MULTIPLY AND DIVIDE MIXED NUMBERS

BUILDING BLOCKS

NAME _____ CLASS _____ DATE _____

KEY IDEA

$2\frac{1}{3}$ means 2 wholes and $\frac{1}{3}$.

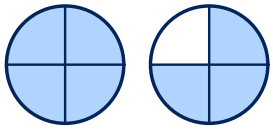
Count the thirds: 3 + 3 + 1 = 7

$2\frac{1}{3} = \frac{7}{3}$



1 Write each mixed number as an improper fraction. Count the parts.

a)



$1\frac{3}{4} = \frac{\square}{\square}$

b)



$2\frac{2}{5} = \frac{\square}{\square}$

2 Write each improper fraction as a mixed number. Count the wholes first.

a)



$\frac{9}{4} = \square\ \frac{\square}{\square}$

b)



$\frac{11}{3} = \square\ \frac{\square}{\square}$

3 Multiply the whole number by the denominator, then add the numerator.

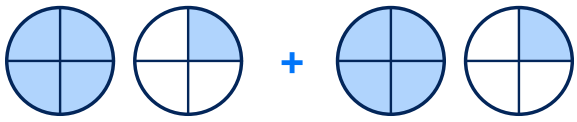
Example: $3\frac{1}{2} \rightarrow 3 \times 2 + 1 = 7 \rightarrow \frac{7}{2}$

a) $1\frac{5}{6} = \frac{\square}{\square}$

b) $4\frac{2}{3} = \frac{\square}{\square}$

c) $2\frac{3}{5} = \frac{\square}{\square}$

4 Add the pictures together. How much is there altogether?



$1\frac{1}{4} + 1\frac{1}{4} = 2 \times 1\frac{1}{4}$

$= \square\ \frac{\square}{\square}$

MULTIPLY AND DIVIDE MIXED NUMBERS

SUPPORT

NAME _____ CLASS _____ DATE _____

KEY IDEA

Change mixed numbers into improper fractions first. Then multiply or divide.

$1\frac{2}{5} \times 3 = \frac{7}{5} \times 3 = \frac{21}{5} = 4\frac{1}{5}$

Change the answer back into a mixed number.

1 Work out. Give each answer as a mixed number.

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

b) $1\frac{3}{8} \times 4 = \frac{\square}{8} \times 4 = \frac{\square}{\square} = \square\frac{\square}{\square}$

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

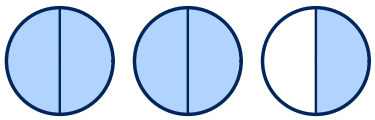
2 Write the mixed number as an improper fraction, then multiply.

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

b) $2\frac{1}{4} \times \frac{1}{3} = \frac{\square}{4} \times \frac{1}{3} = \frac{\square}{\square}$

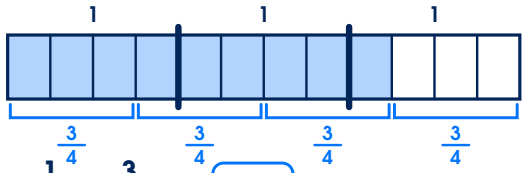
3 How many of the fraction fit into the mixed number?

a)



$2\frac{1}{2} \div \frac{1}{2} = \square$

b)



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

4 Max multiplied the wholes and the fractions separately.

Max writes: $2\frac{1}{2} \times 2\frac{1}{2} = 4\frac{1}{4}$

a) What has Max done wrong?

b) Work out the correct answer. $\frac{5}{2} \times \frac{5}{2} = \frac{\square}{\square} = \square\frac{\square}{\square}$

MULTIPLY AND DIVIDE MIXED NUMBERS

CORE

NAME _____ CLASS _____ DATE _____

KEY IDEA

Write mixed numbers as improper fractions, then multiply or divide. Never work with the whole numbers and the fractions separately.

$3\frac{1}{3} \div 1\frac{1}{4} = \frac{10}{3} \div \frac{5}{4} = \frac{10}{3} \times \frac{4}{5} = \frac{8}{3} = 2\frac{2}{3}$

FLUENCY

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

a) $1\frac{1}{2} \times 2\frac{1}{3} =$ ☐

b) $2\frac{2}{3} \times 1\frac{3}{4} =$ ☐

c) $4\frac{1}{2} \div 3 =$ ☐

d) $5\frac{1}{4} \div 1\frac{3}{4} =$ ☐

e) $2\frac{1}{2} \div 3\frac{1}{3} =$ ☐

f) $6 \div 1\frac{1}{3} =$ ☐

2 Find the missing numbers.

a) $1\frac{1}{2} \times$ ☐ $= 6$

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

c) ☐ $\times 1\frac{1}{3} = 2\frac{2}{3}$

d) $3\frac{1}{2} \div$ ☐ $= 1\frac{3}{4}$

REASONING

3 Ella has worked out a division.

Ella: "$4\frac{1}{2} \div 1\frac{1}{2} = 4 \div 1$ and $\frac{1}{2} \div \frac{1}{2}$, so the answer is 5."

a) Explain why Ella is wrong. .....

b) Work out the correct answer. ☐

4 Explain why multiplying a positive number by a mixed number always gives a bigger answer.

.....

.....

MULTIPLY AND DIVIDE MIXED NUMBERS

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) A mixed number × a mixed number is a mixed number. ALWAYS SOMETIMES NEVER

b) A mixed number ÷ a mixed number is less than 1 ALWAYS SOMETIMES NEVER

c) $1\frac{1}{2} \times n$ is n plus half of n (n is positive) ALWAYS SOMETIMES NEVER

d) $2\frac{1}{2} \times 4 = (2 \times 4) + \frac{1}{2}$ ALWAYS SOMETIMES NEVER

PROBLEM SOLVING

2 A rectangular floor is four and a half metres long and three and two-thirds metres wide.

a) Work out the area of the floor. ☐

b) Carpet costs £12 per m². How much does the carpet cost? ☐

3 A plank of wood is seven and a half metres long.

a) How many pieces $1\frac{1}{4}$ m long can be cut? ☐

b) How many pieces $1\frac{1}{3}$ m long can be cut? ☐ How much is left? ☐

★ CHALLENGE FOR ALL

4 A rectangle has an area of eight and three-quarter square metres. Its length is three and a half metres.

a) Find the width. ☐ **b)** Find the perimeter. ☐

c) A square has the same perimeter as the rectangle. Which shape has the greater area, and by how much? _____

STEP 8 ANSWERS

ANSWERS

Multiply and divide mixed numbers

BUILDING BLOCKS

1a) $\frac{7}{4}$ b) $\frac{12}{5}$

2a) $2\frac{1}{4}$ b) $3\frac{2}{3}$

3a) $\frac{11}{6}$ b) $\frac{14}{3}$ c) $\frac{13}{5}$

4) $2\frac{2}{4} = 2\frac{1}{2}$

SUPPORT

1a) $\frac{7}{3}, \frac{14}{3} = 4\frac{2}{3}$ b) $\frac{11}{8}, \frac{44}{8} = 5\frac{1}{2}$ c) $\frac{7}{6}, \frac{35}{6} = 5\frac{5}{6}$

2a) $\frac{6}{6} = 1$ b) $\frac{9}{4}, \frac{9}{12} = \frac{3}{4}$

3a) 5 b) 3

4a) He multiplied 2 × 2 and $\frac{1}{2} \times \frac{1}{2}$ separately b) $\frac{25}{4} = 6\frac{1}{4}$

CORE

1a) $\frac{7}{2} = 3\frac{1}{2}$ b) $\frac{14}{3} = 4\frac{2}{3}$ c) $\frac{3}{2} = 1\frac{1}{2}$ d) 3 e) $\frac{3}{4}$ f) $\frac{9}{2} = 4\frac{1}{2}$

2a) 4 b) $\frac{3}{4}$ c) 2 d) 2

3a) The wholes and parts can't be divided separately; $\frac{9}{2} \div \frac{3}{2} = 3$ b) 3

4) A mixed number is more than 1, so you get the number plus a fraction of it more

GREATER DEPTH

1a) Sometimes ($1\frac{1}{2} \times 1\frac{1}{3} = 2$) b) Sometimes ($1\frac{1}{2} \div 2\frac{1}{4} = \frac{2}{3}$; $2\frac{1}{4} \div 1\frac{1}{2} = 1\frac{1}{2}$)

c) Always d) Never (it is 10)

2a) $\frac{33}{2} = 16\frac{1}{2}$ m² b) £198

3a) 6 b) 5 pieces, $\frac{5}{6}$ m left

4a) $2\frac{1}{2}$ m b) 12 m c) The square (9 m²) by $\frac{1}{4}$ m²