

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

Warm Up

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

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

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

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

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

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

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Warm Up Answers

$$1. \frac{3}{4} - \frac{4}{13} \\ = \frac{23}{52}$$

$$5. \frac{2}{5} - \frac{1}{4} \\ = \frac{3}{20}$$

$$9. \frac{9}{10} - \frac{4}{9} \\ = \frac{41}{90}$$

$$2. \frac{5}{14} - \frac{1}{3} \\ = \frac{1}{42}$$

$$6. \frac{7}{10} - \frac{2}{9} \\ = \frac{43}{90}$$

$$10. \frac{1}{3} - \frac{1}{5} \\ = \frac{2}{15}$$

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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

Lesson 2.5

October 17, 2014

Essential Question:

How can you multiply decimals?

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.
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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

$$\begin{array}{r} 13.91 \\ \times 7 \\ \hline 97.37 \end{array}$$

2 decimal places

$$\begin{array}{r} 6.218 \\ \times 4 \\ \hline 24.872 \end{array}$$

3 decimal places

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1 Multiplying Decimals and Whole Numbers

a. Find 6×3.91 .

Estimate $6 \times 4 = 24$

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

← 2 decimal places

← 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 $3 \times 0 = 0$

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

← 3 decimal places

← 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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$$.32 \times 100$$

2 Use Mental Math

How high is a stack of 100 dimes?

Method 1: Multiply 1.35 by 100.

$$\begin{array}{r} 1.35 \\ \times 100 \\ \hline 000 \\ 000 \\ \hline 135 \\ \hline 135.00 \end{array}$$

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.



$$10^1 = 10$$
$$10^2 = 100$$

$$\begin{array}{r} 35 \\ 3.50 \end{array}$$

$$\begin{array}{r} 35.31 \\ + 7.00 \\ \hline 10 \\ 10 \end{array}$$

$$\begin{array}{r} 120 \\ +24 \\ \hline \end{array}$$

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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

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

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3 Multiplying Decimals

a. Multiply 4.8×7.2 .

Estimate $5 \times 7 = 35$

$$\begin{array}{r}
 4.8 \quad \leftarrow \quad 1 \text{ decimal place} \\
 \times 7.2 \quad \leftarrow \quad + 1 \text{ decimal place} \\
 \hline
 96 \\
 336 \\
 \hline
 34.56 \quad \leftarrow \quad 2 \text{ decimal places}
 \end{array}$$

• So, $4.8 \times 7.2 = 34.56$. **Reasonable?** $34.56 \approx 35$ ✓

b. Multiply 3.1×0.05 .

Estimate $3 \times 0 = 0$

$$\begin{array}{r}
 3.1 \quad \leftarrow \quad 1 \text{ decimal place} \\
 \times 0.05 \quad \leftarrow \quad + 2 \text{ decimal places} \\
 \hline
 0.155 \quad \leftarrow \quad 3 \text{ decimal places}
 \end{array}$$

• So, $3.1 \times 0.05 = 0.155$. **Reasonable?** $0.155 \approx 0$ ✓

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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.

$$\begin{array}{r} \overset{9}{4} \overset{10}{\cancel{5}} \overset{0}{0} \\ - 3.175 \\ \hline 1.325 \end{array}$$

So, $2.44(4.5 - 3.175) = 2.44(1.325)$.

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

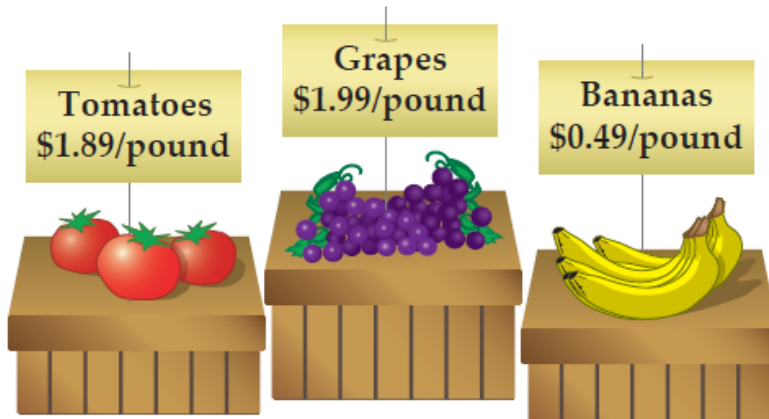
$$\begin{array}{r} 1.325 \\ \times 2.44 \\ \hline 5300 \\ 5300 \\ \underline{2650} \\ 323300 \end{array}$$

❖ The correct answer is (A).

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5 Real-Life Application

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



Step 1: Find the cost of the tomatoes.
Multiply 1.89 by 2.75.

$$\begin{array}{r}
 1.89 \leftarrow 2 \text{ decimal places} \\
 \times 2.75 \leftarrow + 2 \text{ decimal places} \\
 \hline
 945 \\
 1323 \\
 378 \\
 \hline
 5.1975 \leftarrow 4 \text{ decimal places}
 \end{array}$$

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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Assignment

Complete problems:

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

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

$$\begin{array}{r} 0.007 \\ \times 0.03 \\ \hline 0.0021 \end{array}$$

The image shows a handwritten multiplication problem. The numbers 0.007 and 0.03 are written in red ink. A horizontal red line is drawn below the second number. Below the line, the product 0.0021 is written in blue ink. A red wavy underline is drawn under the product, and a red arrow points down from the final digit '1'.

$$3.131 + 4.2$$

$$\begin{array}{r} 4.2 \\ + 3.131 \\ \hline \end{array}$$

$$1.21 \cdot 3.569$$

~~$$\begin{array}{r} 1.21 \\ \times 3.569 \\ \hline \end{array}$$~~

$$\begin{array}{r} 1.21 \\ \times 3.569 \\ \hline \end{array}$$

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Homework

In your Big Ideas Record and Practice Journal
page 50.