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# 3.4 Dividing Decimals by Whole Numbers

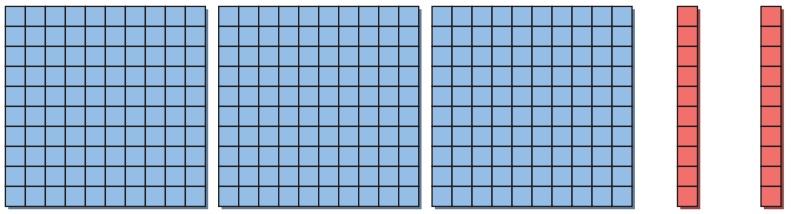
**Essential Question** How is dividing a decimal by a whole number similar to dividing a whole number by a whole number?

## 1 ACTIVITY: Dividing a Decimal by a Whole Number

**Work with a partner. Use base ten blocks to model the division.**

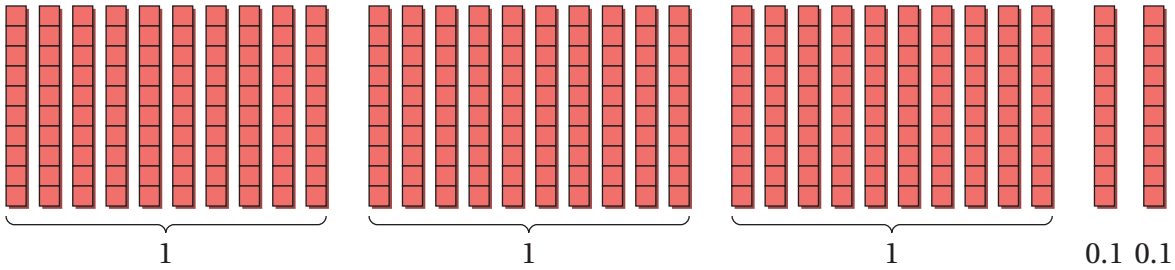
**a. Sample:** $3.2 \div 4$

Begin by modeling 3.2.

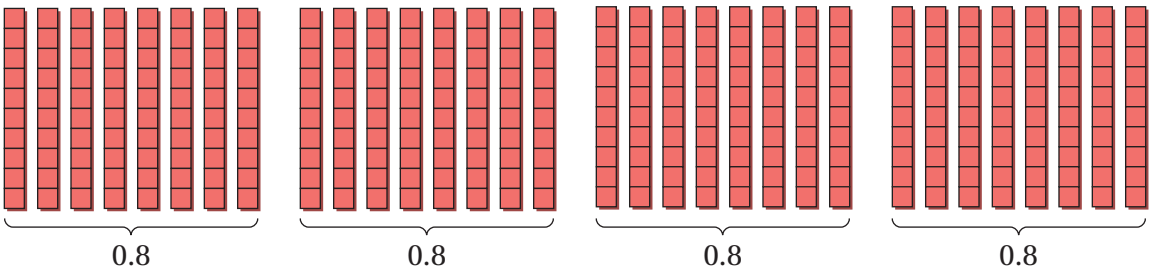


$3.2 = 1 + 1 + 1 + 0.1 + 0.1$

Next, think of the division $3.2 \div 4$ as dividing 3.2 into four parts.
Replace the ones blocks with tenths blocks. You have a total of 32 tenths blocks.




Separate the blocks into four groups.




∴ There are four groups of 0.8. So, $3.2 \div 4 = 0.8$.

**b.** $1.2 \div 3$ **c.** $2.8 \div 4$ **d.** $2.6 \div 2$ **e.** $3.5 \div 5$

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## 2 ACTIVITY: Where Does the Decimal Go?

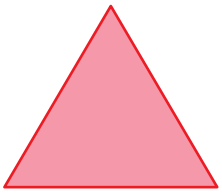
**Work with a partner. Use a pattern to complete each row. Use estimation to check that your answer is reasonable.**

| | | | | |
|---|---|---|---|---|
| **a.** | $1236 \div 3 = 412$ | $123.6 \div 3 = 41.2$ | $12.36 \div 3 =$ | $1.236 \div 3 =$ |
| **b.** | $5120 \div 10 = 512$ | $512.0 \div 10 = 51.2$ | $51.20 \div 10 =$ | $5.120 \div 10 =$ |
| **c.** | $4 \div 2 = 2$ | $0.4 \div 2 = 0.2$ | $0.04 \div 2 =$ | $0.004 \div 2 =$ |
| **d.** | $482.5 \div 1 = 482.5$ | $482.5 \div 10 = 48.25$ | $482.5 \div 100 =$ | $482.5 \div 1000 =$ |
| **e.** | $10 \div 5 = 2$ | $10 \div 50 = 0.2$ | $10 \div 500 =$ | $10 \div 5000 =$ |

## 3 ACTIVITY: Using a Perimeter Formula

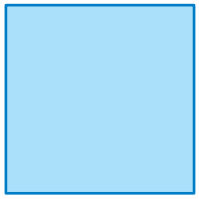
**Work with a partner. Each shape has sides of equal length. Use the perimeter to find the length of the sides. Write the formula and explain how to find the length of the sides.**

**a.**



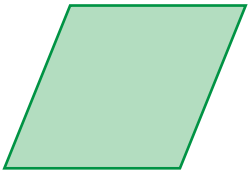
Perimeter = 27.9

**b.**



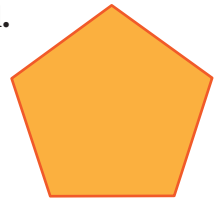
Perimeter = 42.8

**c.**



Perimeter = 36.4

**d.**



Perimeter = 45.5

## What Is Your Answer?

**4.** Which statements describe the division $13.5 \div 5$?

- How can you divide 13.5 into five equal parts?
- What is one-fifth of 13.5?
- How many fives are in 13.5?

**5.** **IN YOUR OWN WORDS** How is dividing a decimal by a whole number similar to dividing a whole number by a whole number? Use the patterns you found in Activity 2 to help write your answer. Give examples with your answer.

**Practice** Use what you learned about dividing decimals by whole numbers to complete Exercises 9–16 on page 130.

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# 3.4 Lesson

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## Key Idea

**Dividing Decimals by Whole Numbers**

**Words** Place the decimal point in the quotient above the decimal point in the dividend. Then divide as you would with whole numbers.

**Numbers**

$$4\overline{)7.32} \quad 1.83$$

Place the decimal point in the quotient above the decimal point in the dividend.

## EXAMPLE 1 Dividing Decimals by Whole Numbers

**a. Find 7.6 ÷ 4.** Estimate $8 \div 4 = 2$

$$\begin{array}{r} 1.9 \\ 4\overline{)7.6} \\ -\,4 \\ \hline 3\,6 \\ -\,3\,6 \\ \hline 0 \end{array}$$

Place the decimal point in the quotient above the decimal point in the dividend.

∴ So, $7.6 \div 4 = 1.9$. Reasonable? $1.9 \approx 2$ ✓

**b. Find 31.75 ÷ 5.** Estimate $30 \div 5 = 6$

$$\begin{array}{r} 6.35 \\ 5\overline{)31.75} \\ -\,30 \\ \hline 1\,7 \\ -\,1\,5 \\ \hline 25 \\ -\,25 \\ \hline 0 \end{array}$$

Place the decimal point in the quotient above the decimal point in the dividend.

∴ So, $31.75 \div 5 = 6.35$. Reasonable? $6.35 \approx 6$ ✓

**Remember**

Another way to check your answer is to multiply the quotient by the divisor. Example 1(b):

$$\begin{array}{r} 6.35 \\ \times\quad 5 \\ \hline 31.75 \end{array}$$ ✓

The product is the dividend.

## On Your Own

**Divide. Use estimation to check your answer.**

1. $36.4 \div 2$
2. $22.2 \div 6$
3. $59.64 \div 7$
4. $43.26 \div 14$

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## EXAMPLE 2 Inserting a Zero in the Dividend

**Find 4.38 ÷ 12.**

$$
\begin{array}{r}
0.365 \\
12\overline{)4.380} \\
-\ 36 \\
\hline
78 \\
-\ 72 \\
\hline
60 \\
-\ 60 \\
\hline
0
\end{array}
$$

Place the decimal point in the quotient above the decimal point in the dividend.

Insert a zero and continue to divide.

∴ So, 4.38 ÷ 12 = 0.365. **Check** $0.365 \times 12 = 4.38$ ✓

### On Your Own

Now You're Ready
Exercises 9–24

**Evaluate the expression.**

**5.** 6.2 ÷ 4

**6.** 34.8 ÷ 8 + 3

**7.** 3.12 ÷ 16

**8.** 1 + 14.14 ÷ 20

## EXAMPLE 3 Real-Life Application

**Which pack of sports drinks is the better buy? Explain.**


To find the better buy, divide each price by the number of bottles. Continue dividing until the quotient can be rounded to the nearest cent.

***6-pack***

$$
\begin{array}{r}
0.991 \\
6\overline{)5.950} \\
-\ 54 \\
\hline
55 \\
-\ 54 \\
\hline
10 \\
-\ 6 \\
\hline
4
\end{array}
$$

Rounds to 0.99.

***8-pack***

$$
\begin{array}{r}
0.968 \\
8\overline{)7.750} \\
-\ 72 \\
\hline
55 \\
-\ 48 \\
\hline
70 \\
-\ 64 \\
\hline
6
\end{array}
$$

Rounds to 0.97.

∴ The price per bottle is \$0.99 for the 6-pack and \$0.97 for the 8-pack. So, the 8-pack is the better buy.

### On Your Own

**9. WHAT IF?** In Example 3, a 12-pack costs \$10.95. Is it the best buy? Explain.

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# 3.4 Exercises

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## Vocabulary and Concept Check

**1. NUMBER SENSE** Which number is the quotient? dividend? divisor?

$$3\overline{)12.9}\quad 4.3$$

**2. NUMBER SENSE** Fix the one that is not correct.

$$4\overline{)24.4}\quad 6.1 \qquad 4\overline{)244}\quad 61 \qquad 4\overline{)2.44}\quad 6.1$$

**Copy the problem and place the decimal point in the correct location.**

**3.** $18.6 \div 4 = 465$

**4.** $6.38 \div 11 = 58$

**5.** $88.27 \div 7 = 1261$

**6.** $19.2 \div 3 = 64$

**7.** $43.254 \div 9 = 4806$

**8.** $3.24 \div 12 = 27$

## Practice and Problem Solving

**Divide. Check your answer.**

**9.** $6\overline{)25.2}$

**10.** $5\overline{)33.5}$

**11.** $7\overline{)3.5}$

**12.** $8\overline{)10.4}$

**13.** $38.7 \div 9$

**14.** $37.6 \div 4$

**15.** $43.4 \div 7$

**16.** $25.6 \div 8$

**17.** $44.64 \div 8$

**18.** $0.294 \div 3$

**19.** $3.6 \div 24$

**20.** $64.26 \div 18$

**21.** $34.64 \div 16$

**22.** $24.2 \div 11$

**23.** $61.299 \div 7$

**24.** $12.25 \div 14$

**ERROR ANALYSIS** **Describe and correct the error in finding the quotient.**

**25.**

$$9\overline{)28.008}\quad 3.922$$
27
100
81
198
198
0

**26.**

$$6\overline{)0.516}\quad 0.86$$
48
36
36
0

**27. TEXT MESSAGING** You send 40 text messages in one month. The total cost is \$4.80. How much does each text message cost?

**28. SUNTAN LOTION** A 5-ounce bottle of suntan lotion costs \$10.29. A 4-ounce bottle costs \$8.49. Which is the better buy? Explain.

**ORDER OF OPERATIONS** **Evaluate the expression.**

**29.** $7.68 + 3.18 \div 12$

**30.** $10.56 \div 3 - 1.9$

**31.** $19.6 \div 7 \times 9$

**32.** $5.5 \times 16.56 \div 9$

**33.** $35.25 \div 5 \div 3$

**34.** $13.41 \times (5.4 \div 9)$

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**35.** **FRUIT PUNCH** Which pack of fruit punch is the best buy? Explain.

**36.** **SALE** You buy three pairs of jeans for $35.95 each and get a fourth pair for free. What is your cost per pair of jeans?

**37.** **SWIMMING** The table shows the top three times in a swimming event at the Summer Olympics. A team consists of four women swimming 100 meters each.

**a.** For each team, suppose the times of all four swimmers were the same. Find how long it took a swimmer from each team to swim 100 meters.

**b.** If each swimmer on the U.S. team swam a quarter second faster, would the U.S. team have won the gold medal? Explain your reasoning.

| Women's 4 × 100 Freestyle Relay | | |
|---|---|---|
| **Medal** | **Country** | **Time (seconds)** |
| Gold | Australia | 215.94 |
| Silver | United States | 216.39 |
| Bronze | Netherlands | 217.59 |

**38.** Analyze You are saving money to buy a new bicycle that costs $155.75. You have $30 and plan to save $5 each week. Your aunt decides to give you an additional $10 each week.

**a.** How many weeks will you have to save until you have enough money to buy the bicycle?

**b.** How many more weeks would you have to save to buy a new bicycle that costs $203.89? Explain how you found your answer.

## Fair Game Review What you learned in previous grades & lessons

**Divide.** SKILLS REVIEW HANDBOOK

**39.** $84 \div 14$ **40.** $102 \div 17$ **41.** $161 \div 23$ **42.** $372 \div 31$

**43.** **MULTIPLE CHOICE** Which is the best estimate of how many $3\frac{3}{4}$-inch pieces of string can be cut from a string that is $32\frac{1}{8}$ inches long? SECTION 2.1

(A) 8 (B) 10 (C) 11 (D) 28