

So, you're having trouble with fractions. Let's see if we can do something about that.

A Multiplying fractions:

- this represents the easiest operation you can perform on fractions
- all you need to do is multiply the numerators together and the denominators together
- if the numerator and denominator of the answer share a common factor then simplify
- look at the examples below and solve the questions that follow

$$\begin{aligned} & \frac{3}{4} \times \frac{5}{6} \\ &= \frac{15}{24} \\ &= \frac{5}{8} \end{aligned}$$

Did you notice that if you simplified the 3 in the numerator and the 6 in the denominator first, you would still get the same answer?

$$\begin{aligned} & \frac{3}{4} \times \frac{5}{6} \\ &= \frac{1}{4} \times \frac{5}{2} \\ &= \frac{5}{8} \end{aligned}$$

1. $\frac{2}{3} \times \frac{4}{5}$ 2. $\frac{7}{6} \times \frac{5}{8}$ 3. $\frac{2}{11} \times \frac{33}{5}$

4. Which of the questions above could have been simplified before you multiplied? If you didn't solve this question this way, do it now.
5. Make up and solve 3 of your own questions similar to the ones above such that one of the three can be simplified, before multiplying.

B Dividing fractions:

- this operation is a little tricky
- you need to know the following terms: dividend, divisor and reciprocal
- to divide fractions you multiply the dividend by the reciprocal of the divisor
- look at the examples below and solve the questions that follow

dividend divisor

$$\begin{aligned} & \frac{8}{5} \div \frac{3}{2} \\ &= \frac{8}{5} \times \frac{2}{3} \quad \leftarrow \text{reciprocal of the divisor} \\ &= \frac{16}{15} \end{aligned}$$

dividend divisor

$$\begin{aligned} & \frac{8}{5} \div \frac{3}{2} \\ &= \frac{8}{5} \times \frac{2}{3} \quad \leftarrow \text{reciprocal of the divisor} \\ &= \frac{16}{15} \end{aligned}$$

1. What do you notice about the examples above?

2. $\frac{2}{3} \div \frac{5}{7}$ 3. $\frac{7}{4} \div \frac{3}{8}$ 4. $\frac{5}{8} \div \frac{3}{7}$ 5. $\frac{7}{21} \div \frac{2}{16}$

6. Make up and solve 4 of your own questions similar to the ones above.

C Adding and subtracting fractions:

- these operations require that you're able to multiply fractions when you need to find a common denominator
- once the denominators are the same you add the numerators and keep the same denominator
- look at the examples below and solve the questions that follow

If you are adding one-sixth to four-sixths, how many sixths will you end up with? Of course the answer is five-sixths. Since the denominators are the same, this represents one of the simpler fraction addition problems. * We could have simplified the fraction four sixths. Why didn't we?*

$$\longrightarrow \frac{1}{6} + \frac{4}{6} = \frac{5}{6}$$

Of course, the problems you'll be faced with won't always be that easy. Here's an example in which there isn't a common denominator. What is the sum of one-sixth and two-thirds?

$$\longrightarrow \frac{1}{6} + \frac{2}{3} = ?$$

Before we do any adding we need to find a common denominator first. To do this it will help you a great deal if you're able to find the lowest common multiple of the denominators. For the numbers 6 and 3, some common multiples are, 6, 9, 12, 18. In other words each of the numbers 6 and 3 can be divided into the common multiples an integer number of times. In this case, 6 is the lowest common multiple so we only need to write two-thirds in terms of sixths. *Notice how we "unsimplified" the fraction two-thirds. What is the value of the fraction we multiplied two-thirds by? Have we changed the value of two-thirds by multiplying it by this number?*

$$\begin{aligned} & \frac{1}{6} + \frac{2}{3} \\ &= \frac{1}{6} + \frac{2}{3} \times \frac{2}{2} \\ \longrightarrow &= \frac{1}{6} + \frac{4}{6} \\ &= \frac{5}{6} \end{aligned}$$

You'll find that in some cases the lowest common multiple of the denominators is just the product of the denominators. In this case you need to "unsimplify" both fractions. Don't forget order of operations!(multiply before subtracting)

$$\begin{aligned} & \frac{1}{3} - \frac{1}{4} \\ \longrightarrow &= \frac{4}{4} \times \frac{1}{3} - \frac{1}{4} \times \frac{3}{3} \\ &= \frac{4}{12} - \frac{3}{12} \\ &= \frac{1}{12} \end{aligned}$$

1. $\frac{2}{3} + \frac{7}{3}$ 2. $\frac{3}{4} + \frac{1}{2}$ 3. $\frac{5}{6} - \frac{7}{18}$ 4. $\frac{1}{5} + \frac{3}{8}$ 5. $\frac{3}{4} - \frac{1}{6}$

6. Make up and solve 5 of your own questions similar to the ones above.