



11+ Ratio and proportion Revision

Test your skills • Challenge yourself • Build confidence

Suitable for GL, Independent Schools, and
Grammar School Preparation

1. What is Ratio?

A **ratio** is a way of comparing two or more quantities.

For example:

2 : 3

This means:

- 2 parts of one quantity
- compared with 3 parts of another quantity

It does **not** necessarily mean there are only 2 and 3 objects.

There could be:

2 : 3

4 : 6

10 : 15

20 : 30

All of these ratios describe the same relationship.

Key idea

A ratio tells you about the **relationship between quantities**, not simply the quantities themselves.

2. Simplifying Ratios

A ratio should usually be written in its **simplest form**.

To simplify a ratio, divide every part by the same number.

Example

Simplify:

18 : 24

The highest common factor of 18 and 24 is 6.

So:

$$18 \div 6 = 3$$

$$24 \div 6 = 4$$

Therefore:

$$\mathbf{18 : 24 = 3 : 4}$$

Remember

Whatever you do to one side of a ratio, you must do to **every part** of the ratio.

You cannot subtract or divide just one number.

3. Ratios and Units

Before working with a ratio, make sure the quantities are in the **same units**.

For example:

2 metres : 50 centimetres

These units are different.

Convert 2 metres into centimetres:

2 metres = 200 centimetres

So:

200 : 50

Divide both sides by 50:

4 : 1

Important

Always check the units before simplifying a ratio.

This is a common place where 11+ questions try to catch you out.

3. Equivalent Ratios

Equivalent ratios have the same relationship.

For example:

2 : 5

can be multiplied by 2:

4 : 10

or multiplied by 3:

6 : 15

or multiplied by 10:

20 : 50

All represent the same ratio.

Example

Complete:

3 : 7 = 15 : ?

3 has been multiplied by 5.

So 7 must also be multiplied by 5.

$$7 \times 5 = 35$$

Therefore:

3 : 7 = 15 : 35

Golden rule

Multiply or divide every part by the same number.

5. Sharing An Amount In A Ratio

This is one of the most important ratio skills for the 11+.

Suppose £60 is shared in the ratio:

2 : 3

Step 1: Find the total number of parts

$$2 + 3 = 5 \text{ parts}$$

Step 2: Find the value of one part

$$£60 \div 5 = \textbf{£12}$$

Step 3: Find each share

First share:

$$2 \times \textbf{£12} = \textbf{£24}$$

Second share:

$$3 \times \textbf{£12} = \textbf{£36}$$

Answer:

£24 and £36

The method to remember

Add → Divide → Multiply

1. Add the ratio parts.
2. Divide the total by the number of parts.
3. Multiply to find each share.

6. Finding A Missing Amount

Sometimes you are given one part of a ratio and need to find another.

For example:

The ratio of boys to girls is:

3 : 5

There are **18 boys**.

How many girls are there?

The 3 parts represent 18.

So:

$$18 \div 3 = \mathbf{6}$$

One part is worth 6.

Girls:

$$5 \times 6 = \mathbf{30}$$

Answer:

30 girls

Think of it as:

Ratio part → Actual amount → One part → Missing amount

7. Proportion

Two quantities are **proportional** when they increase or decrease at the same rate.

For example:

If 1 notebook costs £2, then:

2 notebooks cost £4

3 notebooks cost £6

4 notebooks cost £8

The cost changes in proportion to the number of notebooks.

A useful strategy

When you are given a proportion question, ask:

“What is the value of one?”

Once you know the value of one item, you can usually find the required amount.

8. Ratio Vs Proportion

Although ratio and proportion are closely connected, they are not exactly the same.

Ratio

Compares quantities.

Example:

2 : 3

Proportion

Shows that two ratios or relationships are equivalent.

Example:

2 : 3 = 8 : 12

The key is to recognise when quantities change by the **same scale factor**.

9. Worked Examples

EXAMPLE 1 — SIMPLIFYING A RATIO

Question

There are **12 red counters** and **20 blue counters**.

Write the ratio of red counters to blue counters in its simplest form.

Step 1

Write the ratio:

12 : 20

Step 2

Find the highest common factor.

The highest common factor of 12 and 20 is 4.

Step 3

Divide both parts by 4.

$$12 \div 4 = 3$$

$$20 \div 4 = 5$$

Answer:

3 : 5

Key lesson

To simplify a ratio, divide **every part by the same number**.

EXAMPLE 2 — SHARING IN A RATIO

Question

£84 is shared between two children in the ratio:

3 : 4

How much does each child receive?

Step 1: Add the parts

$$3 + 4 = 7$$

Step 2: Find the value of one part

$$£84 \div 7 = \textbf{£12}$$

Step 3: Find each share

First child:

$$3 \times \text{£12} = \textbf{£36}$$

Second child:

$$4 \times \text{£12} = \textbf{£48}$$

Answer:

£36 and £48

Check

$$£36 + £48 = £84 \checkmark$$

Key lesson

For ratio sharing:

Add → Divide → Multiply

EXAMPLE 3 — FINDING A MISSING QUANTITY

Question

The ratio of pencils to pens in a stationery box is:

2 : 5

There are **14 pencils**.

How many pens are there?

tep 1

2 parts represent 14 pencils.

$$14 \div 2 = \mathbf{7}$$

So one part is worth 7.

Step 2

Pens represent 5 parts.

$$5 \times 7 = \mathbf{35}$$

Answer:

35 pens

Key lesson

If you know the actual amount for one part of the ratio, divide to find the value of one part.

EXAMPLE 4 — RATIO WITH THREE QUANTITIES

Question

The ratio of red, blue and green sweets in a bag is:

2 : 3 : 5

There are **40 sweets altogether**.

How many green sweets are there?

Step 1: Add all the parts

$$2 + 3 + 5 = 10$$

Step 2: Find one part

$$40 \div 10 = 4$$

Step 3: Find the green sweets

Green represents 5 parts.

$$5 \times 4 = 20$$

Answer:

20 green sweets

Key lesson

When a ratio has three or more quantities, **add every part** before finding the value of one part.

EXAMPLE 5 — PROPORTION IN A REAL-LIFE PROBLEM

Question

A recipe for 4 people requires **300 g of flour**.

How much flour is needed for 10 people?

Step 1: Find the amount for one person

$$300 \div 4 = \mathbf{75\text{ g}}$$

Step 2: Multiply for 10 people

$$75 \times 10 = \mathbf{750\text{ g}}$$

Answer:

750 g

Another way to think about it

4 people → 300 g

8 people → 600 g

10 people → 750 g

The quantities increase at the same rate.

Key lesson

When quantities are proportional, find the amount for **one** first whenever possible.

10. COMMON 11+ TRAPS

Ratio and proportion questions can look straightforward, but small mistakes can change the answer completely.

TRAP 1 — Forgetting to simplify

If you write:

12 : 18

you should continue simplifying:

2 : 3

unless the question specifically asks for an equivalent ratio.

TRAP 2 — Only changing one side

If:

2 : 5

is multiplied by 3, you must multiply **both** numbers.

Correct:

6 : 15

Not:

6 : 5

TRAP 3 — Forgetting to add all the parts

For:

2 : 3 : 5

the total number of parts is:

$$2 + 3 + 5 = \mathbf{10}$$

Not 5.

TRAP 4 — Ignoring units

Remember:

1 metre = 100 centimetres

1 kilogram = 1,000 grams

1 litre = 1,000 millilitres

Convert quantities into the same units before comparing them.

TRAP 5 — Dividing by the wrong number

When sharing £60 in the ratio:

2 : 3

do not divide £60 by 2.

First find the total number of parts:

$$2 + 3 = 5$$

Then:

$$£60 \div 5 = £12$$

TRAP 6 — Not checking your answer

If £84 is shared in the ratio 3 : 4 and you get £36 and £48:

$$36 + 48 = 84 \checkmark$$

Always check that your answer makes sense.

11. YOUR FIVE PRACTICE QUESTIONS

Now try these independently.

Remember to show your working.

QUESTION 1

Simplify the ratio:

24 : 36

Answer: _____

QUESTION 2

£72 is shared between two people in the ratio:

5 : 4

How much does each person receive?

Answer: £_____ and £_____

QUESTION 3

The ratio of boys to girls in a class is:

3 : 4

There are **21 boys**.

How many pupils are there altogether?

Answer: _____ pupils

QUESTION 4

A recipe for 6 people requires **450 g of flour**.

How much flour is needed for 10 people?

Answer: _____ g

QUESTION 5

The ratio of red, blue and green counters is:

3 : 4 : 5

There are **48 counters altogether**.

How many blue counters are there?

Answer: _____ blue counters

ANSWERS

QUESTION 1

24 : 36

The highest common factor is 12.

$$24 \div 12 = 2$$

$$36 \div 12 = 3$$

Answer: 2 : 3

QUESTION 2

The ratio is:

5 : 4

Total parts:

$$5 + 4 = 9$$

Value of one part:

$$£72 \div 9 = £8$$

First share:

$$5 \times £8 = £40$$

Second share:

$$4 \times £8 = £32$$

Answer: £40 and £32

QUESTION 3

Boys : girls = 3 : 4

3 parts = 21 boys.

$$21 \div 3 = 7$$

One part = 7 pupils.

Girls:

$$4 \times 7 = 28$$

Total pupils:

$$21 + 28 = 49$$

Answer: 49 pupils

QUESTION 4

6 people require 450 g.

Amount for one person:

$$450 \div 6 = 75 \text{ g}$$

For 10 people:

$$75 \times 10 = 750 \text{ g}$$

Answer: 750 g

QUESTION 5

Red : blue : green = 3 : 4 : 5

Total parts:

$$3 + 4 + 5 = 12$$

Value of one part:

$$48 \div 12 = 4$$

Blue represents 4 parts:

$$4 \times 4 = 16$$

Answer: 16 blue counters

RATIO & PROPORTION

QUICK REVISION CHECKLIST

Before finishing, make sure you can:

- ☐ Explain what a ratio means.
- ☐ Simplify a ratio.
- ☐ Find an equivalent ratio.
- ☐ Convert units before using a ratio.
- ☐ Share an amount in a given ratio.
- ☐ Find a missing quantity from a ratio.
- ☐ Work with ratios involving three quantities.
- ☐ Solve simple proportion problems.
- ☐ Find the value of one when quantities are proportional.
- ☐ Check whether your final answer is sensible.

THE GOLDEN RULES

RATIO

Compare the quantities.

SIMPLIFY

Divide every part by the same number.

SHARING

Add → Divide → Multiply

PROPORTION

Find the value of one → Scale up or down.

ALWAYS

Check the units and check your answer.

WELL DONE!

You have completed the **Acumen Teach 11+ Ratio & Proportion Revision Guide**.

The best way to improve is to revisit the examples, identify the method being used, and then attempt the practice questions again without looking at the answers.

Keep practising. Keep improving. Keep building confidence.

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