

2.7 Writing Decimals as Fractions

Essential Question When you write a terminating decimal as a fraction, what type of denominator do you get?

The Meaning of a Word ● Terminate

When you **terminate** a phone call, you end the conversation.

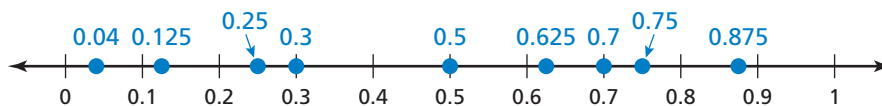


A decimal that ends is called a **terminating decimal**. To convert a terminating decimal to a fraction, express the decimal in words.

0.4	in words →	four tenths	as a fraction →	$\frac{4}{10}$
0.15	in words →	fifteen hundredths	as a fraction →	$\frac{15}{100}$

1 ACTIVITY: Writing Common Decimals as Fractions

Work with a partner. Copy and complete the table.



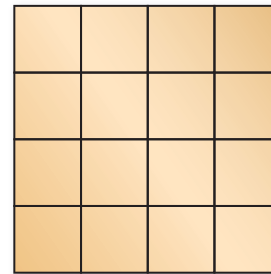
Decimal	Write as a Fraction	Simplify
0.04	Four hundredths = $\frac{4}{100}$	$\frac{4}{100} = \frac{1 \cdot 4}{4 \cdot 25} = \frac{1 \cdot \cancel{4}}{\cancel{4} \cdot 25} = \frac{1}{25}$
0.125	One hundred twenty-five thousandths = $\frac{125}{1000}$	$\frac{125}{1000} = \frac{1 \cdot 125}{8 \cdot 125} = \frac{1 \cdot \cancel{125}}{8 \cdot \cancel{125}} = \frac{1}{8}$
0.25		
0.3		
0.5		
0.625		
0.7		
0.75		
0.875		

2 ACTIVITY: 4 in a Row

Number of Players: 2

Each player

- draws a 4 by 4 square (play card).
- fills the card with decimals or simplified fractions from Activity 1. (Don't show your play card to the other player.)
- takes turns calling out a fraction or decimal.



Both players cross out any number that is equal to the called out number.

The first person to get four numbers in the same row, column, or diagonal wins. Check each other's work.

3 ACTIVITY: Vocabulary Patterns

Work with a partner. Match each word on the left with its description on the right.

Decimal	Originally the 10th month
Deciliter	A number system with base 10
December	Celebration of a 10th anniversary
Decennial	Ten years
Decade	One-tenth of a liter

Inductive Reasoning

- Make a list of all the denominators you found in Activity 1.
 - Factor each denominator into prime factors.
 - What similarities do you see in the denominators?
 - Relate your answer to the decimal system.
- Describe a good strategy you could use to win the game in Activity 2.
- What does the prefix “dec” mean?

What Is Your Answer?

- IN YOUR OWN WORDS** When you write a terminating decimal as a fraction, what type of denominator do you get?

Practice

Use what you learned about writing decimals as fractions to complete Exercises 7–14 on page 88.

Key Vocabulary

 terminating decimal,
p. 84

 Every **terminating decimal** can be written as a fraction.

 Key Idea
Writing Decimals as Fractions
Words Write the digits of the decimal in the numerator. Use the place value of the last digit of the decimal to write the denominator.

Numbers

Write the digit 3 in the numerator.

$0.3 = \frac{3}{10}$

The place value of the last digit is tenths.

EXAMPLE 1 Writing Decimals as Fractions

a. Write 0.28 as a fraction in simplest form.

Write the digits in the numerator.

$$0.28 = \frac{28}{100}$$

 8 is in the **hundredths'** place, so **100** is the denominator.

$$= \frac{\cancel{28}^7}{\cancel{100}^{25}}$$

Divide out the common factor 4.

$$= \frac{7}{25}$$

Simplify.

b. Write 0.475 as a fraction in simplest form.

Write the digits in the numerator.

$$0.475 = \frac{475}{1000}$$

 5 is in the **thousandths'** place, so **1000** is the denominator.

$$= \frac{\cancel{475}^{19}}{\cancel{1000}^{40}}$$

Divide out the common factor 25.

$$= \frac{19}{40}$$

Simplify.

On Your Own

Write the decimal as a fraction in simplest form.

1. 0.9

2. 0.52

3. 0.06

4. 0.135

Now You're Ready
Exercises 7–18

EXAMPLE 2 Writing Decimals as Mixed Numbers

Write 3.025 as a mixed number in simplest form.

$$3.025 = 3 + 0.025$$

Write as a sum.

$$= 3 + \frac{25}{1000}$$

Write "twenty-five thousandths" as a fraction.

$$= 3 + \frac{\cancel{25}^1}{\cancel{1000}_{40}}$$

Simplify fraction.

$$= 3\frac{1}{40}$$

Write as a mixed number.

EXAMPLE 3 Real-Life Application

Two protected bird species are the whooping crane and the piping plover. How many times greater is the weight of a whooping crane than the weight of the piping plover?

Write each weight as a mixed number.



Whooping Crane
246.25 ounces



Piping Plover
 $1\frac{7}{8}$ ounces

Whooping Crane: $246.25 = 246 + 0.25 = 246 + \frac{25}{100} = 246\frac{1}{4}$

Piping Plover: $1\frac{7}{8}$

Divide the weights.

Estimate $246 \div 2 = 123$

$$246\frac{1}{4} \div 1\frac{7}{8} = \frac{985}{4} \div \frac{15}{8}$$

Write as improper fractions.

$$= \frac{985}{4} \times \frac{8}{15}$$

Multiply by the reciprocal $\frac{8}{15}$.

$$= \frac{\cancel{985}^1 \times \cancel{8}^2}{\cancel{4}^1 \times \cancel{15}_3}$$

Divide out common factors.

$$= \frac{394}{3}, \text{ or } 131\frac{1}{3}$$

Simplify.

∴ So, the weight of the whooping crane is $131\frac{1}{3}$ times greater.

Reasonable? $131\frac{1}{3} \approx 123$ ✓

On Your Own

Now You're Ready
Exercises 19–22

Write the decimal as a mixed number in simplest form.

5. 1.7

6. 3.25

7. 6.34

8. 10.76

9. A wood stork weighs 81.9 ounces. How many times greater is the weight of a wood stork than the weight of the piping plover in Example 3?

Vocabulary and Concept Check

- OPEN-ENDED** Find a decimal with a value between 0.25 and 0.5. Write both the decimal and the equivalent fraction.
- OPEN-ENDED** Describe a real-life example where you write a decimal as a mixed number.

Fill in the blank to make the statement true.

3. $6.7 = \square \frac{7}{10}$

4. $2.33 = 2 \frac{33}{\square}$

5. $7.9 = 7 \frac{\square}{10}$


6. $1.622 = 1 \frac{622}{\square}$

Practice and Problem Solving

Write the decimal as a fraction or mixed number in simplest form.

- | | | | |
|------------|----------|-----------|-----------|
| 1 7. 0.9 | 8. 0.6 | 9. 0.4 | 10. 0.8 |
| 11. 0.64 | 12. 0.18 | 13. 0.375 | 14. 0.655 |
| 15. 0.11 | 16. 0.28 | 17. 0.435 | 18. 0.812 |
| 2 19. 2.75 | 20. 3.06 | 21. 8.113 | 22. 4.764 |

23. **ERROR ANALYSIS** Describe and correct the error in writing 0.073 as a fraction.

 $0.073 = \frac{73}{100}$

24. **CELL PHONE** The thickness of a cell phone is 0.46 inch. Write the thickness as a fraction in simplest form.
25. **MOVIE** A movie is 2.3 hours long. Write the length of the movie as a mixed number in simplest form.
26. **RUNNING** A person runs 26.22 miles in a marathon. Write the number of miles as a mixed number in simplest form.

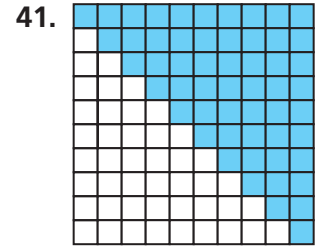
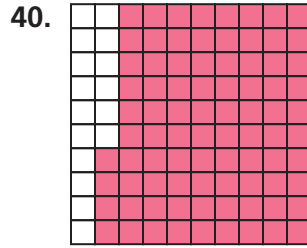
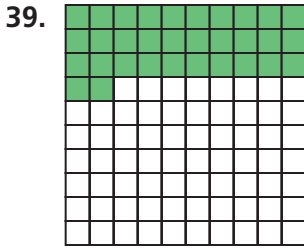
Write the decimal as an improper fraction in simplest form.

- | | | | |
|----------|----------|----------|-----------|
| 27. 7.2 | 28. 3.35 | 29. 6.82 | 30. 2.265 |
| 31. 4.75 | 32. 1.17 | 33. 5.52 | 34. 8.125 |

Write the value of the money as a decimal and as a fraction of a dollar.

- | | |
|-------------------|------------------------------|
| 35. one nickel | 36. one quarter |
| 37. eight pennies | 38. one dollar and six dimes |

Write the shaded part of the unit square as a decimal. Then write the decimal as a fraction.



42. **TRAFFIC JAM** You are in a traffic jam that is $\frac{7}{8}$ mile long. The cars are in one lane bumper to bumper. The average length of a car is 0.003 mile. About how many cars are in the traffic jam?



43. **ZOO** The sign shows the distances to several zoo exhibits.
- Write the distances as fractions.
 - How many times farther is the elephant exhibit than the monkey exhibit?
 - The manatee exhibit is 3 times farther than the tiger exhibit. How far is the manatee exhibit?

44. **Reasoning** A basketball player's 3-point average is the number of 3-point shots made divided by the number of attempts.
- A player's 3-point average is 0.36. How could this happen?
 - If the player in part (a) attempted 350 shots, how many shots did the player make?



Fair Game Review what you learned in previous grades & lessons

Divide. (*Skills Review Handbook*)

45. $30 \div 6$

46. $64 \div 4$

47. $85 \div 5$

48. $81 \div 9$

Divide. Write the answer in simplest form. (*Section 2.5*)

49. $\frac{1}{7} \div \frac{1}{5}$

50. $\frac{6}{11} \div \frac{1}{3}$

51. $\frac{1}{6} \div \frac{7}{12}$

52. $\frac{8}{15} \div \frac{18}{25}$

53. **MULTIPLE CHOICE** What is the area of the triangle?
(*Section 1.5*)

(A) 15 ft^2

(B) 27 ft^2

(C) 54 ft^2

(D) 90 ft^2

