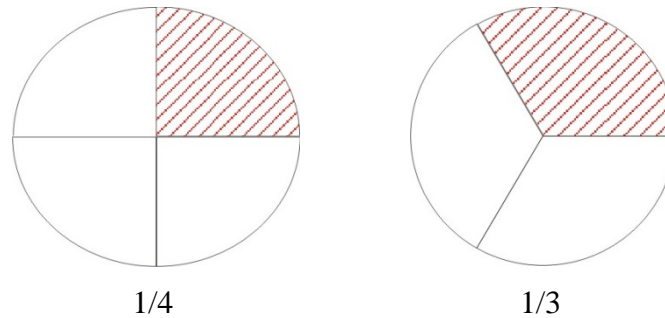


## FRACTIONS

### Least Common Denominator

Before adding or subtracting fractions, you have to have denominators that are the same. You can't add  $\frac{1}{4}$  and  $\frac{1}{3}$  because the sections are not the same size. It's like the old saying, you can't add apples and bananas.



To add these two fractions, you need a common denominator. The denominator is the bottom number of a fraction. A common denominator simply means that they are both the same. To find a common denominator, compare the multiples of the numbers in the denominators. Remember, the common denominator is the same as a common multiple. But what are multiples? Multiples are the answers to multiplication problems.

The multiples of 4 are 4, 8, 12, 16, 20, 24, 28, 32 and so on.

The multiples of 3 are 3, 6, 9, 12, 15, 18, 21, 24 and so on . . .

In these lists of multiples, you can find common multiples. Both 12 and 24 appear in both lists of multiples. 12 and 24 are common multiples of 3 and 4.

The least common multiple is the multiple that has the least value. 12 is less than 24, so 12 is the least common multiple. 12 is also the least common denominator.

**Quick Tip:** Sometimes when working with fractions, the hardest thing to find is a common denominator. This doesn't have to be the LEAST common multiple to work. It just has to be a common multiple. To find one quickly, just multiply the denominators. For the fractions  $\frac{2}{8}$  and  $\frac{1}{6}$ , you could use  $8 \times 6$ , or 48 as the common denominator, even though the least common denominator is 24.

### Equivalent Fractions

After finding a common denominator, the next step is to write equivalent fractions. This just means that you will write new fractions with the new denominators.

Let's go back to the fractions  $1/4$  and  $1/3$  and write them with the least common denominator – 12.

For each fraction, ask yourself, what do you have to do to the original fraction to make it have the new denominator.

$$1/4 = ?/12$$

What do you have to do to the 4 to make it 12? You have to multiply 4 by 3. Do the same to the numerator. Remember, the numerator is the top number of a fraction.

$$1 \times 3 = 3$$

$$4 \times 3 = 12$$

$$1/4 = 3/12$$

Do the same for the second fraction.

$$1/3 = ?/12$$

What do you have to do to 3 to change it to 12. That's right, multiply by 4. But remember to also multiply the numerator by 4.

$$1 \times 4 = 4$$

$$3 \times 4 = 12$$

$$1/3 = 4/12$$

Equivalent fractions for  $1/4$  and  $1/3$  are  $3/12$  and  $4/12$ .

### **Fraction Addition**

Now that you have fractions with common denominators, adding fractions is simple. Just add the numerators, or top numbers. Write the sum over the denominator, or bottom number.

$$3/12 + 4/12 = 7/12$$

$$\text{So, } 1/4 + 1/3 = 7/12$$

### **Reducing Fractions to Simplest Form**

Reducing fractions makes fractions easier to understand. It may be hard to picture what  $25/75$  might look like. But, if you reduce this fraction, you'll find out it's a fraction you are very familiar with.

Look at the numbers in the fraction  $25/75$ . What number could you divide BOTH numbers by without a remainder? Since they both end in 5, they are both multiples of 5. (This doesn't work for all numbers, but does work for 5s.) That means you can divide both numbers evenly by 5.

$$25 \div 5 = 5$$

$$75 \div 5 = 15$$

25/75 reduces to 5/15.

Can 5/15 be reduced? Is there a number that will evenly divide both 5 and 15? Yes, 5 will divide both numbers evenly. So, divide again.

$$5 \div 5 = 1$$

$$15 \div 5 = 3$$

5/15 reduces to 1/3.

Can 1/3 be reduced? Is there a number that will evenly divide both 1 and 3? Yes, 1 divides both 1 and 3. But dividing by 1 will not change the numbers in the fraction.

Since the only number left to divide by is 1, this fraction is said to be in simplest form.

25/75 in simplest form is 1/3.

The addition problem we solved above had a sum of 7/12. Is 7/12 in simplest form?

The only numbers that divide 7 are 1 and 7. 7 will not divide 12 evenly. So, the only number that will divide 7 and 12 is 1.

7/12 is in simplest form.