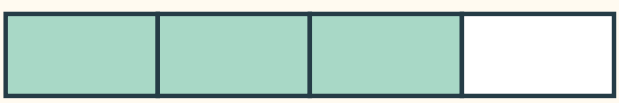
MATHS FIELD GUIDE · GRADE 5

How many fraction-sized groups fit?

OPENING PROBLEM

How many quarter-litre cups fill ¾ of a litre?



¾ litre

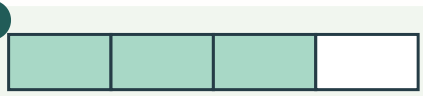
02 Two ways to ask a fraction division question
03 Rules and worked cases
04 Cut equal ribbon pieces
05 Compare the models
06 Predict what multiplication will do
07 Check your reasoning

ILLUSTRATED PROBLEM SHEET

Two ways to ask a fraction division question

Identify whether the answer counts groups or measures one share.

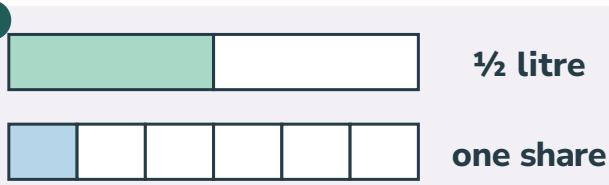
1



How many quarter-litre cups fill ¾ of a litre?

Three cups. Each is one of the three shaded quarters.

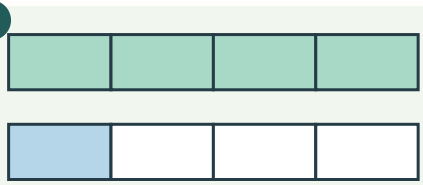
2



Half a litre is shared by three. What is one share?

One sixth of a litre. Three sixths rebuild the half.

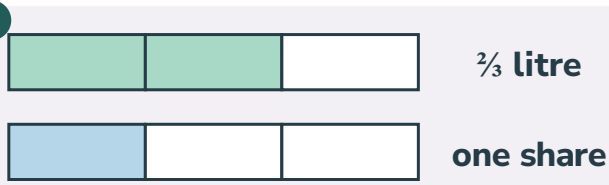
3



How many quarter-litre cups fit in two litres?

Four in one litre, so eight in two.

4



Divide two thirds equally between two. How large is each share?

One third of a litre. Here the two counts people.

2 L in ¼ L cups
eight cups.

¼ L shared by two
⅛ L each.

CHAPTER PROBLEM

Find 4 ÷ 1/3. What does the answer count?

Twelve groups, each of size one third.

MATHS REFERENCE · GRADE 5

How many fraction-sized groups fit?

A whole number divided by a unit fraction counts how many fraction-sized groups fit.

The quotient is a group count, not the size of a share.

Cases to recognise

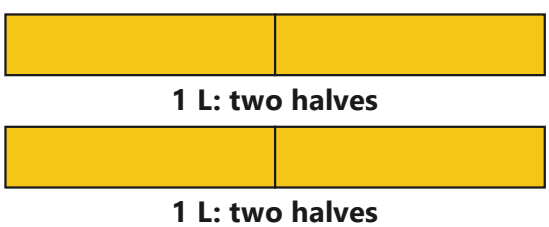
Situation	What to do and why
How many fifths in 3 wholes?	Each whole has five. Fifteen fifths fit.
How many eighths in 1 3/4?	One whole gives eight and three quarters give six. Total fourteen.

Read the model

Count halves in two wholes

Each whole litre contains two half-litres.

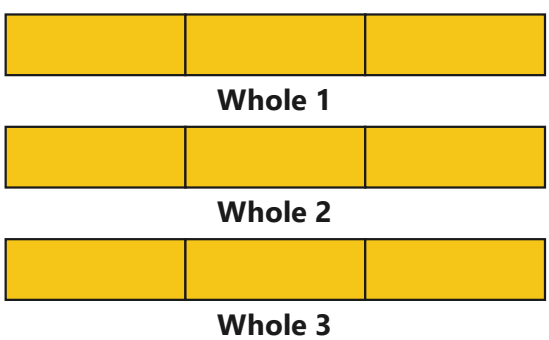
Two litres contain four half-litres, so 2 ÷ 1/2 = 4.



Count thirds in three wholes

Each whole contains three thirds.

Three wholes contain nine thirds: 3 ÷ 1/3 = 9.



group size The amount in each group.
unit fraction A fraction with numerator one.
group count How many complete groups fit.

2¾ = 2 + ¾
↓
8 quarters + 3 quarters
↓
11/4

How many quarter-units altogether?

Eleven. Each whole gives four quarters.

WORKED INVESTIGATION

Cut equal ribbon pieces

A roll holds 3 m. Each bow uses 1/4 m. Count the quarter-metres that fit inside the roll.

Look at this part	What it tells you
1 metre	4 bows
2 metres	8 bows
3 metres	12 bows

Work it through

If 1/2 m has already been used, 2 1/2 m remain. Two whole metres give eight bows and the half metre gives two, for ten bows.

Catch the mistake

Multiplying 3 by 1/4 gives three quarter-metre pieces laid together. Here the question asks how many pieces fill three whole metres.

Compare the cases

Why division can give a larger number

A fraction-sized group is smaller than a whole-sized group.

More of the smaller groups fit into the same positive total.

Do not confuse two division stories

2 ÷ 1/2 asks how many half-sized groups fit into two.

1/2 ÷ 2 shares a half between two people. It gives one quarter each.

Change one condition

Switching to eighth-metre bows doubles the count to 24. Shorter pieces mean more of them fit.

17/5
↓
15/5 + 2/5
↓
3⅖

How many full groups of five fit?

Three wholes with two fifths left over.

HOW MANY FRACTION-SIZED GROUPS FIT?

Compare the models

Connect the shortcut to counting

A whole contains four quarters. Three wholes contain 3 × 4 quarters.

That explains 3 ÷ 1/4 = 12. Do not apply a memorised rule without naming the group size.

Check the result

Twelve quarter-litre cupfuls contain twelve quarters of a litre, or three litres.

Group count times group size must remake the total.

When the group size halves

Two litres fill eight quarter-litre cups. Replace each cup with two eighth-litre cups. The same two litres now fill sixteen cups: halving the size of each group doubles the count.

Explain your reasoning

How many quarter-litre cupfuls fill two litres?

Eight. Each litre contains four quarters.

Two more worked cases

Situation	Reasoning
Cut 2 m into thirds of a metre	Six pieces fit because 6 × 1/3 m = 2 m. Five cuts separate them.
Which fills more cups, 1 L poured in thirds or in sixths?	Six small cups versus three larger cups. The liquid volume stays one litre.

1¾ + 2½
↓
3 + 3/4 + 2/4
↓
4¼

Where does the fourth whole come from?

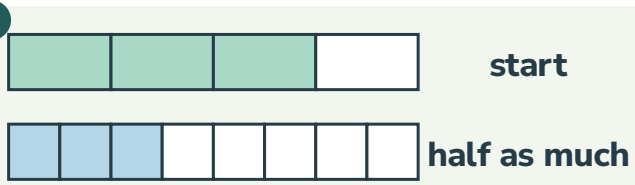
Five quarters contain one whole plus one quarter.

ILLUSTRATED PROBLEM SHEET

Predict what multiplication will do

For a positive starting amount, a factor below one shrinks it. A factor above one enlarges it.

1



What is half of three quarters?

Split each quarter into two eighths. Taking half leaves three eighths.

2

⅔ of ¾
↓
2 × 3 over 3 × 4
↓
½

Why is the product smaller than three quarters?

Only two of three equal shares of the starting amount are kept.

3

1½ × 8
↓
8 + 4
↓
12

What does the extra half add?

Half of eight is four. One full eight plus four is twelve.

4

¾ × 4/3
↓
12/12
↓
1

Which factor undoes multiplication by ¾?

Its reciprocal, 4/3. The product is exactly one.

¾ of 20
15.

20 is ¾ of the whole
whole = 26⅔.

CHAPTER PROBLEM

Are 3 ÷ 1/2 and 1/2 ÷ 3 the same story or answer?

No. The first counts six half-sized groups. The second makes three equal shares of one sixth each.

QUESTION BANK · FOLD OR COVER THE RIGHT COLUMN

Check your reasoning

Try the problem	Solution and reasoning
01 How many half-litres fit into ¾ litre, including a partly filled measure?	One and a half measures. One full half-litre leaves a quarter, half of another measure.
02 What happens when the factor is exactly one?	The starting value stays the same. One whole copy is retained.
03 How many one-sixth-metre pieces can you cut from 1 1/2 m?	One metre contains six sixths and half a metre contains three. Nine pieces fit exactly.
04 How many sixth-metre sections fit in 2 1/3 m?	Two metres contain twelve sixths and one third contains two. Fourteen sections fit.
05 Is two thirds of a cup an exact number of quarter-cup measures?	(2/3) ÷ (1/4) = 8/3. It takes two full measures and two thirds of a measure.

3¼ − 1¾
↓
2 + 5/4 − (1 + 3/4)
↓
1½

How do you subtract three quarters from one quarter?

Exchange one whole for four quarters first. Five quarters minus three is two quarters.

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