Subtracting Fractions
A Closer Look at the Video

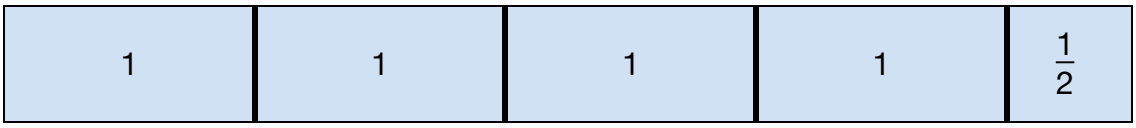
After watching the *Subtracting Fractions* video, make sense of the mathematics by taking a closer look at the problem situation and solution. Use the comments and questions in bold to help you subtract fractions and solve the problem.

Problem: Susan is working on a stained glass project. She starts with a piece of blue glass that is $4\frac{1}{2}$ inches long, but the section she's working on only requires a piece of glass that is $1\frac{3}{4}$ inches long. Once Susan cuts off the piece she needs, how much glass will be left over for another project?

Susan starts with $4\frac{1}{2}$ inches of blue glass, and uses $1\frac{3}{4}$ inches. You want to find out how much of the blue glass will be left after Susan uses $1\frac{3}{4}$ inches, so subtract to find the difference.

$$4\frac{1}{2} - 1\frac{3}{4}$$

The following rectangular region represents the amount of glass Susan has to begin the project.



When subtracting fractions, it is important that both fractions have the same denominator, so the parts are the same size. In this problem you are subtracting fourths from halves. What is a common denominator for halves and fourths? Four is a multiple of two, so four is a common denominator. When the denominator of one fraction is a multiple of the denominator of another fraction, the fractions are *similar*. With similar fractions, a common denominator is always the numerically larger of the two denominators.

Rename $4\frac{1}{2}$ so the denominator is four. One whole is equivalent to $\frac{4}{4}$, so $\frac{1}{2}$ is equivalent to $\frac{2}{4}$. View the *Equivalent Fraction* Video to review equivalent fractions.

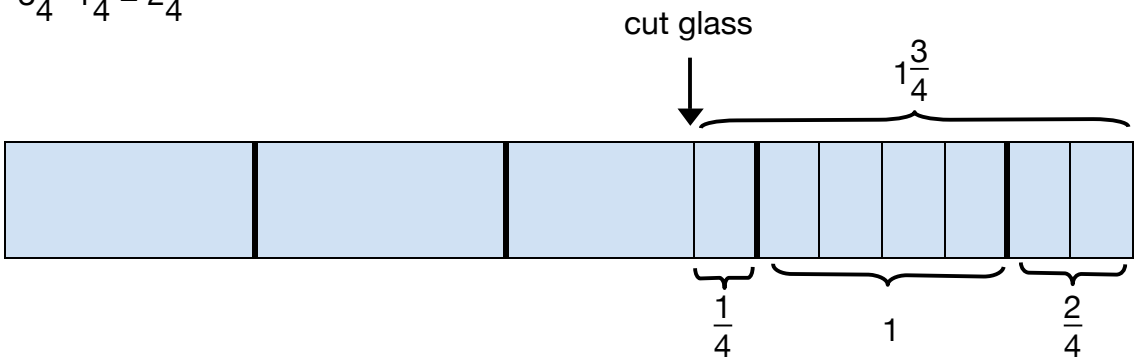
$4\frac{1}{2} = 4\frac{2}{4}$

This makes the problem $4\frac{2}{4} - 1\frac{3}{4}$. Notice the fractional parts of the mixed numbers.

How do you subtract $\frac{3}{4}$ from $\frac{2}{4}$? One whole is equal to $\frac{4}{4}$, so divide one of the four wholes, into four equal parts. $4\frac{2}{4}$ is equal to $3\frac{6}{4}$. The problem now becomes $3\frac{6}{4} - 1\frac{3}{4}$.

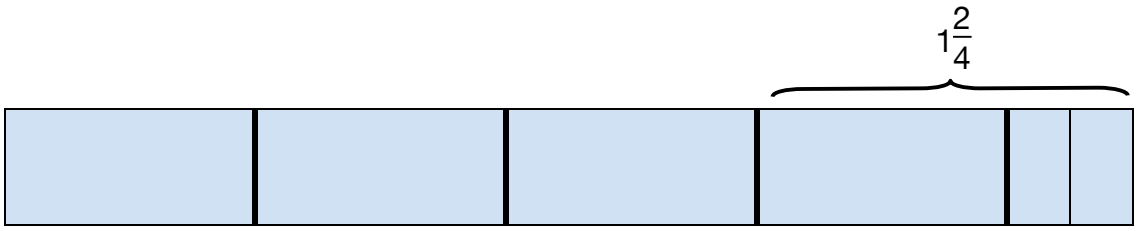
Now subtract. Three minus one equals two, and $\frac{6}{4}$ minus $\frac{3}{4}$ equals $\frac{3}{4}$.

$3\frac{6}{4} - 1\frac{3}{4} = 2\frac{3}{4}$

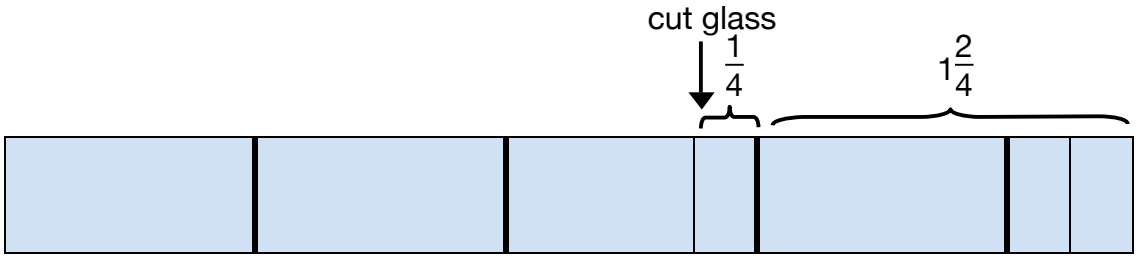


If this were a real piece of glass, you would cut the $1\frac{3}{4}$ inches from one end of the glass as shown.

Another way to solve this problem is to subtract $1\frac{2}{4}$ from $4\frac{2}{4}$, giving you three.



Then subtract the remaining $\frac{1}{4}$, giving you $2\frac{3}{4}$. This is an efficient way to think about the problem mentally.



$4\frac{2}{4} - 1\frac{2}{4} = 3$ and $3 - \frac{1}{4} = 2\frac{3}{4}$