

Adding Fractions

In order to add and subtract fractions, they must have the same denominator. If the fractions have the same denominators, just add the numerators together and write the total over the denominator.

Examples: $\frac{2}{9} + \frac{4}{9} = \frac{6}{9}$ Reduce the $\frac{6}{9}$: $\frac{2}{3}$.

$\frac{5}{8} + \frac{7}{8} = \frac{12}{8}$ Change $\frac{12}{8}$ to a mixed number: $1\frac{4}{8}$, then reduce: $1\frac{1}{2}$.

There are a few extra steps to add mixed numbers with the same denominators, such as $2\frac{3}{5} + 1\frac{4}{5}$:

1. Add the fractions: $\frac{3}{5} + \frac{4}{5} = \frac{7}{5}$
2. Change the improper fraction into a mixed number: $\frac{7}{5} = 1\frac{2}{5}$
3. Add the whole numbers: $2 + 1 = 3$
4. Add the results of steps 2 and 3: $1\frac{2}{5} + 3 = 4\frac{2}{5}$

Subtracting Fractions

Like addition, fractions must have the same denominators before subtracting. If the fractions have the same denominators, just subtract the numerators and write the difference over the denominator.

Example: $\frac{4}{9} - \frac{3}{9} = \frac{4-3}{9} = \frac{1}{9}$

If the fractions you want to subtract don't have the same denominator, you will have to raise some or all of the fractions to higher terms so that they all have the same denominator, or LCD. If you forgot how to find the LCD, just read the section on adding fractions with different denominators.

Example: $\frac{5}{6} - \frac{3}{4}$

1. Raise each fraction to 12ths because 12 is the LCD, the smallest number that 6 and 4 both divide into evenly:
2. Subtract as usual:

$$\begin{array}{r} \frac{5}{6} = \frac{10}{12} \\ -\frac{3}{4} = \frac{9}{12} \\ \hline \frac{1}{12} \end{array}$$

Subtracting mixed numbers with the same denominator is similar to adding mixed numbers.

Example: $4\frac{3}{5} - 1\frac{2}{5}$

1. Subtract the fractions: $\frac{3}{5} - \frac{2}{5} = \frac{1}{5}$
2. Subtract the whole numbers: $4 - 1 = 3$
3. Add the results of steps 1 and 2: $\frac{1}{5} + 3 = 3\frac{1}{5}$

Sometimes, there is an extra "borrowing" step when you subtract mixed numbers with the same denominators, say $7\frac{3}{5} - 2\frac{4}{5}$:

1. You can't subtract the fractions the way they are because $\frac{4}{5}$ is bigger than $\frac{3}{5}$. So you borrow 1 from the 7, making it 6, and change that 1 to $\frac{5}{5}$ because 5 is the denominator: $7\frac{3}{5} = 6\frac{3}{5} + \frac{5}{5}$
2. Add the numbers from step 1: $6\frac{3}{5} + \frac{5}{5} = 6\frac{8}{5}$
3. Now you have a different version of the original problem: $6\frac{8}{5} - 2\frac{4}{5}$
4. Subtract the fractional parts of the two mixed numbers: $\frac{8}{5} - \frac{4}{5} = \frac{4}{5}$
5. Subtract the whole number parts of the two mixed numbers: $6 - 2 = 4$
6. Add the results of the last 2 steps together: $4 + \frac{4}{5} = 4\frac{4}{5}$

Try these subtraction problems:

14. $\frac{4}{5} - \frac{2}{3} =$

15. $\frac{7}{8} - \frac{1}{4} - \frac{1}{2} =$

16. $10\frac{1}{3} - 6\frac{5}{7} =$