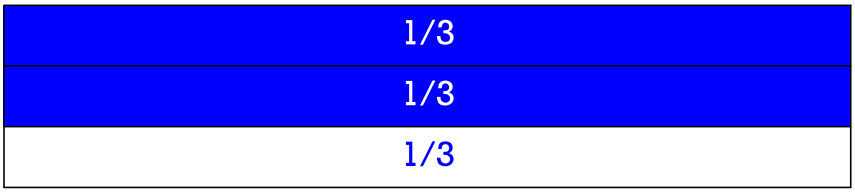
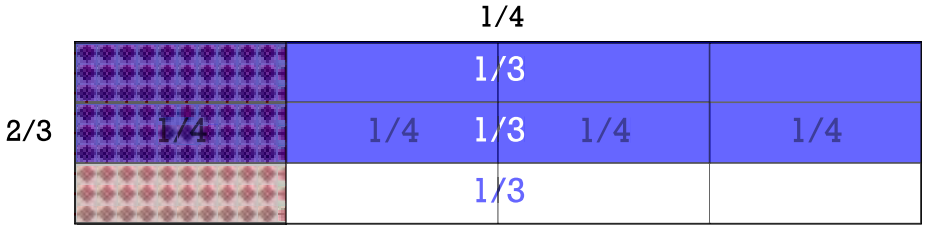
Multiplying Fractions

Whenever you model multiplying fractions, you start out modeling one of the two fractions in the problem. For example, when taking 1/4 of 2/3, I would model 2/3 first.



Then, model the second fraction on top of the model for the first fraction, but in a different direction. Example *(continued):* I cut the model into fourths in the opposite direction and shade 1/4.



You will notice that the model is now divided into 12 equal pieces. The part that is double shaded part, 2/12, represents the product of 1/4 of 2/3 (1/4 x 2/3).

When looking at this rectangle model, we can make a connection with finding the area of a rectangle.

Take some time to examine the equation, 1/4 of 2/3 = 2/12. What do you notice?*(You may want to write the fraction using horizontal fractions bars; not the foward slash).*

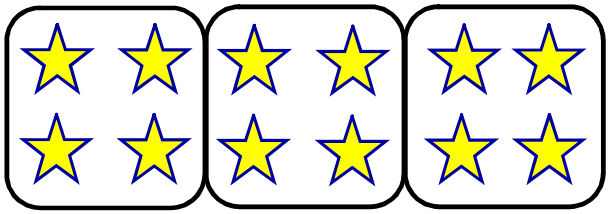
Hopefully, you will notice that the numerator of the product is the product of the numerators (1 x 2 = 2) and the denominator of the product is the product of the denominators (4 x 3 = 12).

Algorithm: When multiplying fractions:

1. Multiply numerator by numerator.
2. Multiply denominator by denominator.
3. If your answer results in an improper fraction, convert it into a mixed number.
4. Simplify, if necessary.

Multiplying Fractions by Whole Numbers and Whole Numbers by Fractions

Example: What is 2/3 of 12?

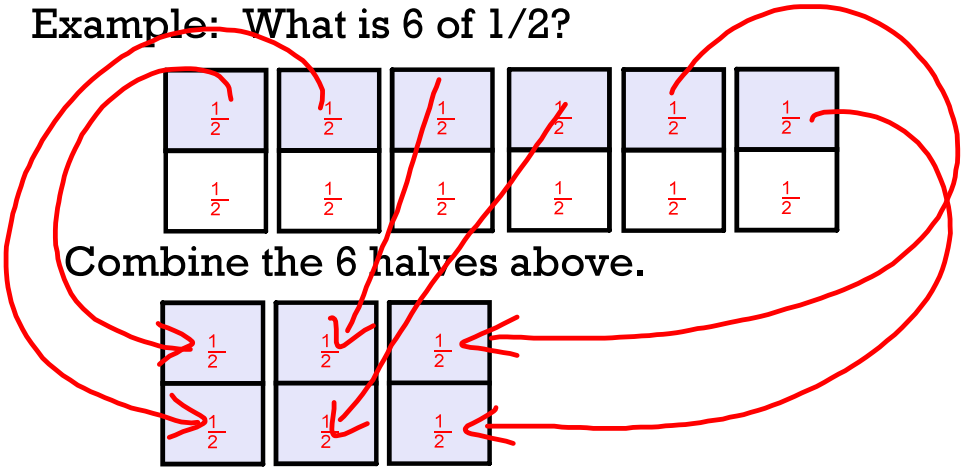


The twelve stars above are divided into 3 groups. If you count the number of stars in 2 of the 3 groups, you will count 8. Therefore, 2/3 of 12 is 8.

We can check this using the standard algorithm for multiplying fractions. Since 12 is a whole number, you should make 1 its denominator. With that being said, multiply 2/3 by 12/1.

$$\frac{2}{3} \times \frac{12}{1} = \frac{24}{3} = 8$$

Example: What is 6 of 1/2?



You end up with three wholes.

We can check this using the standard algorithm for multiplying fractions. Since 6 is a whole number, you should make 1 its denominator. With that being said, multiply 6/1 by 1/2.

$$\frac{6}{1} \times \frac{1}{2} = \frac{6}{2} = 3$$

Multiplying Mixed Numbers

Method 1: Using Improper Fractions

Convert the mixed numbers into improper fractions.

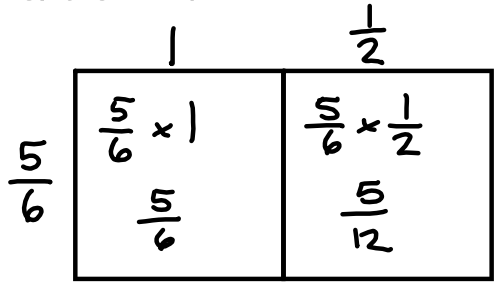
Example: What is 5/6 of 1 1/2?

$$\frac{5}{6} \times 1\frac{1}{2}$$

$$\frac{5}{6} \times \frac{3}{2} = \frac{15}{12} = 1\frac{3}{12} = 1\frac{1}{4}$$

Method 2: Using the Area Model

Example: 5/6 of 1 1/2



$\frac{5}{6} \times \frac{2}{2} = \frac{10}{12}$

$+ \frac{5}{12} = \frac{5}{12}$

$\frac{15}{12} = 1\frac{3}{12} = 1\frac{1}{4}$

This model is similar to the area model used to multiply multi-digit whole number.