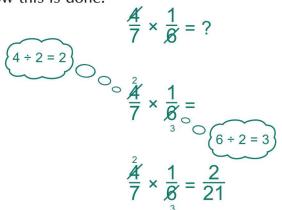# 6 Canceling Before Multiplying Fractions

In the following problem, we multiply, then rewrite the answer in simplest form.

$$\frac{4}{7} \times \frac{1}{6} = \frac{4}{42} = \frac{2}{21}$$

We can save work when multiplying fractions if we cancel first. Canceling is a way to simplify fractions before we multiply. Find one numerator and one denominator that are divisible by the same number. You must always cancel diagonally, never horizontally. See how this is done.

$$\frac{\cancel{4}}{7} \times \frac{1}{\cancel{6}} = ?$$

$4 \div 2 = 2$

In this problem, 4 and 6 are both divisible by two. Cancel out 4 and 6.

$$\frac{\overset{2}{\cancel{4}}}{7} \times \frac{1}{\underset{3}{\cancel{6}}} =$$

$6 \div 2 = 3$

Divide 4 by 2 and divide 6 by 2. Write the quotients in place of the canceled numbers.

$$\frac{\overset{2}{\cancel{4}}}{7} \times \frac{1}{\underset{3}{\cancel{6}}} = \frac{2}{21}$$

Now multiply as usual, using the new numerators and denominators. The answer is already in simplest form. It can't be simplified any further.

Sometimes a diagonal numerator and denominator are the same number. This is the easiest kind of cancellation, because they both cancel to 1.

$5 \div 5 = 1$

$$\frac{3}{\underset{1}{\cancel{5}}} \times \frac{\overset{1}{\cancel{5}}}{8} = \frac{3}{8}$$

$5 \div 5 = 1$

5 and 5 are both divisible by themselves. Cancel both 5's to 1 and multiply as usual. Again, there is no need to simplify the answer. It has already been changed to simplest form.

Sometimes we can cancel **both** diagonal numerators and denominators.

$$\frac{\overset{1}{\cancel{3}}}{\underset{5}{\cancel{10}}} \times \frac{\overset{1}{\cancel{2}}}{\underset{1}{\cancel{3}}} = \frac{1}{5}$$

10 and 2 are both divisible by 2. 3 and 3 both cancel to 1. The answer is in simplest form.

Sometimes we can't cancel at all.

$$\frac{3}{4} \times \frac{3}{8} = \frac{9}{32}$$

3 will not cancel with 8.
4 will not cancel with 3.
The product cannot be simplified, either.

A HELPFUL HINT:
Whether you cancel *before* you multiply, or simplify the answer
***after* you multiply, you will still get the same correct answer.**
But if you cancel completely before you multiply, you will
not have to simplify your answer.

Cancel once, then multiply.

1. a. $\frac{5}{6} \times \frac{1}{15} =$ _____

b. $\frac{8}{9} \times \frac{1}{2} =$ _____

c. $\frac{4}{21} \times \frac{7}{9} =$ _____

Cancel twice, then multiply.

2. a. $\frac{2}{3} \times \frac{3}{4} =$ _____

b. $\frac{9}{14} \times \frac{7}{12} =$ _____

c. $\frac{3}{8} \times \frac{2}{9} =$ _____

Which is easier? Try both ways.

Multiply first. Then simplify.   **Cancel first. Then multiply.**

3. a. $\frac{5}{9} \times \frac{4}{5} =$ _____

b. $\frac{5}{9} \times \frac{4}{5} =$ _____

4. a. $\frac{9}{10} \times \frac{2}{3} =$ _____

b. $\frac{9}{10} \times \frac{2}{3} =$ _____

5. a. $\frac{1}{2} \times \frac{2}{9} =$ _____

b. $\frac{1}{2} \times \frac{2}{9} =$ _____

6. Did you get the same answer both ways? _____

7. Which way is quicker and easier? _____

We Remember

Answer the question.

8. In the number 123,987,654,987,357 which number is in the hundred trillions place? _____