


1-1

Rational Numbers


**Check Skills
You'll Need**
1. Vocabulary Review

Which fraction is a mixed number: $\frac{2}{3}$, $4\frac{1}{5}$, or $\frac{7}{6}$? 

Write each improper fraction as a mixed number.

2. $\frac{9}{7}$ 


3. $\frac{11}{5}$ 

4. $\frac{25}{9}$ 

5. $\frac{30}{18}$ 

What You'll Learn

To write equivalent fractions and decimals

 **New Vocabulary** rational number, terminating decimal, repeating decimal

Why Learn This?

The baseball standings at the right use both decimals and fractions. Decimals and fractions are rational numbers.

A **rational number** is a number that can be written in the form $\frac{a}{b}$, where a is an integer and b is any nonzero integer.

Every rational number has a decimal expansion. You can write the decimal expansion of a fraction by dividing the numerator by the denominator. If the division results in a decimal that stops, the decimal is called a **terminating decimal**.

Team Standings

	W	L	PCT	GB
Houston	24	14	.632	—
St. Louis	19	19	.500	5
Milwaukee	17	20	.459	$6\frac{1}{2}$
Chicago	17	20	.459	$6\frac{1}{2}$
Pittsburgh	15	23	.395	9
Cincinnati	14	25	.359	$10\frac{1}{2}$

EXAMPLE**Writing a Terminating Decimal**

1 Baseball In baseball, a player's batting average is $\frac{\text{number of hits}}{\text{number of times at bat}}$.

A batting average is rounded to three decimal places and is written without the leading 0.

Find the batting average of a hitter with 36 hits in 125 times at bat.

$$\frac{36}{125} \text{ or } 36 \div 125 = 125 \overline{)36.000} \begin{array}{r} 0.288 \leftarrow \text{This is a terminating decimal.} \\ -250 \\ \hline 1100 \\ -1000 \\ \hline 1000 \\ -1000 \\ \hline 0 \end{array}$$

0 \leftarrow There is no remainder.

$$\frac{36}{125} = 0.288. \text{ So the player's batting average is } .288.$$

Example

- 1 **Writing a Terminating Decimal** Find the batting average of a hitter with 27 hits in 120 times at bat.

$$\frac{27}{120} \text{ or } 27 \div 120 = 120 \overline{)27.000}$$

$$\begin{array}{r} 0.225 \\ -240 \\ \hline 300 \\ -240 \\ \hline 600 \\ -600 \\ \hline 0 \end{array}$$

← This is a terminating decimal.

So the player's batting average is

← There is no remainder.

Quick Check

1. Find the batting average of a hitter with 22 hits in 80 times at bat.

If the decimal expansion repeats the same digit or group of digits forever, it is a **repeating decimal**. The repeating group can include one or more digits. You use a bar to indicate the repeating digits.

$$4.83333333333333 \dots = 4.8\overline{3} \leftarrow \text{The digit 3 repeats.}$$

$$0.181818181818 \dots = 0.\overline{18} \leftarrow \text{The digits 18 repeat.}$$

EXAMPLE**Writing a Repeating Decimal**

2 Write $\frac{27}{99}$ as a decimal.

$$\frac{27}{99} \text{ or } 27 \div 99 = \begin{array}{r} 0.27272 \\ \hline 99 \overline{)27.00000} \\ \underline{-198} \\ 720 \\ \underline{-693} \\ 270 \\ \underline{-198} \\ 720 \\ \underline{-693} \\ 27 \end{array}$$

← This is a repeating decimal.

← There will always be a remainder of 27 or 72.

So $\frac{27}{99} = 0.\overline{27}$.

Examples

2 Writing a Repeating Decimal Write $\frac{28}{77}$ as a decimal.

$$\frac{28}{77} \text{ or } \boxed{} \div 77 = \begin{array}{r} \boxed{} \\ \hline 77 \overline{)28.0000} \\ \underline{-231} \\ 490 \\ \underline{-462} \\ 280 \\ \underline{-231} \\ 490 \\ \underline{-\boxed{}} \\ 28 \end{array}$$

← This is a repeating decimal.

← There will always be a remainder of 28 or 49.

So $\frac{28}{77} = \boxed{}$

Quick Check

2. Write $\frac{55}{60}$ as a decimal. $\boxed{}$

You can write a terminating decimal as a fraction by multiplying both the numerator and the denominator by the same power of 10.

EXAMPLE Writing an Equivalent Fraction

3 Write 1.345 as a mixed number in simplest form.

$$\begin{aligned} 1.345 &= \frac{1,345}{1} && \leftarrow \text{Write as a fraction with the denominator 1.} \\ &= \frac{1,345}{1,000} && \leftarrow \text{Since there are 3 digits to the right of the decimal,} \\ &&& \text{multiply the numerator and the denominator by 1,000.} \\ &= \frac{1,345 \div 5}{1,000 \div 5} && \leftarrow \text{Divide the numerator and the denominator by the GCF, 5.} \\ &= \frac{269}{200} = 1\frac{69}{200} && \leftarrow \text{Simplify. Write as a mixed number.} \end{aligned}$$

3 Writing an Equivalent Fraction Write 1.24 as a mixed number in simplest form.

$$\begin{aligned} 1.24 &= \frac{1.24}{1} && \leftarrow \text{Write as a fraction with the denominator 1.} \\ &= \frac{\boxed{}}{100} && \leftarrow \text{Since there are two digits to the right of} \\ &&& \text{the decimal point, multiply the numerator} \\ &&& \text{and the denominator by } \boxed{}. \\ &= \frac{124 \div \boxed{}}{100 \div 4} && \leftarrow \text{Divide the numerator and the denominator} \\ &&& \text{by the GCF.} \\ &= \frac{31}{25} = \boxed{}\frac{\boxed{}}{\boxed{}} && \leftarrow \text{Simplify. Write as a mixed number.} \end{aligned}$$

Quick Check

3. Write 1.42 as a mixed number in simplest form.

 **Check Your Understanding**

Match each fraction with its decimal expansion.

3. $\frac{1}{4}$

4. $\frac{1}{3}$

5. $\frac{1}{2}$

6. $\frac{2}{11}$

A. 0.5

B. $0.\overline{18}$

C. $0.\overline{3}$

D. 0.25

Your assignment awaits you in google forms.
Check your email.

It is three questions. You may use scratch paper.