6 Rusty the dog eats $\frac{1}{5}$ of a bag of dog biscuits each day.

How many bags does his owner need to buy to feed him for 11 days?

7 **a)** A double decker bus is $18\frac{3}{5}$ metres long.
What is the total length of 12 double decker buses?

CHALLENGE

b) Work out the missing numbers.

$\frac{1}{5} \times \square = \frac{4}{5}$ $\qquad \frac{\square}{7} \times 5 = \frac{10}{7}$ $\qquad \frac{2}{3} \times \square = 3\frac{1}{3}$

$\frac{3}{5} \times \square = \frac{12}{5}$ $\qquad \frac{\square}{7} \times 3 = \frac{15}{7}$ $\qquad \frac{2}{3} \times \square = 6$

Reflect

Explain why $1\frac{2}{3} \times 4$ is equal to $6\frac{2}{3}$.

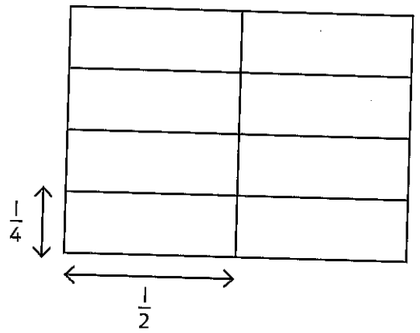
Textbook 6A p176

Multiplying a fraction by a fraction 1

1 Zac is baking cookies.

a) The bag of flour is $\frac{1}{4}$ full. He uses $\frac{1}{2}$ of the flour in the bag.

What fraction of the whole bag does Zac use?



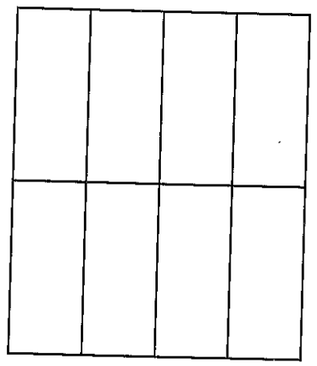
$\frac{1}{2} \times \frac{1}{4} = \frac{\square}{\square}$

Zac uses $\frac{\square}{\square}$ of the bag of flour.

b) The bag of chocolate chips is $\frac{1}{2}$ full.

Zac needs $\frac{3}{4}$ of the chocolate chips.

What fraction of the whole bag does he need?

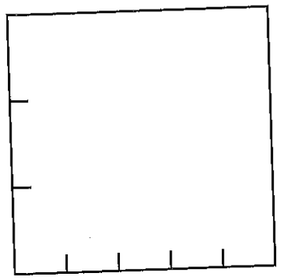


$\frac{\square}{\square} \times \frac{\square}{\square} = \frac{\square}{\square}$

Zac needs $\frac{\square}{\square}$ of the bag.

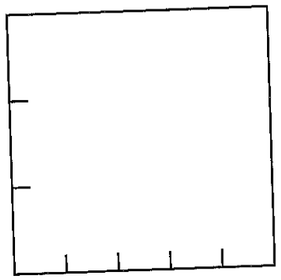
2 **a)** Complete the diagram to work out $\frac{1}{5} \times \frac{1}{3}$.

$\frac{1}{5} \times \frac{1}{3} = \frac{\square}{\square}$



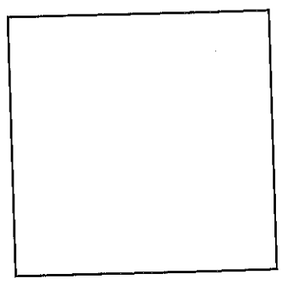
b) Complete the diagram to work out $\frac{2}{3}$ of $\frac{2}{5}$.

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

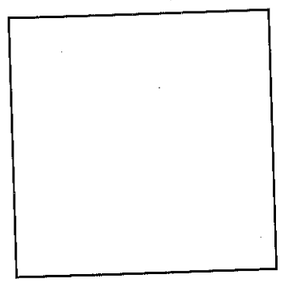


3 Draw diagrams to help you work out these calculations. Give each answer in its simplest form.

a) $\frac{3}{4} \times \frac{2}{5} = \frac{\square}{\square}$

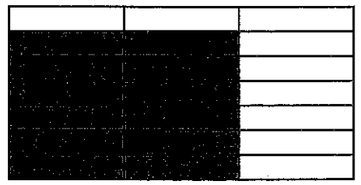


b) $\frac{2}{3}$ of $\frac{5}{6} = \frac{\square}{\square}$



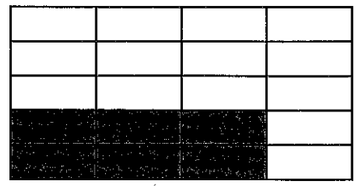
4 These diagrams show the result of two fractions being multiplied together. What could the questions have been?

a)



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

b)



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

5 Is this statement always true, sometimes true or never true? Explain your answer.

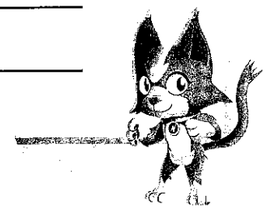
'When you multiply a proper fraction by another proper fraction, the answer will be smaller than the two original fractions.'

The statement is_____ because_____

_____

_____

A proper fraction has a numerator that is less than the denominator.



Reflect

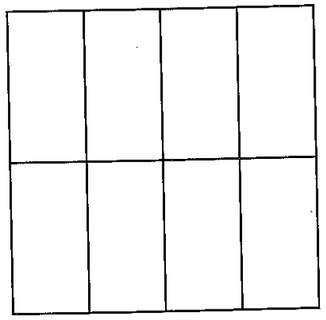
Draw a diagram to show why $\frac{1}{2} \times \frac{3}{5} = \frac{3}{10}$.

Textbook 6A p180

Multiplying a fraction by a fraction 2

1 **a)** Use the diagram to work out $\frac{3}{4} \times \frac{1}{2}$.

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



b) Reena says you can work out the answer without drawing a diagram. Explain how.

2 Work out these calculations without using a diagram.

a) $\frac{2}{9} \times \frac{1}{4} = \frac{\square \times \square}{\square \times \square} = \frac{\square}{\square} = \frac{\square}{\square}$

b) $\frac{2}{9} \times \frac{3}{4} = \frac{\square \times \square}{\square \times \square} = \frac{\square}{\square} = \frac{\square}{\square}$

c) $\frac{1}{5} \times \frac{10}{11} = \frac{\square \times \square}{\square \times \square} = \frac{\square}{\square} = \frac{\square}{\square}$

3 Work out these calculations.

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

b) $\frac{3}{4} \times \frac{1}{7} = \frac{\square}{\square}$

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

d) $\frac{1}{2}$ of $\frac{7}{8} = \frac{\square}{\square}$

e) $\frac{\square}{\square} = \frac{5}{6}$ of $\frac{7}{8}$

f) $\frac{7}{23} \times \frac{9}{10} = \frac{\square}{\square}$

4 Fill in the boxes to complete the calculations.

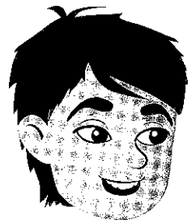
a) $\frac{\square}{3} \times \frac{2}{\square} = \frac{2}{15}$

b) $\frac{\square}{3} \times \frac{\square}{6} = \frac{5}{18}$

c) $\frac{\square}{5} \times \frac{1}{\square} \times \frac{3}{7} = \frac{9}{70}$

d) $\frac{7}{12} \times \frac{1}{\square} = \frac{1}{6} \times \frac{\square}{6}$

5 Aki and Kate are working out $\frac{2}{7} \times \frac{3}{8}$.



Aki: I think the answer is $\frac{5}{56}$.

Kate: No, the answer is $\frac{3}{28}$.

a) What mistake has Aki made?

b) Has Kate got the correct answer? Explain how you know.

CHALLENGE

6 Use fractions to complete the number sentences.
Find two different ways to get each answer.

a) $\frac{\square}{\square} \times \frac{\square}{\square} = \frac{8}{15}$

$\frac{\square}{\square} \times \frac{\square}{\square} = \frac{8}{15}$

b) $\frac{\square}{\square} \times \frac{\square}{\square} = \frac{12}{21}$

$\frac{\square}{\square} \times \frac{\square}{\square} = \frac{12}{21}$

c) $\frac{\square}{\square} \times \frac{\square}{\square} = \frac{1}{2}$

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

d) $\frac{\square}{\square} \times \frac{\square}{\square} \times \frac{\square}{\square} = \frac{9}{48}$

$\frac{\square}{\square} \times \frac{\square}{\square} \times \frac{\square}{\square} = \frac{9}{48}$

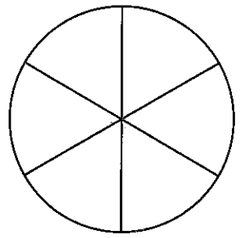
Reflect

Describe what you do when you multiply two fractions together.
Compare your method with your partner's method. Is it the same or different?

Textbook 6A p184

Dividing a fraction by a whole number 1

1 **a)** A circle is divided into 6 equal parts.



Follow these instructions:

- Divide 1 of the sixths into 2 parts.
- Shade in 1 of the parts you have just made.

What fraction of the circle is shaded?

$\frac{1}{6} \div 2 = \frac{\square}{\square}$

$\frac{\square}{\square}$ of the circle is shaded.

b) Use the diagram to work out $\frac{1}{5} \div 2$.

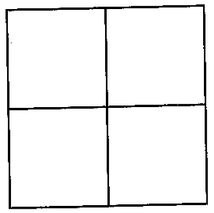
$\frac{1}{5} \div 2 = \frac{\square}{\square}$

2 Use the diagram to show $\frac{1}{8} \div 2$.

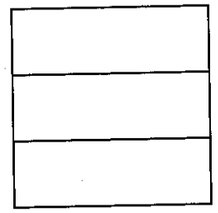
$\frac{1}{8} \div 2 = \frac{\square}{\square}$

3 Use the diagrams to work out these divisions.

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

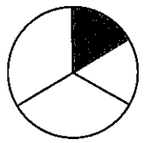


b) $\frac{1}{3} \div 4 = \frac{\square}{\square}$

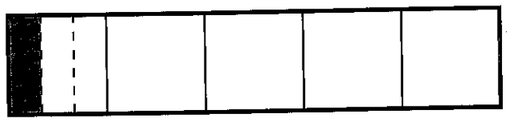


4 Write the calculations to match these diagrams.

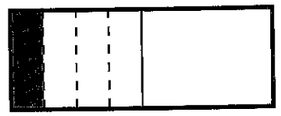
a) $\frac{\square}{\square} \div \square = \frac{\square}{\square}$



b) $\frac{\square}{\square} \div \square = \frac{\square}{\square}$



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



5 Find the missing numbers and fractions.

a) $\frac{1}{9} \div 2 = \frac{\square}{\square}$

b) $\frac{1}{3} \div 6 = \frac{\square}{\square}$

c) $\frac{1}{10} \div 3 = \frac{\square}{\square}$

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

e) $\frac{\square}{\square} = \frac{1}{7} \div 4$

f) $\frac{1}{6} \div 4 = \frac{\square}{\square}$

g) $\frac{1}{4} \div \square = \frac{1}{8}$

h) $\frac{1}{10} \div \square = \frac{1}{30}$

i) $\frac{1}{\square} \div 3 = \frac{1}{9}$

6 a) Kate shares $\frac{1}{3}$ of a pizza equally between her and her two friends.

What fraction of the whole pizza does each person get?

Each person gets $\frac{\square}{\square}$ of the pizza.

b) Emma has a chocolate bar. She eats $\frac{5}{6}$ of the bar.

She shares the remainder equally with Max.

What fraction of the whole bar does Max get?

Max gets $\frac{\square}{\square}$ of the bar.

7 Find six different ways to make the calculation correct.

CHALLENGE

$\frac{1}{\square} \div \square = \frac{1}{48}$ $\frac{1}{\square} \div \square = \frac{1}{48}$ $\frac{1}{\square} \div \square = \frac{1}{48}$

$\frac{1}{\square} \div \square = \frac{1}{48}$ $\frac{1}{\square} \div \square = \frac{1}{48}$ $\frac{1}{\square} \div \square = \frac{1}{48}$

Reflect

$\frac{1}{10} \div 2 = \frac{1}{5}$ Is this true or false? Explain your reasoning.

Textbook 6A p188

Dividing a fraction by a whole number 2

1 This circle is divided into twelfths.

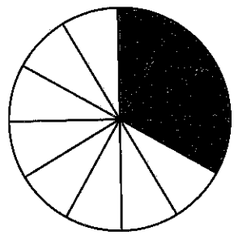
4 of the twelfths can be divided into 2 equal groups.

How many twelfths are there in each group?

There are ☐ twelfths in each group.

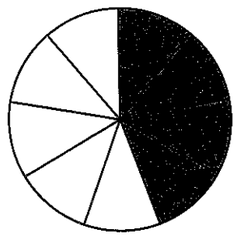
Write this as a division.

$\frac{4}{12} \div 2 = \frac{\square}{\square}$



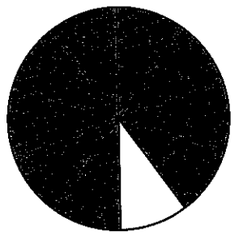
2 Use the diagrams to help you work out the divisions.

a)



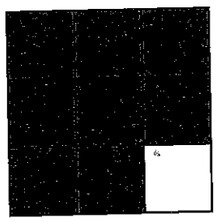
$\frac{4}{9} \div 2 = \frac{\square}{\square}$

b)



$\frac{9}{10} \div 3 = \frac{\square}{\square}$

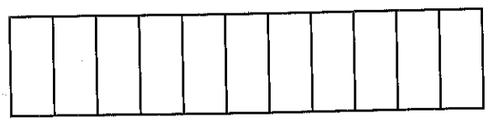
c)



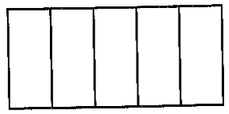
$\frac{8}{9} \div 2 = \frac{\square}{\square}$

3 Work out these divisions.

a) $\frac{10}{11} \div 5 = \frac{\square}{\square}$

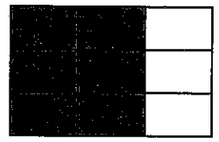


b) $\frac{4}{5} \div 4 = \frac{\square}{\square}$



4 Write a calculation for this diagram.

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



5 Work out these divisions.

a) $\frac{5}{9} \div 5 = \frac{\square}{\square}$

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

c) $\frac{6}{7} \div 2 = \frac{\square}{\square}$

d) $\frac{8}{15} \div 2 = \frac{\square}{\square}$

6 Complete these number sentences.

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

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

b) $\frac{\square}{20} \div 3 = \frac{2}{20}$

$\frac{\square}{20} \div 3 = \frac{5}{20}$

c) $\frac{14}{15} \div \square = \frac{2}{15}$

$\frac{14}{15} \div \square = \frac{7}{15}$

$\frac{14}{15} \div \square = \frac{1}{15}$

$\frac{14}{15} \div \square = \frac{14}{15}$

d) $\frac{40}{45} \div \square = \frac{4}{45}$

$\frac{40}{45} \div \square = \frac{5}{45}$

$\frac{40}{45} \div \square = \frac{20}{45}$

$\frac{40}{45} \div \square = \frac{8}{45}$

7 A snail travels $\frac{12}{15}$ km in 3 days. It travels the same distance each day.

What fraction of a km does the snail travel each day?

8 Max is dividing a fraction by a whole number.

He simplifies his answer. Work out the missing numbers.

$\frac{\square}{18} \div 3 = \frac{2}{9}$ $\frac{\square}{60} \div 4 = \frac{7}{30}$ $\frac{\square}{24} \div 2 = \frac{3}{8}$

Reflect

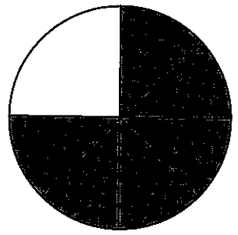
Danny says $\frac{10}{15} \div 5 = \frac{2}{3}$.

Explain the mistake Danny has made. What is the correct answer? Prove it.

Textbook 6A p192

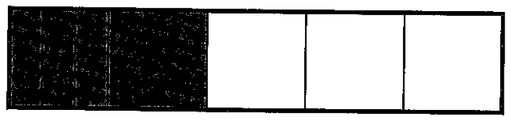
Dividing a fraction by a whole number 3

1 **a)** Use the diagram to help you work out $\frac{3}{4} \div 2$.



$\frac{3}{4} \div 2 = \frac{\square}{8} \div 2 = \frac{\square}{8}$

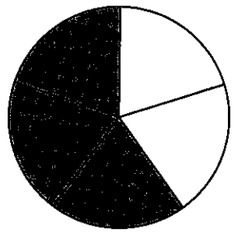
b) Use the diagram to help you work out $\frac{2}{5} \div 3$.



$\frac{2}{5} \div 3 = \frac{\square}{15} \div 3 = \frac{\square}{15}$

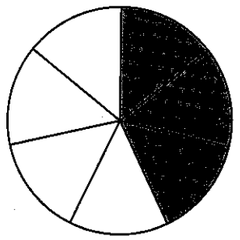
2 Use the diagrams to work out the divisions.

a)



$\frac{3}{5} \div 2 = \frac{\square}{10} \div 2 = \frac{\square}{10}$

b)



$\frac{3}{7} \div 2 = \frac{\square}{\square} \div 2 = \frac{\square}{\square}$