Objectives:
- Students will memorize the multiplication table, as evidenced by them passing "minute quizzes."
- Students will convert mixed numbers to improper fractions, as evidenced by them completing a warm-up worksheet where they do so.
- Students will multiply fractions by whole numbers, as evidenced by them completing a homework assignment where they do so.
- Students will multiply mixed numbers by converting them to improper fractions and then multiplying, as evidenced by them completing a homework assignment where they do so.

Student Materials on Desk Corner:
- Homework #2-11
- Homework Checker
- Readiness Checker

Student Materials for Class:
- Homework Log
- Binder Paper
- Pencils

Teacher Materials:
- "Warm-up 2-12" for each student
- "Minute Quiz 2-12" for each student
- "Homework #2-11" answer key and grading roster for TA
- "Homework #2-12" handout for each student

Homework:
- Homework #2-12

Time	Activity
Before Bell	**DO NOW** 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.
5 min	**MINUTE QUIZ, HOMEWORK COLLECTION, AND WARM-UP** **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. **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. **Warm-up** After the minute quiz, students should work on the **warm-up** while you take **attendance**.
35 min	**LESSON: MULTIPLYING SPECIAL FRACTIONS** **Notes** Follow the handwritten Cornell Notes. **Homework** Pass out the ""Homework #2-12" handout and have students write down the assignment on their homework logs.
40 min	**ALEKS** Students should continue with **ALEKS**. Use this student work time to **return graded homework**.

Name:
Date: Period:

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

1 • 8 =	1 • 5 =	4 • 5 =
2 • 9 =	12 • 7 =	2 • 11 =
1 • 3 =	9 • 12 =	1 • 12 =
10 • 8 =	6 • 9 =	2 • 7 =

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

8 • 12 =	9 • 7 =	9 • 3 =
5 • 8 =	6 • 5 =	7 • 8 =
12 • 6 =	7 • 4 =	6 • 3 =
5 • 9 =	1 • 6 =	8 • 9 =

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

12 • 6 =   9 • 6 =   10 • 5 =

10 • 6 =   8 • 8 =   6 • 9 =

12 • 2 =   12 • 6 =   8 • 5 =

6 • 10 =   6 • 11 =   3 • 1 =

Convert the following mixed numbers into improper fractions.

Ex.) $2\dfrac{3}{4}$

1) $3\dfrac{6}{7}$

2) $1\dfrac{1}{2}$

$$2\frac{3}{4} = \frac{2\cdot 4 + 3}{4} = \frac{8 + 3}{4} = \frac{11}{4}$$

3) $6\dfrac{7}{10}$

4) $2\dfrac{4}{5}$

5) $4\dfrac{2}{6}$

Multiplying Special Fractions

Section→ _Multiplying Fractions by Whole Numbers_

Recall to multiply two fractions, we write the product of the numerators

over the product of the denominators, then simplify.

But, what about $\frac{2}{3} \cdot 4$?

↳ what's the numerator and denominator
of a whole number?

Well, 4 looks like

◯ ◯ ◯ ◯

So, each pizza has one giant slice.

Then, $4 = \frac{4}{1}$.

↖ one slice in
a pizza

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

Finally, simplify:

$3 \overline{)8} \atop \underline{-6} \atop 2$ $^{2}$ $\Rightarrow \frac{8}{3} = \boxed{2\frac{2}{3}}$

Ex: Evaluate $6 \cdot \frac{3}{4}$.

$6 \cdot \frac{3}{4} = \frac{6}{1} \cdot \frac{3}{4} = \frac{6 \cdot 3}{1 \cdot 4} = \frac{18}{4}$

Now, simplify:

$4 \overline{)18} \atop \underline{-16} \atop 2$ $^{4}$ $\Rightarrow \frac{18}{4} = 4\frac{2}{4}$

↳ this can be simplified: $\frac{2}{4} = \frac{2}{2 \cdot 2} = \frac{1}{2}$

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

Multiplying Mixed Numbers

To multiply mixed numbers, we write them as improper fractions
and then multiply like we normally would.

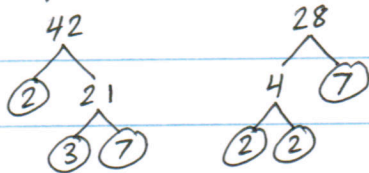Ex: $\frac{2}{7} \cdot 5\frac{1}{4} = ?$

$\underset{\text{convert to improper fraction}}{\underbrace{\phantom{5\frac{1}{4}}}}$

$$5\frac{1}{4} = \frac{5 \cdot 4 + 1}{4} = \frac{20 + 1}{4} = \frac{21}{4}$$

$$\frac{2}{7} \cdot \frac{21}{4} = \frac{42}{28}$$

Now, simplify:

42
⟋⟍
② 21
    ⟋⟍
   ③⑦

28
⟋⟍
4 ⑦
⟋⟍
②②

$42 = 2 \cdot 3 \cdot 7$ $28 = 2 \cdot 2 \cdot 7$

$$\frac{42}{28} = \frac{2 \cdot 3 \cdot 7}{2 \cdot 2 \cdot 7} = \frac{3}{2}$$

↑
improper fraction
turn into mixed number

$$2\overline{)3} \atop \underline{-2} \atop 1 \quad \Rightarrow \quad \frac{3}{2} = \boxed{1\frac{1}{2}}$$

Ex: $1\frac{1}{2} \cdot 1\frac{5}{9} = ?$

$\llcorner\!\!\to 1\frac{5}{9} = \frac{1 \cdot 9 + 5}{9} = \frac{9 + 5}{9} = \frac{14}{9}$

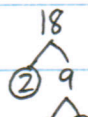$\llcorner\!\!\to 1\frac{1}{2} = \frac{1 \cdot 2 + 1}{2} = \frac{2 + 1}{2} = \frac{3}{2}$

$$\frac{3}{2} \cdot \frac{14}{9} = \frac{3 \cdot 14}{2 \cdot 9} = \frac{42}{18}$$

Now, simplify:

$42 = 2 \cdot 3 \cdot 7$
(from last example)

18
⟋⟍
② 9
   ⟋⟍

$$18 = 2 \cdot 3 \cdot 3$$

$$\frac{42}{18} = \frac{2 \cdot 3 \cdot 7}{2 \cdot 3 \cdot 3} = \frac{7}{3}$$

↙ turn into mixed number

$$3\overline{)7} \quad \Rightarrow \quad \frac{7}{3} = \boxed{2\frac{1}{3}}$$
$$\begin{array}{r} 2 \\ 3\overline{)7} \\ \underline{-6} \\ 1 \end{array}$$

The ideas in this fraction lesson are taken from the ebooks that are sold on this website. Only a few examples of each problem type are shown; you should make more problems of each kind for the student.

Multiplying fractions by a whole number
Free fraction lesson plan from HomeschoolMath.net

Color first $\dfrac{1}{6}$. Color another $\dfrac{1}{6}$. Continue till you have colored seven times $\dfrac{1}{6}$.

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

Color first $\dfrac{2}{5}$. Color another $\dfrac{2}{5}$. Continue till you have colored four times $\dfrac{2}{5}$.

$4 \times \dfrac{2}{5} =$

We know that multiplication by a whole number is **repeated addition**:

$$5 \times 4 = 4 + 4 + 4 + 4 + 4 = 20$$

$$3 \times 120 = 120 + 120 + 120 = 360$$

Multiplying a fraction by a whole number works exactly the same:

$$3 \times \dfrac{1}{4} = \dfrac{1}{4} + \dfrac{1}{4} + \dfrac{1}{4} = \text{---}$$

$$3 \times \dfrac{2}{9} = \dfrac{2}{9} + \dfrac{2}{9} + \dfrac{2}{9} = \text{---} = \text{---}$$

(simplify the answer)

Example problem types

1. Write the multiplication problems as addition problems and solve. Give your answer as a mixed number and simplify the fractional parts to lowest terms whenever possible.

$5 \times \dfrac{1}{4} =$ 　　　　　　 $2 \times \dfrac{2}{3} =$

$4 \times \dfrac{2}{7} =$ 　　　　　　 $5 \times \dfrac{2}{10} =$

2. Do as above, but do the work in your notebook. Can you notice a SHORTCUT to the problems where you don't have to write them as addition?
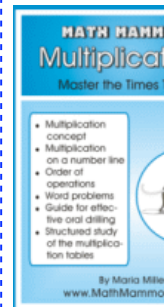
a. $3 \times \dfrac{2}{9}$ 　　 c. $5 \times \dfrac{1}{6}$ 　　 e. $8 \times \dfrac{1}{9}$ 　　 g. $4 \times \dfrac{5}{7}$ 　　 i. $6 \times \dfrac{7}{10}$

The shortcut is (explain)

_____

_____

Remember?

To find $\dfrac{1}{2}$ of a number you need to _____

To find $\dfrac{1}{3}$ of a number you need to _____

To find $\dfrac{1}{4}$ of a number you need to _____

A fraction of a number is the same as **that fraction TIMES the number.** In other words, the word **'of'** translates into multiplication. For example:
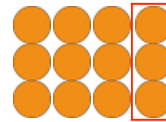
$$\dfrac{1}{2} \text{ of } 24 = \dfrac{1}{2} \times 24 = 12 \qquad\qquad \dfrac{1}{7} \text{ of } 35 = \dfrac{1}{7} \times 35 = 5$$

- Remember you can use division when finding 1/2, 1/3, 1/4, 1/5, etc. of a number!

We know one can do multiplication both ways, or the order doesn't matter. In other words, **multiplication is _commutative_**. See the examples:
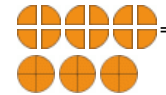
$\dfrac{1}{4} \times 12$ means **a fourth part of 12** (objects),

which is 12 ÷ 4 = 3.

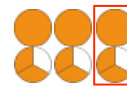$12 \times \dfrac{1}{4}$ means **12 times 1/4**,

which is 3 wholes.

In other words, fourth part of 12 is the same as 12 fourth parts.

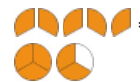$\dfrac{1}{3} \times 5$ means **a third part of 5** (objects),

which is 5 ÷ 3 = 1 2/3.

$5 \times \dfrac{1}{3}$ means **5 times 1/3**,

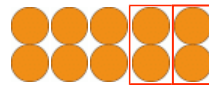which is 5/3 = 1 2/3.

In other words, _____ part of 5 is the same as ___ _____ parts.

$\dfrac{2}{5} \times 10$ means **two-fifth parts of 10**,

which is (10 ÷ 5) × 2 = 4.

$10 \times \dfrac{2}{5}$ means **10 times 2/5**,

which is 4 wholes.

In other words, _____ part of 10 is the same as ____ _____ parts.

The usual way of writing these is

$$\frac{1}{4} \times 12 = \frac{1 \times 12}{4} = \frac{12}{4} = 3 \qquad \textit{compare with} \qquad 12 \times \frac{1}{4} = \frac{12 \times 1}{4} = \frac{12}{4} = 3$$

$$\frac{1}{3} \times 5 = \frac{1 \times 5}{3} = \frac{5}{3} = 1\frac{2}{3} \qquad \textit{compare with} \qquad 5 \times \frac{1}{3} = \frac{5 \times 1}{3} = \frac{5}{3} = 1\frac{2}{3}$$

$$\frac{2}{5} \times 10 = \frac{2 \times 10}{5} = \frac{20}{5} = 4 \qquad \textit{compare with} \qquad 10 \times \frac{2}{5} = \frac{10 \times 2}{5} = \frac{20}{5} = 4$$

3. Multiply.

a. $5 \times \dfrac{7}{9}$ b. $10 \times \dfrac{5}{12}$ c. $\dfrac{4}{9} \times 7$ d. $\dfrac{14}{25} \times 3$ e. $16 \times \dfrac{1}{12}$

4. This morning one of the kids is sick, so Mom only wants to make 2/3 of the recipe. How much does she need of each ingredient? (*dl* stands for *deciliter*)

Pancakes

4 dl water
2 eggs
3 dl whole wheat flour
(pinch of salt)
50 g butter for frying

5. For a coming get-together, Alison needs to multiply the coffee recipe. Assume that half of the guests drink one serving, and the other half drink two servings. Find how much **coffee** she needs, if she has
a) 30 guests b) 50 guests   c) 80 guests.

Coffee (5 servings)

3 1/2 cups water
1/4 cup coffee

Next lesson: Multiplying fractions, part 2

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.

Subscribe for free

Find the product of the following fractions and whole numbers by converting the whole numbers into fractions, multiplying, and simplifying.

Ex.) $\dfrac{3}{4} \cdot 5$

1) $2 \cdot \dfrac{3}{4}$

Convert the whole number into a fraction and multiply:

$$\dfrac{3}{4} \cdot 5 = \dfrac{3}{4} \cdot \dfrac{5}{1} = \dfrac{3 \cdot 5}{4 \cdot 1} = \dfrac{15}{4}$$

Now, simplify:

$$4{\overline{\smash{\big)}\,15}} \Rightarrow \dfrac{15}{4} = 3\dfrac{2}{4} = 3\dfrac{2}{2 \cdot 2} = 3\dfrac{1}{2}$$
$$\underline{-12}$$
$$\ 3$$

2) $5 \cdot \dfrac{2}{15}$

3) $\dfrac{3}{24} \cdot 7$

4) $\dfrac{5}{10} \cdot 4$

5) $\dfrac{3}{25} \cdot 8$

more on back

Multiply the following mixed numbers by converting them to improper fractions, multiplying the numerators and denominators separately, and simplifying.

Ex.) $1\dfrac{1}{2} \cdot 3\dfrac{2}{5}$

6) $2\dfrac{1}{4} \cdot 4\dfrac{2}{3}$

Convert the mixed numbers into improper fractions and multiply:

$$1\dfrac{1}{2} \cdot 3\dfrac{2}{5} = \dfrac{1 \cdot 2 + 1}{2} \cdot \dfrac{3 \cdot 5 + 2}{5}$$

$$= \dfrac{2 + 1}{2} \cdot \dfrac{15 + 2}{5} = \dfrac{3}{2} \cdot \dfrac{17}{5} = \dfrac{51}{10}$$

Now, simplify:

$$10\overline{)\,51} \Rightarrow \dfrac{51}{10} = 5\dfrac{1}{10}$$
$$\underline{-50}$$
$$\quad 1$$

7) $\dfrac{6}{7} \cdot 4\dfrac{1}{5}$

8) $3\dfrac{1}{4} \cdot \dfrac{2}{5}$

9) $3\dfrac{1}{3} \cdot 4\dfrac{1}{2}$

10) $1\dfrac{1}{4} \cdot 2\dfrac{4}{5}$