English Spanish

3.4 Dividing Decimals by Whole Numbers

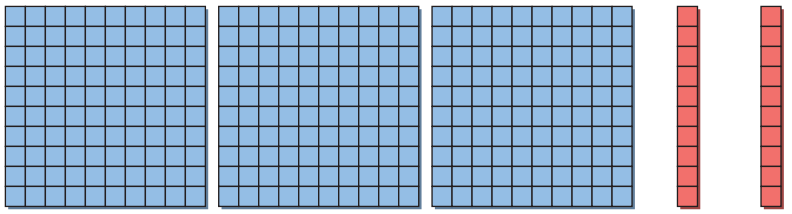
Essential Question How is dividing a decimal by a whole number similar to dividing a whole number by a whole number?

1 ACTIVITY: Dividing a Decimal by a Whole Number

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

a. Sample: $3.2 \div 4$

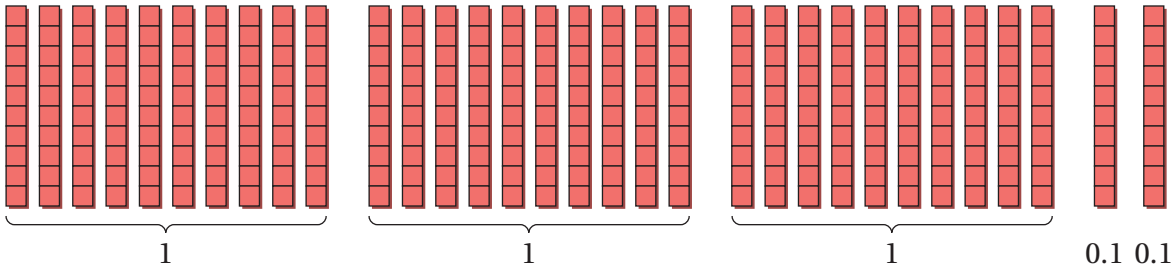
Begin by modeling 3.2.



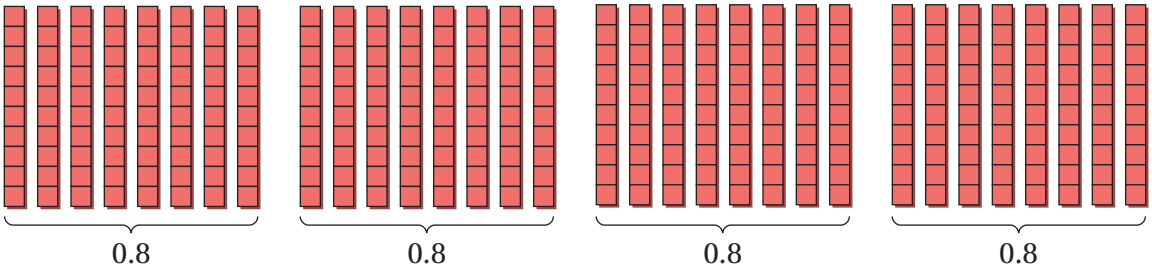
$3.2 = 1 + 1 + 1 + 0.1 + 0.1$

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?

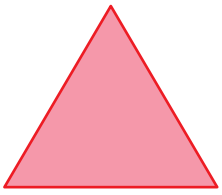
Work with a partner. Use a pattern to complete each row. Use estimation to check that your answer is reasonable.

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

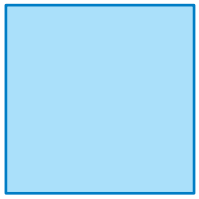
Work with a partner. Each shape has sides of equal length. Use the perimeter to find the length of the sides. Write the formula and explain how to find the length of the sides.

a.



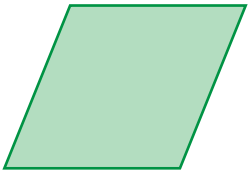
Perimeter = 27.9

b.



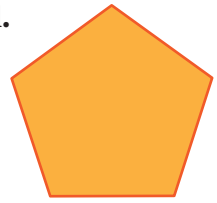
Perimeter = 42.8

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

Check It Out
Lesson Tutorials
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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 $8 \div 4 = 2$

$$4\overline{)7.6} \quad 1.9$$

$$\begin{array}{r} -\ 4 \\ \hline 3\,6 \\ -\ 3\,6 \\ \hline 0 \end{array}$$

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 $30 \div 5 = 6$

$$5\overline{)31.75} \quad 6.35$$

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

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):

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

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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Help with Homework
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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