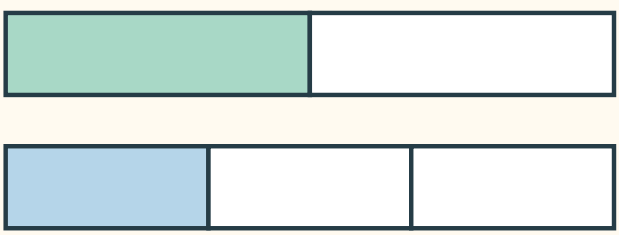
MATHS FIELD GUIDE · GRADE 5

Add and subtract equal-sized fraction units

OPENING PROBLEM

Add the shaded amounts. What common piece works?



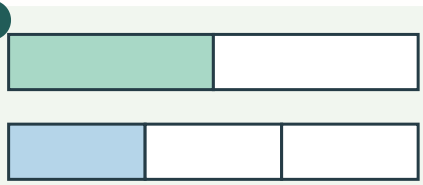
02 Change the unit before combining
03 Rules and worked cases
04 Ribbon for two gifts
05 Compare the models
06 Regroup at a whole
07 Check your reasoning

ILLUSTRATED PROBLEM SHEET

Change the unit before combining

Rename both quantities in equal-sized pieces of the same whole.

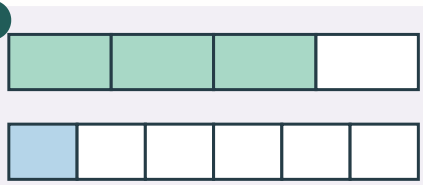
1



Add the shaded amounts. What common piece works?

Sixths: 3/6 + 2/6 = 5/6.

2



How much greater is the first amount?

Use twelfths. 9/12 − 2/12 = 7/12.

3

1⅓ + ¾
↓
1 + 4/12 + 9/12
↓
2 1/12

Why does the whole number increase?

Thirteen twelfths can be regrouped as a whole and one twelfth.

4

2¼ − ⅔
↓
1 + 15/12 − 8/12
↓
1 7/12

Where did the extra twelve twelfths come from?

One of the two wholes was exchanged. Total value stays fixed.

1/6 + 1/3
1/6 + 2/6 = 1/2.

1/3 − 1/6
2/6 − 1/6 = 1/6.

CHAPTER PROBLEM

Find 5/6 − 1/4 and check by addition.

7/12. Seven twelfths plus three twelfths remakes ten twelfths, or five sixths.

MATHS REFERENCE · GRADE 5

Add and subtract equal-sized fraction units

Adding fractions joins amounts. Subtracting fractions removes an amount or finds a difference.

To count the parts directly, first name them with the same-sized unit.

Cases to recognise

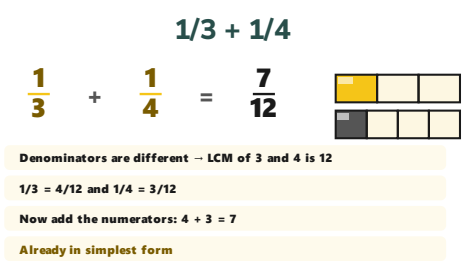
Situation	What to do and why
3/4 + 5/6	In twelfths add 9 and 10: 19/12 = 1 7/12.
5/6 – 3/8	In twenty-fourths subtract 9 from 20 to get 11/24.

Read the model

Build an addition

1/3 and 1/4 of the same whole become 4/12 and 3/12.

Together they make 7/12. The denominator stays twelve because the pieces are still twelfths.



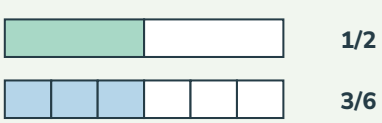
Adding fractions

Why adding denominators fails

1/3 + 1/4 is not 2/7.

Thirds and quarters are different units. Adding their unit names does not make a meaningful total.

fraction unit One equal part named by a denominator.
common denominator The same unit for both fractions.
inverse An operation that undoes another.



Do the equal-length bars agree?

Yes. Splitting each half into three pieces gives three shaded sixths.

WORKED INVESTIGATION

Ribbon for two gifts

One gift uses 1/2 m of ribbon and another uses 1/3 m. Divide a metre into six equal lengths so both pieces can be counted in sixths.

Look at this part	What it tells you
1/2 m	3/6 m
1/3 m	2/6 m
Together	5/6 m

Work it through

One full metre leaves 1/6 m after both gifts. Add the two pieces and the remainder to remake six sixths.

Catch the mistake

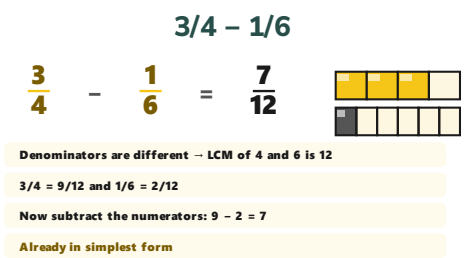
Adding both denominators would give 2/5 m, less than the first ribbon alone. The sum of positive lengths must grow.

Compare the cases

Use the same idea for subtraction

For 3/4 − 1/6, use twelfths: 9/12 − 2/12.

Seven twelfths remain, so the difference is 7/12.



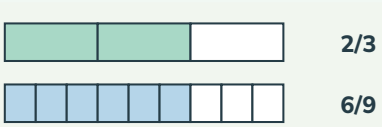
The common denominator need not be a product

For 1/2 + 1/6, sixths already work.

Three sixths plus one sixth gives four sixths, equal to two thirds. Using twelfths also works but needs extra renaming.

Change one condition

Replace the second ribbon with 1/4 m. Now four equal units per metre suffice, and the total is 3/4 m.



Which multiplier connects the labels?

Multiply both numbers by three. The strip keeps the same length.

ADD AND SUBTRACT EQUAL-SIZED FRACTION UNITS

Compare the models

A sum can exceed one

Three quarters plus one half becomes three quarters plus two quarters.

Five quarters is one whole and one quarter. Adding fractions does not require the result to stay below one.

Estimate before calculating

1/3 + 1/4 must be greater than 1/3 and less than one.

For 3/4 − 1/6, the answer must be below 3/4 but still positive.

Check with the inverse

Add the removed fraction back to the difference.

For 3/4 − 1/6 = 7/12, check 7/12 + 2/12 = 9/12 = 3/4.

Explain your reasoning

Find 1/2 + 1/5. Explain your chosen unit.

7/10. Five tenths and two tenths join to make seven tenths.

Two more worked cases

Situation	Reasoning
1 − 7/10	A whole has ten tenths, leaving 3/10.
Check 4/5 − __ = 1/2	In tenths, eight minus three leaves five. The gap is 3/10.

18/24
↓
divide both by 6
↓
3/4

Why divide by their greatest common factor?

It reaches lowest terms in one step. Three and four share no positive factor beyond one.

ILLUSTRATED PROBLEM SHEET

Regroup at a whole

A mixed number joins a whole-number part and a proper fraction. Keep the size of the fraction unit fixed.

1

$$2\frac{3}{4} = 2 + \frac{3}{4}$$
$$\downarrow$$
$$\text{8 quarters + 3 quarters}$$
$$\downarrow$$
$$11/4$$

How many quarter-units altogether?

Eleven. Each whole gives four quarters.

2

$$17/5$$
$$\downarrow$$
$$15/5 + 2/5$$
$$\downarrow$$
$$3\frac{2}{5}$$

How many full groups of five fit?

Three wholes with two fifths left over.

3

$$1\frac{3}{4} + 2\frac{1}{2}$$
$$\downarrow$$
$$3 + 3/4 + 2/4$$
$$\downarrow$$
$$4\frac{1}{4}$$

Where does the fourth whole come from?

Five quarters contain one whole plus one quarter.

4

$$3\frac{1}{4} - 1\frac{3}{4}$$
$$\downarrow$$
$$2 + 5/4 - (1 + 3/4)$$
$$\downarrow$$
$$1\frac{1}{2}$$

How do you subtract three quarters from one quarter?

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

13/4
$3\frac{1}{4}$.

$3\frac{1}{4} \times 4$
13.

CHAPTER PROBLEM

A learner adds the denominators in 1/2 + 1/3. Explain the error.

Halves and thirds are different units. Rename as three sixths and two sixths; the total is five sixths.

QUESTION BANK · FOLD OR COVER THE RIGHT COLUMN

Check your reasoning

Try the problem	Solution and reasoning
01 Can you add numerators directly for 2/7 + 3/7?	Yes. The unit is already sevenths. Five pieces give 5/7.
02 Is 2⅓ the same as two times one third?	No. It means two plus one third, or seven thirds.
03 A third gift uses 1/12 m along with the original two. How much ribbon is used?	In twelfths the lengths are 6/12, 4/12 and 1/12 m. Their sum is 11/12 m.
04 What must be added to 3/8 to reach 2/3?	Sixteenths will not match thirds. Use twenty-fourths: 16/24 – 9/24 = 7/24.
05 Is 7/9 + 2/3 greater than one? By how much?	The sum is 13/9, exceeding 9/9 by 4/9.

3/5 and 5/8
↓
3 × 8 = 24
↓
5 × 5 = 25

Which is larger?

Write both in fortieths. 25/40 exceeds 24/40, so 5/8 is larger.

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