Learning Objective: Students will be able to use a formal rule to multiply decimals.

Warm Up

1. $\dfrac{3}{4} - \dfrac{4}{13}$

5. $\dfrac{2}{5} - \dfrac{1}{4}$

9. $\dfrac{9}{10} - \dfrac{4}{9}$

2. $\dfrac{5}{14} - \dfrac{1}{3}$

6. $\dfrac{7}{10} - \dfrac{2}{9}$

10. $\dfrac{1}{3} - \dfrac{1}{5}$

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Warm Up Answers

1. $\dfrac{3}{4} - \dfrac{4}{13}$

$= \dfrac{23}{52}$

5. $\dfrac{2}{5} - \dfrac{1}{4}$

$= \dfrac{3}{20}$

9. $\dfrac{9}{10} - \dfrac{4}{9}$

$= \dfrac{41}{90}$

2. $\dfrac{5}{14} - \dfrac{1}{3}$

$= \dfrac{1}{42}$

6. $\dfrac{7}{10} - \dfrac{2}{9}$

$= \dfrac{43}{90}$

10. $\dfrac{1}{3} - \dfrac{1}{5}$

$= \dfrac{2}{15}$

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Homework Answers

2.4 Record and Practice Journal

Add.

1. $3.02 + 1.67$
4.69

2. $1.4 + 8.68$
10.08

3. $11.514 + 4.29$
15.804

4. $15.71 + 12.643$
28.353

5. $9.562 + 21.764$
31.326

6. $15.602 + 2.47$
18.072

Subtract.

7. $2.64 - 1.52$
1.12

8. $4.023 - 3.146$
0.877

9. $7.87 - 5.152$
2.718

10. $16.045 - 12.63$
3.415

11. $17.1 - 11.457$
5.643

12. $5.18 - 2.487$
2.693

13. You buy a movie for $19.99 and a set of earphones for $12.49. How much is the bill before taxes?
$32.48

Learning Objective: Students will be able to use a formal rule to multiply decimals.

Lesson 2.5   October 25, 2016

Essential Question:

How can you multiply decimals?

Lesson 2.5   October 24, 2016

Lesson Objective:

Students will be able to:

use a formal rule to multiply decimals.

Self-Evaluation Scale

Score	Description
4	I can teach other students how to use a formal rule to multiply decimals.
3	I can use a formal rule to multiply decimals.
2	I recognize, but still need help to use a formal rule to multiply decimals.
1	I do not know how to use a formal rule to multiply decimals.

Learning Objective: Students will be able to use a formal rule to multiply decimals.

Key Idea

Multiplying Decimals by Whole Numbers

Words   Multiply as you would with whole numbers. Then count the number of decimal places in the decimal factor. The product has the same number of decimal places.

Numbers

$$13.91$$
$$\underline{\times \quad 7}$$
$$97.37$$

> 2 decimal places

$$6.218$$
$$\underline{\times \quad 4}$$
$$24.872$$

> 3 decimal places

Learning Objective: Students will be able to use a formal rule to multiply decimals.

1 Multiplying Decimals and Whole Numbers

a. Find 6×3.91.

Estimate $6 \times 4 = 24$

$$
\begin{array}{r}
5 \\
3.91 \\
\times \quad 6 \\
\hline
23.46
\end{array}
$$

3.91 ← 2 decimal places

23.46 ← Count 2 decimal places from right to left.

So, $6 \times 3.91 = 23.46$.

Reasonable? $23.46 \approx 24$ ✓

b. Find 3×0.016.

Estimate $3 \times 0 = 0$

$$
\begin{array}{r}
1 \\
0.016 \\
\times \quad 3 \\
\hline
0.048
\end{array}
$$

0.016 ← 3 decimal places

0.048 ← To have 3 decimal places, insert zeros to the left of 48.

So, $3 \times 0.016 = 0.048$.

Reasonable? $0.048 \approx 0$ ✓

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Learning Objective: Students will be able to use a formal rule to multiply decimals.

2 **Use Mental Math**

How high is a stack of 100 dimes?

1.35 millimeters

Method 1: Multiply 1.35 by 100.

$$
\begin{array}{r}
1.35 \\
\times\ 1\ 00 \\
\hline
0\ 00 \\
00\ 0 \\
135\ \ \ \\
\hline
135.00
\end{array}
$$

2 decimal places

Method 2: You are multiplying by a power of 10. Use mental math.

There are **two** zeros in 100. So, move the decimal point in 1.35 **two** places to the right.

$1.35 \times 100 = 135. = 135$

∴ So, a stack of 100 dimes is 135 millimeters high.

Learning Objective: Students will be able to use a formal rule to multiply decimals.

Key Idea

Multiplying Decimals by Decimals

Words   Multiply as you would with whole numbers. Then add the number of decimal places in the factors. The sum is the number of decimal places in the product.

Numbers

$$
\begin{array}{r}
4.716 \quad \longleftarrow \quad \text{3 decimal places} \\
\times \quad 0.2 \quad \longleftarrow \quad \underline{+ \text{ 1 decimal place}} \\
\hline
0.9432 \quad \longleftarrow \quad \text{4 decimal places}
\end{array}
$$

Learning Objective: Students will be able to use a formal rule to multiply decimals.

3 Multiplying Decimals

a. Multiply 4.8 × 7.2.   **Estimate 5 × 7 = 35**

$$
\begin{array}{r}
4.8 \quad \longleftarrow \quad \text{1 decimal place} \\
\times\, 7.2 \quad \longleftarrow \quad \underline{+\ \text{1 decimal place}} \\
\hline
9\,6 \\
3\,3\,6 \\
\hline
3\,4.5\,6 \quad \longleftarrow \quad \text{2 decimal places}
\end{array}
$$

So, 4.8 × 7.2 = 34.56.   **Reasonable? 34.56 ≈ 35** ✓

b. Multiply 3.1 × 0.05.   **Estimate 3 × 0 = 0**

$$
\begin{array}{r}
3.1 \quad \longleftarrow \quad \text{1 decimal place} \\
\times\, 0.0\,5 \quad \longleftarrow \quad \underline{+\ \text{2 decimal places}} \\
\hline
0.1\,5\,5 \quad \longleftarrow \quad \text{3 decimal places}
\end{array}
$$

So, 3.1 × 0.05 = 0.155.   **Reasonable? 0.155 ≈ 0** ✓

Learning Objective: Students will be able to use a formal rule to multiply decimals.

4 Evaluating an Expression

What is the value of 2.44(4.5 − 3.175)?

(A) 3.233   (B) 3.599   (C) 7.805   (D) 32.33

Step 1: Subtract first because the minus sign is in parentheses.

$$
\begin{array}{r}
\overset{9}{4\,\cancel{10}10} \\
4.\cancel{5}\cancel{0}\cancel{0} \\
-\ 3.1\,7\,5 \\
\hline
1.3\,2\,5
\end{array}
$$

So, 2.44(4.5 − 3.175) = 2.44(1.325).

Step 2: Multiply the result from Step 1 by 2.44.

$$
\begin{array}{r}
1.3\,2\,5 \\
\times\ \ 2.4\,4 \\
\hline
5\,3\,0\,0 \\
5\,3\,0\,0 \\
2\,6\,5\,0 \\
\hline
3.2\,3\,3\,0\,0
\end{array}
$$

The correct answer is (A).

Learning Objective: Students will be able to use a formal rule to multiply decimals.

5 **Real-Life Application**

You buy 2.75 pounds of tomatoes. You hand the cashier a $10 bill. How much change will you receive?

Tomatoes
$1.89/pound

Grapes
$1.99/pound

Bananas
$0.49/pound
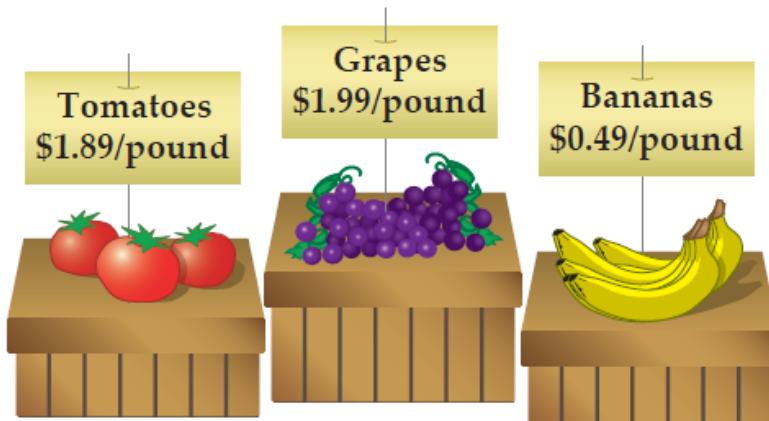
Step 1: Find the cost of the tomatoes.
Multiply 1.89 by 2.75.

$$
\begin{array}{r}
1.8\,9 \quad \longleftarrow \quad \text{2 decimal places} \\
\times\,2.7\,5 \quad \longleftarrow \quad +\text{2 decimal places} \\
\hline
9\,4\,5 \\
1\,3\,2\,3 \\
3\,7\,8 \\
\hline
5.1\,9\,7\,5 \quad \longleftarrow \quad \text{4 decimal places}
\end{array}
$$

The cost of 2.75 pounds of tomatoes is $5.20.

Step 2: Subtract the cost of the tomatoes from the amount of money you hand the cashier.

$$10.00 - 5.20 = \$4.80$$

∴ So, you will receive $4.80 in change.

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Learning Objective: Students will be able to use a formal rule to multiply decimals.

Assignment

Complete problems:

14, 16, 32, 36, 42, 44, 48, 56, 59, & 69

on pages 89 - 91 in your Big Ideas Text Book.

Learning Objective: Students will be able to use a formal rule to multiply decimals.

Lesson 2.5   October 24, 2016

Essential Question:

How can you multiply decimals?

Lesson 2.5   October 24, 2016

Lesson Objective:

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use a formal rule to multiply decimals.

Self-Evaluation Scale

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Homework

In your Big Ideas Record and Practice Journal page 50.