DIVIDE A FRACTION BY A UNIT FRACTION

BUILDING BLOCKS

NAME _____ CLASS _____ DATE _____

KEY IDEA

$\frac{3}{5} \div \frac{1}{5}$ **asks:**

How many fifths are in three-fifths?

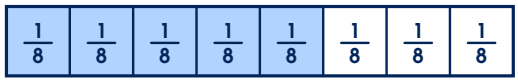
Count the shaded fifths: 3



$\frac{3}{5} \div \frac{1}{5} = 3$

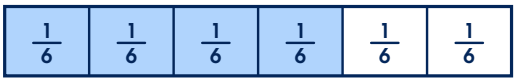
1 Count the shaded parts to answer each question.

a)



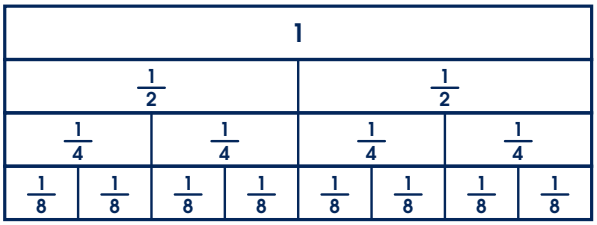
How many $\frac{1}{8}$s in $\frac{5}{8}$? ☐

b)



How many $\frac{1}{6}$s in $\frac{4}{6}$? ☐

2 Use the fraction wall to answer the questions.

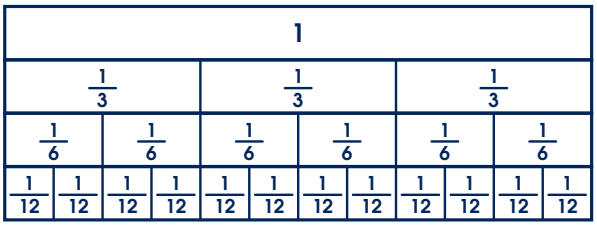


a) How many quarters are in $\frac{1}{2}$? ☐

b) How many eighths are in $\frac{1}{2}$? ☐

c) How many eighths are in $\frac{3}{4}$? ☐

3 Use the fraction wall to find the missing numbers.



a) $\frac{1}{3} = \frac{\square}{6}$ b) $\frac{2}{3} = \frac{\square}{12}$

c) $\frac{5}{6} = \frac{\square}{12}$

4 Flip each unit fraction upside down. What whole number is it?

a) $\frac{1}{4}$ flip $\frac{\square}{\square}$

whole number = ☐

b) $\frac{1}{7}$ flip $\frac{\square}{\square}$

whole number = ☐

c) $\frac{1}{10}$ flip $\frac{\square}{\square}$

whole number = ☐

DIVIDE A FRACTION BY A UNIT FRACTION

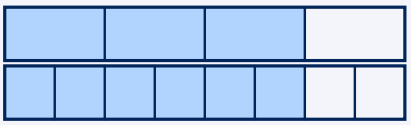
SUPPORT

NAME _____ CLASS _____ DATE _____

KEY IDEA

$\frac{3}{4} \div \frac{1}{8}$ **means how many eighths are in** $\frac{3}{4}$**?**

$\frac{3}{4} = \frac{6}{8}$, so the answer is 6.



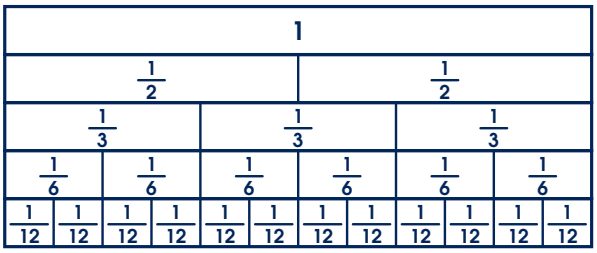
Or multiply by the reciprocal: $\frac{3}{4} \times 8 = \frac{24}{4} = 6$

1 Work out.

For example, ask yourself: how many sevenths are in four-sevenths?

a) $\frac{4}{7} \div \frac{1}{7} =$ ☐ b) $\frac{9}{10} \div \frac{1}{10} =$ ☐ c) $\frac{7}{12} \div \frac{1}{12} =$ ☐

2 Use the fraction wall to work out the divisions.



a) $\frac{1}{2} \div \frac{1}{6} =$ ☐

b) $\frac{2}{3} \div \frac{1}{6} =$ ☐

c) $\frac{1}{3} \div \frac{1}{12} =$ ☐

3 Divide by multiplying by the reciprocal.

a) $\frac{3}{5} \div \frac{1}{2} = \frac{3}{5} \times 2 = \frac{\square}{\square}$

b) $\frac{2}{9} \div \frac{1}{3} = \frac{2}{9} \times \square = \frac{\square}{\square}$

c) $\frac{5}{6} \div \frac{1}{4} = \frac{5}{6} \times \square = \frac{\square}{\square}$

4 Zak has made a mistake.

Zak writes: $\frac{3}{4} \div \frac{1}{4} = \frac{3}{16}$

a) How can you tell Zak is wrong without working it out?

b) Work out the correct answer. $\frac{3}{4} \div \frac{1}{4} =$ ☐

DIVIDE A FRACTION BY A UNIT FRACTION

CORE

NAME _____ CLASS _____ DATE _____

KEY IDEA

Dividing by one over n is the same as multiplying by n. Simplify, and write improper fractions as mixed numbers.

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

FLUENCY

1 Work out. Give each answer in its simplest form, as a mixed number where needed.

a) $\frac{5}{9} \div \frac{1}{9} =$ ☐

b) $\frac{3}{4} \div \frac{1}{12} =$ ☐

c) $\frac{2}{5} \div \frac{1}{3} =$ ☐

d) $\frac{7}{8} \div \frac{1}{6} =$ ☐

e) $\frac{1}{6} \div \frac{1}{2} =$ ☐

f) $\frac{4}{15} \div \frac{1}{10} =$ ☐

2 Find the missing numbers.

a) $\frac{\square}{7} \div \frac{1}{7} = 6$

b) $\frac{2}{3} \div \frac{1}{\square} = 8$

c) $\frac{3}{\square} \div \frac{1}{4} = \frac{3}{2}$

d) $\frac{1}{\square} \div \frac{1}{10} = 2$

REASONING

3 Write three different divisions of a fraction by a unit fraction that each have an answer of 4.

$\frac{\square}{\square} \div \frac{1}{\square} = 4$ $\frac{\square}{\square} \div \frac{1}{\square} = 4$ $\frac{\square}{\square} \div \frac{1}{\square} = 4$

4 Ola says, "A fraction divided by a unit fraction always gives a whole number." Give an example to show that Ola is wrong.

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DIVIDE A FRACTION BY A UNIT FRACTION

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) $\frac{a}{b} \div \frac{1}{b} = a$ (b is not 0) ALWAYS SOMETIMES NEVER

b) $\frac{1}{a} \div \frac{1}{b}$ is a whole number (a, b positive integers) ALWAYS SOMETIMES NEVER

c) $\frac{1}{2} \div \frac{1}{3} = \frac{1}{3} \div \frac{1}{2}$ ALWAYS SOMETIMES NEVER

d) Dividing a positive number by $\frac{1}{3}$ makes it 3 times as big. ALWAYS SOMETIMES NEVER

PROBLEM SOLVING

2 A snail crawls two-fifths of a metre in one-third of an hour.

a) What is its speed in metres per hour? ☐

b) At this speed, how far does it crawl in 2 hours? ☐

3 A bottle holds seven-eighths of a litre. Each cup holds one-sixth of a litre.

a) How many cups can be filled completely? ☐

b) What fraction of a litre is left in the bottle? $\frac{\square}{\square}$

★ CHALLENGE FOR ALL

4 Work out each calculation. Do the brackets first.

a) $\left(\frac{1}{3} + \frac{1}{4}\right) \div \frac{1}{12} =$ ☐

b) $\left(\frac{1}{2} - \frac{1}{5}\right) \div \frac{1}{10} =$ ☐

c) Find whole numbers a and b so that $\left(\frac{1}{a} + \frac{1}{b}\right) \div \frac{1}{ab} = 9$.

a = ☐ b = ☐

STEP 6 ANSWERS

ANSWERS

Divide a fraction by a unit fraction

BUILDING BLOCKS

1a) 5 b) 4

2a) 2 b) 4 c) 6

3a) 2 b) 8 c) 10

4a) $\frac{4}{1} = 4$ b) $\frac{7}{1} = 7$ c) $\frac{10}{1} = 10$

SUPPORT

1a) 4 b) 9 c) 7

2a) 3 b) 4 c) 4

3a) $\frac{6}{5} = 1\frac{1}{5}$ b) 3, $\frac{2}{3}$ c) 4, $\frac{10}{3} = 3\frac{1}{3}$

4a) Dividing by a fraction less than 1 gives a bigger answer, but $\frac{3}{16}$ is smaller than $\frac{3}{4}$ b) 3

CORE

1a) 5 b) 9 c) $\frac{6}{5} = 1\frac{1}{5}$ d) $\frac{21}{4} = 5\frac{1}{4}$ e) $\frac{1}{3}$ f) $\frac{8}{3} = 2\frac{2}{3}$

2a) 6 b) 12 c) 8 d) 5

3) e.g. $\frac{4}{5} \div \frac{1}{5}$, $\frac{1}{2} \div \frac{1}{8}$, $\frac{2}{3} \div \frac{1}{6}$

4) e.g. $\frac{1}{6} \div \frac{1}{2} = \frac{1}{3}$, or $\frac{2}{5} \div \frac{1}{3} = 1\frac{1}{5}$

GREATER DEPTH

1a) Always b) Sometimes ($\frac{1}{2} \div \frac{1}{4} = 2$; $\frac{1}{4} \div \frac{1}{2} = \frac{1}{2}$) c) Never d) Always

2a) $\frac{6}{5} = 1\frac{1}{5}$ m per hour b) $\frac{12}{5} = 2\frac{2}{5}$ m

3a) 5 cups b) $\frac{1}{24}$ litre

4a) 7 b) 3 c) any a, b with a + b = 9, e.g. 4 and 5