



Adding & Subtracting Fractions

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Adding and subtracting fractions are basically the same; the only difference is the operation (you add or you subtract!). There are two rules to remember when performing this basic skill and if you can remember these two rules, the rest is easy-peasy, lemon squeezey!

Rule #1: When adding/subtracting fractions, the denominators must be the same.

In order to be able to add or subtract fractions, they **MUST** share a common denominator.

Rule #2: When all calculations are finished, if needed, reduce your fraction to lowest terms.

Does this sound difficult? Naaahhh...so, let's try a method or two out and see how it works.

Using the Least Common Multiple/Least Common Denominator

Here is an addition problem where the two denominators are not the same. We are going to use the 'least common denominator' method to simplify.

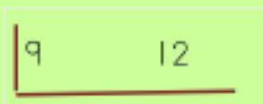
$$\frac{4}{9} + \frac{11}{12}$$

Step #1: You need to come up with a common denominator. So, find the **LEAST** common **MULTIPLE** (LCM) which is the same thing.

First, write down the denominators

9 12

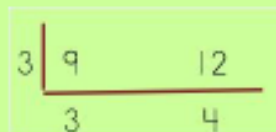
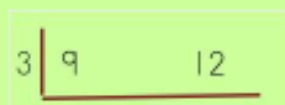
and then draw this shape, kind of like the division 'box' but upside-down...



Step #2: Begin to factor out common divisors (what factors do both of the numbers have in common?).

Use your divisibility rules to help you.

Start dividing (basically, you are dividing but upside-down!) until you can't find any common factors/divisors.



Step #3: When there are no factors left (you have come down to all of the common factors), then multiply **ALL** of the numbers that are on the **OUTSIDE** of the 'box.'

*Notice that when you are multiplying the numbers, the shape made is an L!



This will give you the LCM (least common multiple). This becomes your new **DENOMINATOR**.

36

Step #4: Now, criss-cross. This will tell you what you will be multiplying the numerators of each of your original fractions by.



Following the **green** arrow, you are going to multiply the 4 from 4/9 by 4.

Following the **red** arrow, you are going to multiply the **11** from the 11/12 by **3**.

$$\underline{4 \cdot 4} \quad \underline{11 \cdot 3}$$

Step #5: Perform your operation (in this case, addition).

If necessary or possible, reduce to lowest terms.

$$\frac{16 + 33}{36} = \frac{49}{36}$$

**In Algebra, you will probably leave your fraction as an Improper fraction.*