 2, 3, 5, 7, 11, 13, 17, 19, 23, 29, 31, 37, ... Method 2 Divide both the top and bottom of the fraction by the Greatest Common Factor (you have to work it out first!). The largest number that goes exactly into both 8 and 12 is 4, so the Greatest Common Factor is 4. Divide both top and bottom by 4: That is as far as we can go. The fraction simplifies to 2 3 Simplifying Fractions Automatically OK, there is a third method, use this tool: numbers/images/fraction-simplify.js Fractions on the Number Line Also ... see an animation of Fractions on the Number Line where you can see many common fractions and their simpler version. We also have a chart of fractions with the simplest fraction highlighted. 918,919, 1380, 1381, 3543, 3544, 1379, 3545, 3546, 3547 Copyright © 2025 Rod Pierce