



### Solve & Discuss It!

Calvin wants to customize his surfboard so that it is wider than the 82 model but narrower than the 92 model. What measurement could be the width of his surfboard? Explain.



**Be Precise**  
Between which two numbers is the custom width located?



Model	82	92	102
	$22\frac{1}{2}$ " wide	$23\frac{1}{4}$ " wide	24" wide
	$3\frac{1}{4}$ " thick	$3\frac{1}{2}$ " thick	$3\frac{5}{8}$ " thick

### Lesson 1-2

#### Understand Rational Numbers

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**I can...**  
recognize rational numbers and write them in decimal form.

**Focus on math practices**

**Use Structure** Lindy's surfboard is  $23\frac{1}{4}$  inches wide. Between which two surfboard models is her custom surfboard's width? How do you know?

### Essential Question

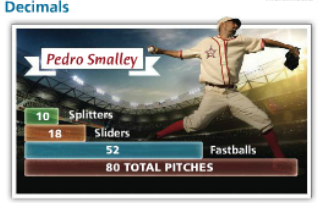
How are rational numbers written as decimals?

INTERACTIVE ANIMATOR

**EXAMPLE 1** Write Rational Numbers in Decimal Form: Terminating Decimals

Juanita is reporting on pitching statistics. Pedro's fastball statistic is  $\frac{52}{80}$ . How can Juanita write the fastball statistic in decimal form?

**Make Sense and Persevere**  
How can you write a rational number as a decimal?



Make a bar diagram to show how the quantities are related.

52 Fastballs

80 TOTAL PITCHES

52

80

Divide the numerator by the denominator to convert the rational number  $\frac{52}{80}$  to decimal form.

$$\begin{array}{r} 0.65 \\ 80 \overline{) 52.00} \\ \underline{-480} \phantom{0} \\ 400 \phantom{0} \\ \underline{-400} \\ 0 \end{array}$$

A terminating decimal is a decimal that ends in zero.

The remainder is 0, so the decimal form of  $\frac{52}{80}$  is a terminating decimal.

Juanita can write  $\frac{52}{80}$  as 0.65.

**Try It!**

In the next several games, the pitcher threw a total of 384 pitches and used a fastball 240 times. What decimal should Juanita use to update her report?

240 Fastballs

384 TOTAL PITCHES

Juanita should use the decimal  to update her report.

**Convince Me!** How do you know that the answer is a terminating decimal?

$$\begin{array}{r} \phantom{0} \phantom{0} \phantom{0} \phantom{0} \\ 384 \overline{) 240.0000} \\ \underline{-232} \phantom{00} \\ 80 \phantom{00} \\ \underline{-80} \phantom{00} \\ 0 \phantom{00} \\ \underline{-0} \\ 0 \end{array}$$

**EXAMPLE 2** Write Rational Numbers in Decimal Form: Repeating Decimals

A class votes on whether to change their school mascot. How can you express the number of students in favor of a new mascot in decimal form?

Divide to write  $\frac{5}{18}$  in decimal form.

$$\begin{array}{r} 0.277 \\ 18 \overline{) 5.000} \\ \underline{-36} \phantom{00} \\ 140 \phantom{0} \\ \underline{-126} \phantom{0} \\ 140 \phantom{0} \\ \underline{-126} \phantom{0} \\ 14 \phantom{0} \end{array}$$

A repeating decimal has a decimal expansion that repeats the same digit, or block of digits, without end.

The products and differences repeat. The remainder will never be 0.

The decimal form of  $\frac{5}{18}$  is  $0.27\overline{7}$  or  $0.27\overline{7}$ .

The ... means the decimal does not terminate.

A line over one or more digits indicates that those digits repeat.

In a class of 18 students, 5 voted to change their mascot.

**Try It!**

What is the decimal form of  $\frac{100}{3}$ ,  $\frac{100}{5}$ , and  $\frac{100}{6}$ ? Determine whether each decimal repeats or terminates.

**EXAMPLE 3** Recognize Rational Numbers in Decimal Form

Explain whether each of the following is a rational number.

a.  $-6.382$   
The decimal terminates, so this is a rational number.

b.  $1.539\overline{81}$   
The digits 8 and 1 repeat infinitely, so this is a rational number.

c.  $0.43524982\dots$   
The decimal does not terminate and the digits do not repeat, so this is NOT a rational number.

**Try It!**

Is  $-0.3$  a rational number? Is  $3.1414414441444\dots$  a rational number? Explain your reasoning.

**KEY CONCEPT**  $\rightarrow$  can be written as a fraction (JM)

To convert from the fraction form of a rational number to its decimal form, divide the numerator by the denominator. The decimal form of a rational number either terminates in 0s or eventually repeats.

Terminating Decimal:  $\frac{3}{4} = 0.75$  (end stop)

Repeating Decimal:  $\frac{1}{6} = 0.1\overline{6}$  (numerator 1, denominator 6)

**Do You Understand?**

1. Essential Question: How are rational numbers written as decimals?

Rational numbers can be written as decimals by dividing the numerator by the denominator.

2. Reasoning: How can you use division to find the decimal equivalent of a rational number?

3. Be Precise: What is the difference between a terminating decimal and a repeating decimal?

**Do You Know How?**

4. What is the decimal equivalent of each rational number?

a.  $\frac{7}{20} = 7 \div 20 = 0.35$  (terminating)

b.  $\frac{23}{20} = 23 \div 20 = 1.15$

c.  $\frac{1}{18} = 1 \div 18 = .0555\dots$  or  $0.\overline{5}$

d.  $-\frac{60}{22} = -60 \div 22 = -2.7272\dots$  or  $-2.\overline{72}$  (repeating)

5. There are 5,280 feet in a mile. What part of a mile, in decimal form, will you drive until you reach the exit?

**EXIT 1,000 FEET**

$$\frac{\text{part}}{\text{total}} = \frac{1000}{5280} = 0.1893939393\dots = 0.18\overline{93}$$

We will drive  $0.18\overline{93}$  part of a mile until we reach the exit.

Name: \_\_\_\_\_

**Practice & Problem Solving**

**Leveled Practice** In 6–8, write the decimal equivalent for each rational number. Use a bar over any repeating digits.

6.  $\frac{2}{3}$       7.  $\frac{3}{11}$       8.  $8\frac{4}{9}$

9. Is 1.0227 a rational number? Explain.
10. Which should Aaron use to convert a fraction to a decimal?  
 (A) numerator/denominator  
 (B)  $\frac{\text{denominator}}{\text{numerator}} \cdot 100$   
 (C) denominator/numerator  
 (D)  $\frac{\text{numerator}}{\text{denominator}} \cdot 100$

11. Is the fraction  $\frac{1}{3}$  equivalent to a terminating decimal or a decimal that does not terminate?
12. Determine whether the given number belongs to each set.

	Whole Numbers	Integers	Rational Numbers
-34	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

13. Ariel incorrectly says that  $2\frac{5}{8}$  is the same as 2.58.  
 a. Convert  $2\frac{5}{8}$  to a decimal.  
 b. What was Ariel's likely error?
14. **Use Structure** Consider the rational number  $\frac{a}{b}$ .  
 a. What are the values of a and b in  $a/b$  when you use division to find the decimal form?  
 b. What is the decimal form for  $\frac{3}{11}$ ?

15. At a grocery store, Daniel wants to buy  $3\frac{1}{2}$  lb of ham. What decimal should the digital scale show? Write  $3\frac{1}{2}$  as a fraction and then divide. The scale should read  lb.



16. **Reasoning** At a butcher shop, Hilda bought beef and pork. She left with  $18\frac{8}{25}$  pounds of meat. Express the number of pounds of pork she bought using a decimal.



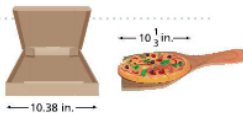
9.373000

17. **Be Precise** Is 9.373 a repeating decimal? Is it rational? Explain your reasoning.

9.373 is not a repeating decimal. However it is a terminating decimal. Yes, it is a rational since it can be written as a fraction  $\frac{9373}{1000}$

18. **Reasoning** Aiden has one box that is  $3\frac{3}{4}$  feet tall and a second box that is 3.27 feet tall. If he stacks the boxes, about how tall will the stack be?

20. **Higher Order Thinking** Dion has a pizza with a diameter of  $10\frac{1}{2}$  in. Is the square box shown big enough to fit the pizza inside? Justify your answer.



$373 \div 1000 = 0.373$   
 $9 + 0.373 = 9.373$

**Assessment Practice**

21. Which of the following shows  $117\frac{51}{200}$  as a decimal?  
 (A) 117.755    (B) 117.7    (C) 117.5    (D) 117.00
22. Use the negative fractions  $-\frac{4}{5}$  and  $-\frac{5}{6}$ .

**PART A**

Find the decimal equivalents for each fraction.

**PART B**

Which is a repeating decimal? Which digit is repeating?

