

Objectives:

- Students will memorize the multiplication table, as evidenced by them passing “minute quizzes.”
- Students will simplify, as evidenced by them completing a warm-up worksheet where they do so.
- Students will multiply fractions, as evidenced by them completing a homework assignment where they do so.

Student Materials on Desk Corner:

- Homework #2-10
- Homework Checker
- Readiness Checker

Student Materials for Class:

- Homework Log
- Binder Paper
- Pencils

Teacher Materials:

- “Warm-up 2-11” for each student
- “Minute Quiz 2-11” for each student
- “Homework #2-10” answer key and grading roster for TA
- “Homework #2-11” handout for each student

Homework:

- Homework #2-11

Time	Activity
Before Bell	<p style="text-align: center;">DO NOW</p> <p>As students enter the classroom, shake hands and give them a copy of the warm-up. Remind students that there is a minute quiz, so students need to be seated quietly with a pencil when the bell rings.</p>
5 min	<p style="text-align: center;">MINUTE QUIZ, HOMEWORK COLLECTION, AND WARM-UP</p> <p>Minute Quiz When the bell rings, quickly go around and put the minute quiz on each student’s desk, facedown. Then, start everyone on the quiz at the same time and give everyone one minute. While students are working on the quiz, stamp the readiness checkers of students who were ready when the bell rang and had their readiness checkers out.</p> <p>Homework Collection Instruct the TA go around and collect homework and stamp homework checkers. Give the TA the answer key and have him or her grade the homework that was collected.</p> <p>Warm-up After the minute quiz, students should work on the warm-up while you take attendance.</p>
35 min	<p style="text-align: center;">LESSON: SIMPLIFYING FRACTIONS</p> <p>Notes Follow the handwritten Cornell Notes.</p> <p>Homework Pass out the “Homework #2-11” handout and have students write down the assignment on their homework logs.</p>
40 min	<p style="text-align: center;">ALEKS</p> <p>Students should continue with ALEKS. Use this student work time to return graded homework.</p>

Solve the following multiplication problems. You have exactly one minute!

$7 \cdot 3 =$

$7 \cdot 7 =$

$10 \cdot 3 =$

$3 \cdot 8 =$

$6 \cdot 4 =$

$3 \cdot 2 =$

$5 \cdot 3 =$

$7 \cdot 11 =$

$1 \cdot 2 =$

$12 \cdot 12 =$

$9 \cdot 12 =$

$10 \cdot 6 =$

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$3 \cdot 2 =$

$5 \cdot 3 =$

$7 \cdot 11 =$

$1 \cdot 2 =$

$12 \cdot 12 =$

$9 \cdot 12 =$

$10 \cdot 6 =$

Solve the following multiplication problems. You have exactly one minute!

$11 \cdot 3 =$

$7 \cdot 7 =$

$6 \cdot 1 =$

$6 \cdot 12 =$

$3 \cdot 5 =$

$11 \cdot 8 =$

$8 \cdot 4 =$

$4 \cdot 12 =$

$7 \cdot 11 =$

$11 \cdot 6 =$

$8 \cdot 7 =$

$3 \cdot 8 =$

Solve the following multiplication problems. You have exactly one minute!

$11 \cdot 3 =$

$7 \cdot 7 =$

$6 \cdot 1 =$

$6 \cdot 12 =$

$3 \cdot 5 =$

$11 \cdot 8 =$

$8 \cdot 4 =$

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Solve the following multiplication problems. You have exactly one minute!

$11 \cdot 3 =$

$7 \cdot 7 =$

$6 \cdot 1 =$

$6 \cdot 12 =$

$3 \cdot 5 =$

$11 \cdot 8 =$

$8 \cdot 4 =$

$4 \cdot 12 =$

$7 \cdot 11 =$

$11 \cdot 6 =$

$8 \cdot 7 =$

$3 \cdot 8 =$

Solve the following multiplication problems. You have exactly one minute!

$11 \cdot 2 =$

$5 \cdot 6 =$

$6 \cdot 12 =$

$6 \cdot 5 =$

$4 \cdot 6 =$

$4 \cdot 10 =$

$1 \cdot 9 =$

$7 \cdot 2 =$

$10 \cdot 4 =$

$11 \cdot 4 =$

$7 \cdot 4 =$

$3 \cdot 12 =$

Solve the following multiplication problems. You have exactly one minute!

$11 \cdot 2 =$

$5 \cdot 6 =$

$6 \cdot 12 =$

$6 \cdot 5 =$

$4 \cdot 6 =$

$4 \cdot 10 =$

$1 \cdot 9 =$

$7 \cdot 2 =$

$10 \cdot 4 =$

$11 \cdot 4 =$

$7 \cdot 4 =$

$3 \cdot 12 =$

Solve the following multiplication problems. You have exactly one minute!

$11 \cdot 2 =$

$5 \cdot 6 =$

$6 \cdot 12 =$

$6 \cdot 5 =$

$4 \cdot 6 =$

$4 \cdot 10 =$

$1 \cdot 9 =$

$7 \cdot 2 =$

$10 \cdot 4 =$

$11 \cdot 4 =$

$7 \cdot 4 =$

$3 \cdot 12 =$

Simplify the following fractions using prime factorization and canceling terms.

1) $\frac{4}{6}$

2) $\frac{15}{30}$

3) $\frac{12}{18}$

4) $\frac{28}{35}$

5) $\frac{36}{48}$

6) $\frac{18}{40}$

Simplify the following fractions using prime factorization and canceling terms.

1) $\frac{4}{6}$

2) $\frac{15}{30}$

3) $\frac{12}{18}$

4) $\frac{28}{35}$

5) $\frac{36}{48}$

6) $\frac{18}{40}$

Multiplying Fractions

Section → Rule for Multiplying Fractions

how to mult fractions To multiply two fractions, write the product of the numerators over the product of the denominators, then simplify.

Ex: Evaluate $\frac{3}{8} \cdot \frac{2}{3}$.

$$\frac{3}{8} \cdot \frac{2}{3} = \frac{3 \cdot 2}{8 \cdot 3} = \frac{6}{24}$$

$$\begin{array}{c} 6 \\ \swarrow \searrow \\ \textcircled{2} \textcircled{3} \\ 6 = 2 \cdot 3 \end{array}$$

$$\begin{array}{c} 24 \\ \swarrow \searrow \\ 4 \quad 6 \\ \swarrow \searrow \quad \swarrow \searrow \\ \textcircled{2} \textcircled{2} \textcircled{2} \textcircled{3} \\ 24 = 2 \cdot 2 \cdot 2 \cdot 3 \end{array}$$

$$\frac{6}{24} = \frac{2 \cdot 3}{2 \cdot 2 \cdot 2 \cdot 3} = \frac{1}{2 \cdot 2} = \boxed{\frac{1}{4}}$$

Ex: Evaluate $\frac{3}{7} \cdot \frac{4}{9}$.

$$\frac{3}{7} \cdot \frac{4}{9} = \frac{3 \cdot 4}{7 \cdot 9} = \frac{12}{63}$$

$$\begin{array}{c} 12 \\ \swarrow \searrow \\ \textcircled{3} \quad 4 \\ \quad \swarrow \searrow \\ \quad \textcircled{2} \quad \textcircled{2} \\ 12 = 2 \cdot 2 \cdot 3 \end{array}$$

$$\begin{array}{c} 63 \\ \swarrow \searrow \\ \textcircled{7} \quad 9 \\ \quad \swarrow \searrow \\ \quad \textcircled{3} \quad \textcircled{3} \\ 63 = 3 \cdot 3 \cdot 7 \end{array}$$

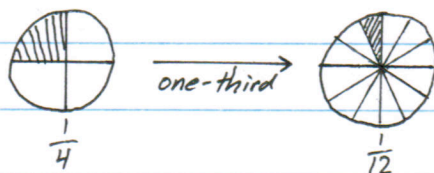
$$12 = 2 \cdot 2 \cdot 3 \quad 63 = 3 \cdot 3 \cdot 7$$

$$\frac{12}{63} = \frac{2 \cdot 2 \cdot 3}{3 \cdot 3 \cdot 7} = \frac{2 \cdot 2}{3 \cdot 7} = \boxed{\frac{4}{21}}$$

Section → Why the Rule Works

★ Multiplication means "of."

$$\text{Ex: } \frac{1}{3} \cdot \frac{1}{4} = \frac{1}{3} \text{ of } \frac{1}{4}$$



$$\text{So, } \frac{1}{3} \cdot \frac{1}{4} = \frac{1}{12}$$

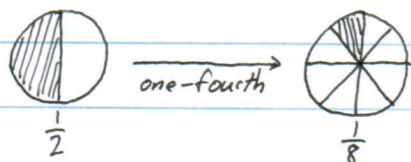
$$\text{Ex: } \frac{2}{3} \cdot \frac{1}{4} = \frac{2}{3} \text{ of } \frac{1}{4}$$

From the previous example, $\frac{1}{3}$ of $\frac{1}{4} = \frac{1}{12}$.

Then, $\frac{2}{3}$ of $\frac{1}{4}$ should be twice as much, or $\frac{2}{12}$.

$$\text{So, } \frac{2}{3} \cdot \frac{1}{4} = \frac{2}{12}$$

$$\text{Ex: } \frac{1}{4} \cdot \frac{1}{2} = \frac{1}{4} \text{ of } \frac{1}{2}$$



$$\text{So, } \frac{1}{4} \cdot \frac{1}{2} = \frac{1}{8}$$

$$\text{Ex: } \frac{3}{4} \cdot \frac{1}{2} = \frac{3}{4} \text{ of } \frac{1}{2}$$

From the previous example, $\frac{1}{4}$ of $\frac{1}{2} = \frac{1}{8}$.

Then, $\frac{3}{4}$ of $\frac{1}{2}$ should be three times as much, or $\frac{3}{8}$.

$$\text{So, } \frac{3}{4} \cdot \frac{1}{2} = \frac{3}{8}$$

From these examples, we can see that the numerators and denominators are multiplied separately.

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The ideas in this fraction lesson are taken from the [Fractions 2 ebook](#). Only a few examples of each problem type are shown; you should make more problems of each kind for the student.

Multiplying fractions by fractions

Free fraction lesson plan from [HomeschoolMath.net](#)

Most textbooks just plain 'announce' the rule for multiplying fractions by fractions. This lesson will let you think and discover WHY the rule works. The several steps in this lesson are all aiming towards something, so please follow them and do the exercises.

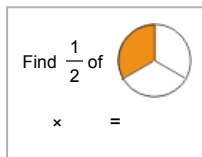
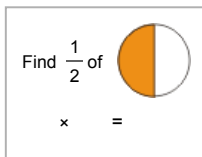
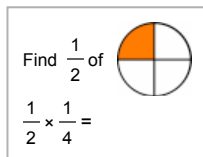
We have studied how to find $\frac{1}{2}$ of a whole number. For example $\frac{1}{2} \times 24 = \underline{\quad}$.

- Remember also that when you find a fraction of a number, the word OF translates into **MULTIPLICATION**.

The same idea works when finding $\frac{1}{2}$ of a fraction!

Example problem types

1. Suppose the pictures show how much pizza is left, and you share it equally with your brother. How much will you get? Write a multiplication sentence:



Connection:

- $\frac{1}{2}$ of a number is the same as dividing the number by 2!

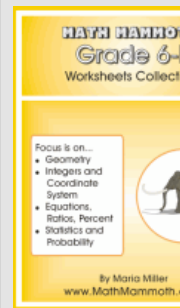
$\frac{1}{2} \times 30 =$	and $30 \div 2 =$	$\frac{1}{2} \times \frac{1}{5} =$	and $\frac{1}{5} \div 2 =$
$\frac{1}{2} \times \frac{1}{7} =$	and $\frac{1}{7} \div 2 =$	$\frac{1}{2} \times \frac{1}{10} =$	and $\frac{1}{10} \div 2 =$

- $\frac{1}{3}$ of a number is the same as dividing the number by 3!

$\frac{1}{3} \times 30 =$	and $30 \div 3 =$	$\frac{1}{3} \times \frac{1}{2} =$	and $\frac{1}{2} \div 3 =$
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- $\frac{1}{4}$ of a number is the same as dividing the number by 4!

$\frac{1}{4} \times 28 =$	and $28 \div 4 =$	$\frac{1}{4} \times \frac{1}{2} =$	and $\frac{1}{2} \div 4 =$
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Remember? How to find $\frac{3}{4}$ of 16, or in other words $\frac{3}{4} \times 16$? You can think:

- $\frac{1}{4}$ of 16 is 4, so $\frac{3}{4}$ of 16 is 3 times as much. Therefore $\frac{3}{4}$ of 16 is $3 \times 4 = 12$.

Multiplying a fraction by a fraction means taking that fractional part of the fraction. It is just like taking certain part of the leftovers when leftovers is already a fraction.

2. Suppose the pictures show how much pizza is left, and you get a certain part of the leftovers.

How much will you get? Write a multiplication sentence. Color in an answer picture.

Can you see how the multiplication means taking that fractional part of the fraction?

It is just like taking certain part of the leftovers when leftovers is already a fraction.

<p>a. $\frac{3}{4} \times \frac{1}{2} = \frac{3}{8}$</p> <p>First find $\frac{1}{4}$ of it, then multiply that by 3.</p> <p>$\frac{1}{4} \times \frac{1}{2} = \frac{1}{8}$, $\frac{1}{8} \times 3 = \frac{3}{8}$</p>	<p>b. $\frac{2}{3} \times \frac{1}{2} = \frac{1}{3}$</p> <p>First find $\frac{1}{3}$ of it, then multiply that by 2.</p>
<p>c. $\frac{3}{4} \times \frac{1}{4} = \frac{3}{16}$</p> <p>First find $\frac{1}{4}$ of it, then multiply that by 3.</p>	<p>d. $\frac{2}{3} \times \frac{1}{3} = \frac{2}{9}$</p> <p>First find $\frac{1}{3}$ of it, then multiply that by 2.</p>

The rule for multiplying fractions is very easy:

Multiply the numerators and the denominators separately.

- For example:
- $\frac{5}{8} \times \frac{3}{4} = \frac{5 \times 3}{8 \times 4} = \frac{15}{32}$
 - $\frac{3}{7} \times \frac{4}{9} = \frac{3 \times 4}{7 \times 9} = \frac{12}{63} = \frac{4}{21}$

3. Go back to exercise 2, and do the problems a-f using the rule. Compare the results.

The following discussion justifies the rule by using an example.

I want to find $\frac{3}{4} \times \frac{5}{7}$, or if there is $\frac{5}{7}$ of a pie left, how much is three fourths of that. You can think:

- I can first find $\frac{1}{4}$ of the $\frac{5}{7}$, or $\frac{1}{4} \times \frac{5}{7}$, and take that 3 times.
 - $\frac{1}{4} \times \frac{5}{7}$ is the same as $\frac{5}{7} \times \frac{1}{4}$, and that I can find $\frac{1}{7} \times \frac{1}{4}$ and taking that 5 times.
 - $\frac{1}{7} \times \frac{1}{4} = \frac{1}{28}$. Taking that 5 times is $5 \times \frac{1}{28} = \frac{5}{28}$.

7 4 28

28 28

• Taking previous result 3 times is $3 \times \frac{5}{28} = \frac{3 \times 5}{28} = \frac{15}{28}$.

So the result is the same as if I had multiplied the numerators and the denominators separately.

The same thinking process works with other fractions, too.

4. Multiply. Remember to always give your answer in lowest terms (simplified) and as a mixed number, if possible.

a. $\frac{3}{9} \times \frac{2}{9}$

b. $\frac{11}{12} \times \frac{1}{6}$

c. $8 \times \frac{3}{13}$

d. $9 \times \frac{2}{3}$

e. $\frac{2}{9} \times 8$

5. Mary wants to make half of this recipe. How much does she need of each ingredient?

Brownies

3 cups sweetened carob chips
8 tablespoons Extra virgin olive oil
2 eggs
1/2 cup honey
1 teaspoon vanilla
3/4 cup whole wheat flour
3/4 teaspoon baking powder
1 cup walnuts or other nuts

PUZZLE CORNER

Find the missing factor.

$$\times \frac{6}{7} = \frac{1}{7}$$

$$\times \frac{1}{4} = \frac{5}{16}$$

$$\times \frac{3}{8} = \frac{1}{16}$$

$$\times \frac{2}{5} = \frac{3}{10}$$

Multiplication as an area

The ideas in this fraction lesson are taken from the [Fractions 2 ebook](#). Only a few examples of each problem type are shown; you should make more problems of each kind for the student.

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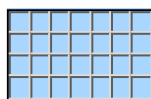


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Multiplication and area (and some review)

Free fraction lesson plan from HomeschoolMath.net

If you have studied geometry, you know the area of a rectangle is found by multiplying the side by the other side. For example, this rectangle has 28 little squares as its area, and its one side is 4 and the other side is 7.



We can apply that idea to fractions, too, but it is a little different in the sense that now think of the whole side of the rectangle as being 1 whole, the other side also is 1 whole, and the whole rectangle also illustrates 1 whole in terms of area. The fractions being multiplied represent **length of the sides**, whereas the result fraction represents **area**.

← 1 whole →

← 1/2 →

↑ 2/3 ↓

2/6 = 1/3 of the area is colored

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

length of one side length of other side AREA compared to total area

Example problem types

1. The pictures show a fractional area. Write down the multiplication sentence that goes with the pictures.

a.

b.

c.

d.

2. Multiply the fractions, and draw a picture as in the previous exercise to illustrate the multiplication sentences.

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a. $\frac{1}{4} \times \frac{1}{2}$ b. $\frac{1}{2} \times \frac{1}{6}$ c. $\frac{1}{3} \times \frac{2}{5}$ d. $\frac{2}{7} \times \frac{3}{4}$

Multiplying mixed numbers

3. Multiply the mixed numbers by first changing them to fractions, and then multiplying. In the end give the result in lowest terms and as a mixed number, if possible.

a. $2\frac{1}{4} \times 1\frac{1}{2}$ b. $10\frac{1}{3} \times 2\frac{1}{2}$ c. $5\frac{1}{5} \times 1\frac{1}{6}$ d. $4\frac{1}{9} \times 3\frac{1}{5}$

4. Still remember how fractions or mixed numbers are added?

a. $2\frac{1}{4} + 1\frac{1}{2}$ b. $10\frac{2}{3} + 2\frac{1}{5}$ c. $3\frac{4}{5} + 1\frac{1}{6}$ d. $4\frac{7}{9} + 3\frac{2}{5}$

5. a) A photo frame needs to go $\frac{3}{4}$ inch over the size of the photo on each side. Mary's photo is $5\frac{1}{2}$ inches high and $7\frac{3}{4}$ inches wide. How wide and how high is the frame? Draw a picture of the situation.

b) Now the photo is enlarged so that it is double high and double wide. How high and wide is the photo? What about a new frame?

[Simplifying before multiplying](#)

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Multiply the following fractions by writing the product of the numerators over the product of the denominators and then simplifying.

Ex.) $\frac{3}{4} \cdot \frac{2}{5}$

1) $\frac{2}{3} \cdot \frac{1}{8}$

Multiply top & bottom separately:

$$\frac{3}{4} \cdot \frac{2}{5} = \frac{3 \cdot 2}{4 \cdot 5} = \frac{6}{20}$$

Now, simplify:

$$\frac{6}{20} = \frac{2 \cdot 3}{2 \cdot 2 \cdot 5} = \frac{3}{2 \cdot 5} = \frac{3}{10}$$

2) $\frac{6}{7} \cdot \frac{2}{3}$

3) $\frac{1}{4} \cdot \frac{2}{5}$

4) $\frac{8}{9} \cdot \frac{3}{12}$

5) $\frac{6}{10} \cdot \frac{5}{12}$

6) $\frac{10}{12} \cdot \frac{4}{10}$

7) $\frac{7}{8} \cdot \frac{12}{14}$