RECIPROCALS

BUILDING BLOCKS

NAME _____ CLASS _____ DATE _____

KEY IDEA

When the numerator and denominator are the same, the fraction is 1 whole.

$4 \times \frac{1}{4} = \frac{4}{4} = 1$



1 whole

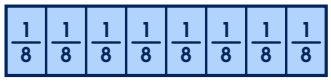
1 How many of each part make 1 whole?

a) 

☐ lots of $\frac{1}{3} = 1$

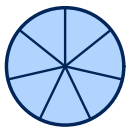
b) 

☐ lots of $\frac{1}{5} = 1$

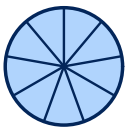
c) 

☐ lots of $\frac{1}{8} = 1$

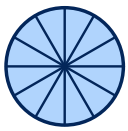
2 Every circle is fully shaded, so each fraction is 1. Find the missing numbers.

a) 

$\frac{\square}{7} = 1$

b) 

$\frac{9}{\square} = 1$

c) 

$\frac{\square}{12} = 1$

d) 

$\frac{5}{\square} = 1$

3 Flip each fraction upside down.

The numerator and the denominator swap places.

a) $\frac{5}{7}$ flip $\frac{\square}{\square}$

b) $\frac{4}{5}$ flip $\frac{\square}{\square}$

c) $\frac{1}{6}$ flip $\frac{\square}{\square}$

4 Any whole number can be written as a fraction over 1.

Example: $6 = \frac{6}{1}$

a) $3 = \frac{\square}{1}$

b) $8 = \frac{\square}{1}$

c) $11 = \frac{\square}{\square}$

RECIPROCALS

SUPPORT

NAME _____ CLASS _____ DATE _____

KEY IDEA

Two numbers that multiply to give 1 are reciprocals.

$\frac{2}{5} \times \frac{5}{2} = \frac{10}{10} = 1$ $\quad 3 \times \frac{1}{3} = 1$

To find the reciprocal, flip it: $6 = \frac{6}{1} \rightarrow \frac{1}{6}$



1 Complete each multiplication so that the answer is 1.

a) $5 \times \frac{1}{\square} = 1$ $\quad$ b) $\frac{1}{9} \times \square = 1$

c) $\frac{3}{4} \times \frac{\square}{\square} = 1$ $\quad$ d) $\frac{7}{2} \times \frac{\square}{\square} = 1$

2 Write the reciprocal of each number.

a) $8 \rightarrow \frac{\square}{\square}$ $\quad$ b) $\frac{1}{10} \rightarrow \frac{\square}{\square}$ $\quad$ c) $\frac{3}{7} \rightarrow \frac{\square}{\square}$ $\quad$ d) $\frac{11}{4} \rightarrow \frac{\square}{\square}$

3 Draw lines to match each number to its reciprocal.

$\frac{2}{11}$	$\frac{1}{5}$	15	$\frac{7}{8}$
$\frac{8}{7}$	5	$\frac{11}{2}$	$\frac{1}{15}$

4 Sam has made a mistake.

Sam says, "The reciprocal of 5 is –5."

a) Work out $5 \times -5 =$ $\square$ $\quad$ b) Is Sam correct? .....

c) What is the reciprocal of 5? $\frac{\square}{\square}$

RECIPROCALS

CORE

NAME _____ CLASS _____ DATE _____

KEY IDEA

The reciprocal of a number is 1 divided by the number; a number × its reciprocal = 1. Write mixed numbers and decimals as fractions first, then flip.

$2\frac{1}{3} = \frac{7}{3} \rightarrow \frac{3}{7}$ $\quad 0.4 = \frac{2}{5} \rightarrow \frac{5}{2}$ $\quad 9 = \frac{9}{1} \rightarrow \frac{1}{9}$

FLUENCY

1 Write the reciprocal of each number as a fraction.

a) $15 \rightarrow \frac{\square}{\square}$ b) $\frac{1}{12} \rightarrow \frac{\square}{\square}$ c) $\frac{6}{11} \rightarrow \frac{\square}{\square}$ d) $1\frac{2}{5} \rightarrow \frac{\square}{\square}$

e) $3\frac{3}{4} \rightarrow \frac{\square}{\square}$ f) $0.6 \rightarrow \frac{\square}{\square}$ g) $0.75 \rightarrow \frac{\square}{\square}$ h) $1.6 \rightarrow \frac{\square}{\square}$

2 Find the missing numbers.

a) $\frac{5}{12} \times \square = 1$ b) $\square \times 0.125 = 1$

c) $1\frac{1}{6} \times \square = 1$ d) $2.5 \times \square = 1$

REASONING

3 Explain why 0 does not have a reciprocal.

4 Ben says, "The reciprocal of a number is always smaller than the number." Is Ben correct? Use examples to explain.

RECIPROCALS

GREATER DEPTH

NAME _____ CLASS _____ DATE _____

REASONING

1 Is each statement always, sometimes or never true? Circle your answer.

If it is sometimes true, give an example of when it is true and when it is not.

a) The reciprocal of a positive proper fraction is more than 1. ALWAYS SOMETIMES NEVER

b) A number and its reciprocal are equal. ALWAYS SOMETIMES NEVER

c) The reciprocal of a negative number is positive. ALWAYS SOMETIMES NEVER

d) The reciprocal of the reciprocal of n is n (n is not 0). ALWAYS SOMETIMES NEVER

.....

PROBLEM SOLVING

2 Write these numbers in order of size, starting with the smallest.

0.3 | reciprocal of 3 | reciprocal of 0.4 | $1\frac{1}{4}$ | reciprocal of $\frac{7}{8}$

$\square < \square < \square < \square < \square$

3 A number is added to its reciprocal. Find the number for each total.

a) total $2\frac{1}{2}$ ☐ b) total $3\frac{1}{3}$ ☐ c) total $2\frac{1}{6}$ ☐

Can you find two answers to each part?

★ CHALLENGE FOR ALL

4 x is not 0. Write the reciprocal of each algebraic term.

a) $x \rightarrow \frac{\square}{\square}$ b) $3x \rightarrow \frac{\square}{\square}$ c) $\frac{x}{5} \rightarrow \frac{\square}{\square}$ d) $\frac{2}{3y} \rightarrow \frac{\square}{\square}$

e) What is x multiplied by its reciprocal? Explain why. .....

STEP 3 ANSWERS

ANSWERS

Reciprocals

BUILDING BLOCKS

1a) 3 b) 5 c) 8

2a) 7 b) 9 c) 12 d) 5

3a) $\frac{7}{5}$ b) $\frac{5}{4}$ c) $\frac{6}{1} = 6$

4a) 3 b) 8 c) $\frac{11}{1}$

SUPPORT

1a) 5 b) 9 c) $\frac{4}{3}$ d) $\frac{2}{7}$

2a) $\frac{1}{8}$ b) $\frac{10}{1} = 10$ c) $\frac{7}{3}$ d) $\frac{4}{11}$

3) $\frac{2}{11} - \frac{11}{2}$, $\frac{1}{5} - 5$, $15 - \frac{1}{15}$, $\frac{7}{8} - \frac{8}{7}$

4a) −25 b) No, 5 × −5 is not 1 c) $\frac{1}{5}$

CORE

1a) $\frac{1}{15}$ b) 12 c) $\frac{11}{6}$ d) $\frac{5}{7}$ e) $\frac{4}{15}$ f) $\frac{5}{3}$ g) $\frac{4}{3}$ h) $\frac{5}{8}$

2a) $\frac{12}{5}$ b) 8 c) $\frac{6}{7}$ d) 0.4 or $\frac{2}{5}$

3) 0 × any number is 0, never 1 (1 ÷ 0 has no answer)

4) No: e.g. $\frac{1}{2}$ has reciprocal 2, which is bigger; 1 is its own reciprocal

GREATER DEPTH

1a) Always b) Sometimes (1 and −1 only) c) Never d) Always

2) 0.3, recip. of 3 ($\frac{1}{3}$), recip. of $\frac{7}{8}$ ($\frac{8}{7}$), $1\frac{1}{4}$, recip. of 0.4 ($\frac{5}{2}$)

3a) 2 or $\frac{1}{2}$ b) 3 or $\frac{1}{3}$ c) $\frac{3}{2}$ or $\frac{2}{3}$

4a) $\frac{1}{x}$ b) $\frac{1}{3x}$ c) $\frac{5}{x}$ d) $\frac{3y}{2}$ e) 1, a number × its reciprocal is 1