Review: Multiplying Fractions 1

The **shortcut for multiplying fractions** is:

- Multiply the numerators.
- Multiply the denominators.

$$\frac{6}{7} \cdot \frac{5}{2} \cdot \frac{1}{3} = \frac{6 \cdot 5 \cdot 1}{7 \cdot 2 \cdot 3} = \frac{30}{42} = \frac{5}{7}$$

To **multiply mixed numbers**, *first* write them as fractions, then multiply.

$$2\frac{1}{3} \cdot 1\frac{1}{10} = \frac{7}{3} \cdot \frac{11}{10} = \frac{7 \cdot 11}{3 \cdot 10} = \frac{77}{30} = 2\frac{17}{30}$$

If one of the factors is a whole number, write it as a fraction with a denominator of 1.

$$6 \cdot \frac{11}{12} = \frac{6}{1} \cdot \frac{11}{12} = \frac{66}{12} = \frac{11}{2} = 5\frac{1}{2}$$

1. Multiply. Give your answer in lowest terms, and as a mixed number, if applicable.

a. $5 \cdot \frac{7}{8}$	**b.** $\frac{2}{7} \cdot \frac{5}{6}$
c. $\frac{9}{10} \cdot \frac{6}{7} \cdot \frac{1}{2}$	**d.** $1\frac{1}{3} \cdot 2\frac{2}{3}$
e. $\frac{1}{10} \cdot 3\frac{1}{5}$	**f.** $2\frac{5}{6} \cdot 10 \cdot \frac{1}{2}$

2. Find the area of a square with sides 1 ¼ units. Use fractions.

3. A biscuit recipe calls for 1½ cups of buttermilk, and Mary plans to make the recipe one and a half times, three times a week, in order to sell biscuits. How much buttermilk does she need in a week?

You have already learned to use **factoring** when simplifying.

The example on the right shows simplifying 96/144.

$$\frac{96}{144} = \frac{\overset{2}{\cancel{8}} \cdot \overset{1}{\cancel{12}}}{\underset{3}{\cancel{12}} \cdot \underset{1}{\cancel{12}}} = \frac{2}{3}$$

You have also learned how to simplify **"criss-cross."** To simplify 45/150, we cancel the 5s from the numerator and the denominator. Then we simplify 9 and 30 into 3 and 10.

$$\frac{45}{150} = \frac{\overset{1}{\cancel{5}} \cdot \overset{3}{\cancel{9}}}{\underset{10}{\cancel{30}} \cdot \underset{1}{\cancel{5}}} = \frac{3}{10}$$

In a similar manner, you can simplify fractions *before* multiplying.

Compare the two examples on the right. They show the same problem.

The first one (above right) is written out with an extra step, whereas the one below is written without the extra step.
In both cases, the simplifying is done *before* multiplying.

$$\frac{7}{6} \cdot \frac{3}{9} = \frac{7 \cdot \overset{1}{\cancel{3}}}{\underset{2}{\cancel{6}} \cdot 9} = \frac{7}{18}$$

$$\frac{7}{\underset{2}{\cancel{6}}} \cdot \frac{\overset{1}{\cancel{3}}}{9} = \frac{7}{18}$$

4. Simplify before multiplying, and solve the riddle.

E. $\frac{3}{10} \cdot \frac{1}{3} =$

A. $\frac{5}{6} \cdot \frac{2}{4} =$

O. $\frac{2}{6} \cdot \frac{5}{7} =$

L. $\frac{2}{9} \cdot \frac{9}{11} =$

M. $\frac{4}{10} \cdot \frac{1}{3} =$

E. $\frac{3}{10} \cdot \frac{3}{9} =$

I. $7 \cdot \frac{5}{21} =$

N. $\frac{16}{24} \cdot 8 =$

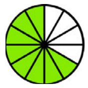
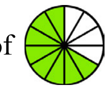
W. $\frac{4}{5} \cdot \frac{3}{6} =$

P. $\frac{4}{8} \cdot \frac{1}{3} =$

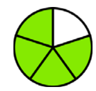
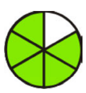
S. $\frac{7}{40} \cdot 15 =$

R. $\frac{2}{6} \cdot \frac{3}{9} =$

	$\frac{5}{12}$	$\frac{1}{9}$	$\frac{1}{10}$		$\frac{21}{8}$	$\frac{5}{3}$	$\frac{2}{15}$	$\frac{1}{6}$	$\frac{2}{11}$	$\frac{1}{10}$		$\frac{16}{3}$	$\frac{5}{21}$	$\frac{2}{5}$	
These problems															!

Use multiplication to find a fractional part of a fraction. The word "of" translates into multiplication.	
How much is $\frac{3}{4}$ of  ? Since "of" becomes ·, we get the multiplication $\frac{3}{4} \cdot \frac{8}{12} = \frac{\cancel{3}^{1}}{\cancel{4}_{1}} \cdot \frac{\cancel{8}^{2}}{\cancel{12}_{4}} = \frac{2}{4} = \frac{1}{2}$.	But, how can we make sense of that answer 1/2? If you have 8 slices of a pie that was originally cut into twelfths, and you take 3/4 *of* those 8 slices, you will end up with 6 slices (of the original 12). And 6/12 is 1/2. $\frac{3}{4}$ of  is  .

5. The pictures show how much pizza is left. Find the given part of it. Write a multiplication sentence.

a. Find $\frac{1}{2}$ of  $\frac{1}{2} \cdot \frac{}{} =$	**b.** Find $\frac{2}{3}$ of  $\frac{}{} \cdot \frac{}{} =$	**c.** Find $\frac{1}{4}$ of  · =
d. Find $\frac{9}{10}$ of  · =	**e.** Find $\frac{1}{6}$ of  · =	**f.** Find $\frac{3}{8}$ of  · =

6. Rewrite the ingredients for the pancake recipe as 3/4 of the original amounts.

Pancakes	Pancakes
1 3/4 c milk	_______ c milk
2 eggs	_______ eggs
2 c flour	_______ c flour
2 1/2 tsp baking powder	_______ tsp baking powder
1/2 tsp salt	_______ tsp salt
1 tsp cinnamon	_______ tsp cinnamon

7. Isabella was riding her bicycle from her house to her friend's, which was 3/4 mile away. Then, 2/3 of the way there, she realized that she had forgotten something, so she had to return home. What distance did Isabella ride her bicycle from her home to the point where she turned back and then home again? Calculate the distance in two ways:

a. Using fractions.

b. Using decimals.