Chapter 6, Lesson 6. Pages 411-414.

Multiply Decimals by Powers of Ten

ESSENTIAL QUESTION
How is multiplying and dividing decimals similar to multiplying and dividing whole numbers?

Math in My World

Watch | Tutor

Example 1

Josh will need to make 10 payments of $32.25 to purchase a new skimboard. What is the total cost of the skimboard?

Find $32.25 × 10.

$$\begin{array}{r} 32.25 \\ \times\ 10 \\ \hline 0000 \\ +\ 32250 \\ \hline 322.50 \end{array}$$

The non-zero digits are the same. The decimal point in the product moved one place to the right.

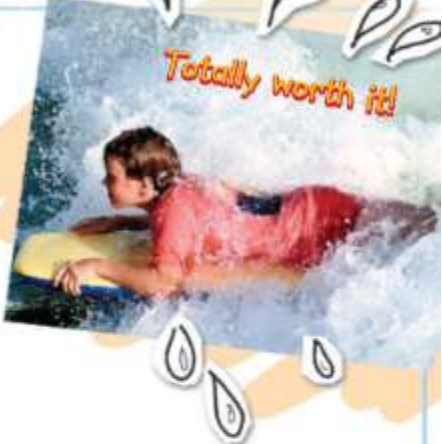Multiplying a decimal by 10 moves the decimal point one place to the right.

$$32.25 \longrightarrow 322.50$$

So, the skimboard costs _____.

Numbers like 10, 100, and 1,000 are powers of ten. They can be written with exponents with a base of ten.

There is 1 zero in 10. The exponent on 10^1 is 1.

There are 2 zeros in 100. The exponent on 10^2 is 2.

There are 3 zeros in 1,000. The exponent on 10^3 is 3.

Power of Ten	Written with Exponent
10	10^1
100	10^2
1,000	10^3

To multiply a decimal by a power of ten, move the decimal point to the right the same number of zeros in the power of ten. This is also the same number as the exponent on 10.

Example 2
Tutor

Find 24.7×10^2.

One Way Multiply.

Since $10^2 = 100$, find 24.7×100.

$$
\begin{array}{r}
24.7 \\
\times\ 100 \\
\hline
000 \\
0000 \\
+\ 24700 \\
\hline
2,470.0
\end{array}
$$

The non-zero digits are the same. The decimal point in the product moved two places to the right.

Another Way Move the decimal point.

Multiplying a decimal by 100 moves the decimal point two places to the right.

Annex a zero.

$24.70 \longrightarrow 2,470$

So, $24.7 \times 10^2 = \underline{\hspace{1cm}}$.

Guided Practice
Check ✓

Multiply.

1. $0.54 \times 10 = \underline{\hspace{1cm}}$

2. $8.32 \times 100 = \underline{\hspace{1cm}}$

3. $7.46 \times 1,000 = \underline{\hspace{1cm}}$

Talk MATH

Explain how you can mentally find the cost of 10 text messages that each cost $0.25.

Independent Practice

4. $1.63 \times 10 =$ _____

5. $0.853 \times 10^3 =$ _____

6. $0.397 \times 10^1 =$ _____

7. $1.76 \times 100 =$ _____

8. $0.78 \times 10^2 =$ _____

9. $76.5 \times 10^3 =$ _____

10. $0.81 \times 10 =$ _____

11. $1.23 \times 10^2 =$ _____

12. $0.48 \times 100 =$ _____

Algebra **Find each unknown.**

13. $0.93 \times 10 = a$

$a =$ _____

14. $22.94 \times 10^2 = n$

$n =$ _____

15. $0.05 \times 1,000 = w$

$w =$ _____

Problem Solving

16. A music store has 10 flutes. Each flute costs $325.50. What is the cost of all 10 flutes?

17. **Make a Plan** One carton of milk costs $0.99. What is the total cost of 10^2 cartons of milk?

18. Titus's and Cam's hourly charges for yard work are shown. Suppose Titus and Cam each worked 10 hours. How much money did they earn together?

Titus	Cam
$8.25	$5.58

19. The length of Jenny's dog is 10 times the length of her hamster. The length of her hamster is 8.4 centimeters. What is the length of her dog?