ESW Support Materials: Essential Application of Number Skills

Ratio and Proportion

The purpose of these materials is to assist centres with supporting their learners when working towards the Essential Application of Number Skills (EAoNS) qualification at Level 2, and preparing for the EAoNS Level 2 Confirmatory Test.

The materials focus consist of:

- a brief explanation of the basics
- worked examples
- practice questions and answers with workings
- multiple-choice test practice questions and answers with workings.

The contents of these materials are as follows:

Proportion

When numbers or amounts are in direct proportion, they are related.
When one amount goes up, the other goes up at the same rate.

Example
There are 6 eggs in a box.
There are 12 eggs in total in 2 boxes, 30 eggs in 5 boxes, and so on.
The number of eggs and the number of boxes are in proportion.

Example
5 litres of paint will cover an area of 60 m^2.
$2\frac{1}{2}$ litres of paint will cover 30 m^2.
1 litre of paint will cover 12 m^2.

Calculating with proportion

Here's how to work out the amounts so they are in proportion.

A recipe to make 12 biscuits uses 150 grams of flour.
How much flour is used to make 60 biscuits?

This is how to work out the answer.

12 biscuits use 150 grams of flour.

So 1 biscuit uses $\frac{150}{12}$ grams of flour.

60 biscuits use $\frac{60 \times 150}{12}$ grams of flour

To make the calculation more manageable, **cancel down** the numbers.

Divide the top number and the bottom number by a common factor.

In this case, 12 is a common factor of 60 and 12. This means that 60 and 12 can both be divided by 12 with no remainders.

60 ÷ 12 = 5 and 12 ÷ 12 = 1

$$\frac{^{5}\cancel{60} \times 150}{^{1}\cancel{12}}$$

So $\frac{60 \times 150}{12}$ is the same as $\frac{5 \times 150}{1}$

5 × 150 ÷ 1 = 750

Answer: 750 grams

If you don't know how to cancel down then you need to practise this as it will help with all of your division calculations.

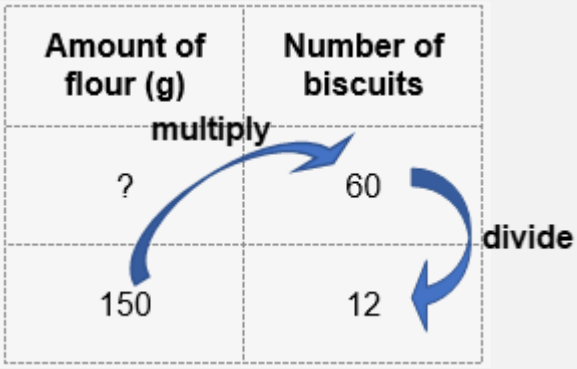
A different way of doing the calculation is to set out the given information in columns.

Grams of flour	Number of biscuits
150	12

Next, put in the number of biscuits needed in the correct column.
The question mark ? shows the number we need to work out. In this case it is the amount of flour.

Amount of flour (g)	Number of biscuits
?	60
150	12

These are the calculations to do.



Divide 60 by 12
Then multiply by 150
60 ÷ 12 = 5
5 × 150 = 750
Answer: 750 grams

This is what's happening in the calculation.
We know that every 150 grams of flour make 12 biscuits.
We want to make 60 biscuits.
First we work out how many lots of 12 there are in 60.
This is 60 ÷ 12, which is 5
Each lot of 12 biscuits needs 150 g of flour.
So the total amount of flour for 5 lots of biscuits is 5 × 150, which is 750
(Note: you get the same answer if you multiply 60 by 150 first and then divide by 12. Doing the division first gives you nicer numbers to work with)

Example
A recipe to make 12 biscuits uses 150 grams of flour.
What if we have 1500 grams of flour? How many biscuits can we make?

12 biscuits use 150 grams of flour.

So 1 gram of flour makes $\frac{12}{150}$ biscuits.

1500 grams of flour make $\frac{1500 \times 12}{150}$ biscuits

To make the calculation more manageable, cancel down the numbers.

150 is a common factor of 1500 and 150.

1500 ÷ 150 = 10 and 150 ÷ 150 = 1

$$\frac{{}^{10}\cancel{1500} \times 12}{{}^{1}\cancel{150}}$$

So $\frac{1500 \times 12}{150}$ is the same as $\frac{10 \times 12}{1}$

10 × 12 ÷ 1 = 120
Answer: 120 biscuits

Check if your answer makes sense. There is more flour so there should be more biscuits.

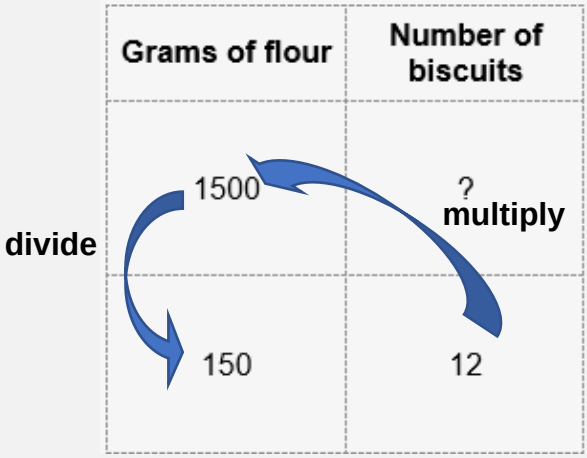
Using an alternative method, this is the information from the recipe in columns.

Grams of flour	Number of biscuits
150	12

This time, put in the amount of flour, in the correct column. The question mark ? shows the number we need to work out, the number of biscuits.

Grams of flour	Number of biscuits
1500	?
150	12

These are the calculations to do.



Divide 1500 by 150
Then multiply by 12

1500 ÷ 150 = 10
10 × 12 = 120
Answer: 120 biscuits

This is what's happening in the calculation.
We know that every 150 grams of flour make 12 biscuits.
We have 1500 grams of flour.
First we work out how many lots of 150 grams there are in 1500 grams.
This is 1500 ÷ 150, which is 10
Each lot of 150 grams makes 12 biscuits.
So the total number of biscuits in 10 lots is 10 × 12, which is 120

Example

A tin of 5 litres of paint will cover 60 square metres of wall.

What area of wall will 20 litres of paint cover?

5 litres cover 60 square metres

So 1 litre covers $\frac{60}{5}$ square metres.

20 litres cover $\frac{20 \times 60}{5}$ square metres

To make the calculation more manageable, cancel down the numbers.

5 is a common factor of 20 and 5.

20 ÷ 5 = 4 and 5 ÷ 5 = 1

$$\frac{{}^{4}\cancel{20} \times 60}{{}^{1}\cancel{5}}$$

So $\frac{20 \times 60}{5}$ is the same as $\frac{4 \times 60}{1}$

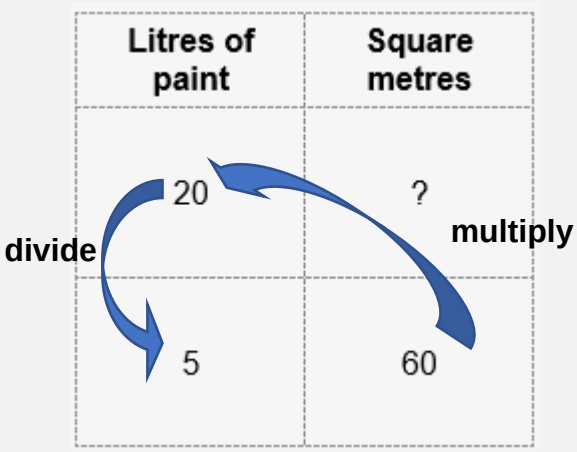
4 × 60 ÷ 1 = 240

Answer: 240 square metres

Using the alternative method:

Litres of paint	Square metres
5	60

Put the 20 litres in the correct column.



Divide 20 by 5
Multiply by 60

20 ÷ 5 = 4
4 × 60 = 240
Answer: 240 square metres

How much paint do you need to cover 150 square metres?

5 litres cover 60 square metres

So 1 square metre needs $\frac{5}{60}$ litres.

150 square metres need $\frac{5 \times 150}{60}$ litres

Cancel down the numbers.

10 is a common factor of 150 and 60.

150 ÷ 10 = 15 and 60 ÷ 10 = 6

$$\frac{5 \times {}^{15}\cancel{150}}{{}^{6}\cancel{60}}$$

3 is a common factor of 15 and 6.

15 ÷ 3 = 5 and 6 ÷ 3 = 2

$$\frac{5 \times {}^{5}\cancel{15}}{{}^{2}\cancel{6}}$$

So $\frac{5 \times 150}{6}$ is the same as $\frac{5 \times 5}{2}$

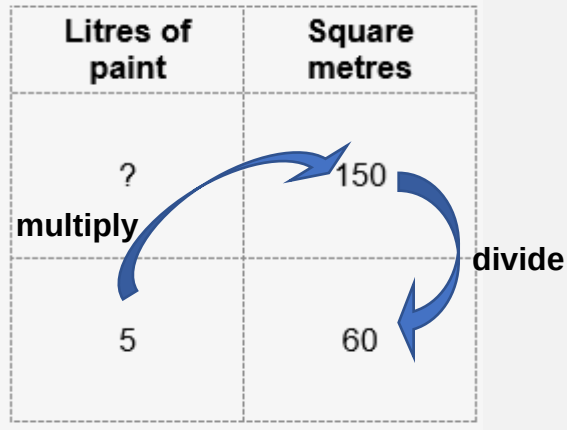
5 × 5 ÷ 2 = 12.5

Answer: 12.5 litres

Using the alternative method:

Litres of paint	Square metres
5	60

Put the 150 square metres in the correct column.



Divide 150 by 60
Multiply by 5

150 ÷ 60 = 2.5
2.5 × 5 = 12.5
Answer: 12.5 litres

The rule is:
Divide by the number in the same column.
Multiply by the number in the other column.

Practice questions

1. In a special offer, 8 small batteries cost £5
   What is the total cost of 40 small batteries?

2. To use a cleaning liquid, 30 ml of the liquid must be mixed with 100 ml of water.
   How much cleaning liquid must be mixed with 800 ml of water?

3. A fruit dessert to serve 6 people needs 400 g strawberries.
   How many people can you serve with dessert made with 1200 g of strawberries?

4. Chainsaw fuel is a mixture of 5 ml oil for every 200 ml of petrol.
   How much petrol do you need to add to 35 ml of oil?

5. A pattern of floor tiles uses 6 grey tiles for every 10 white tiles.
   How many grey tiles are used with 120 white tiles?

6. A car will go 450 miles on 50 litres of fuel.
   How much fuel will the car use to go 270 miles?

7. A bakery sells 4 pies for £7
   How many pies can you buy for £42?

8. On a map, a distance of 2 cm represents an actual distance of 500 m.
   What is the actual distance represented by 7 cm on the map?

9. To make fibreglass, 5 ml of hardener is added to every 250 g of resin.
   How much hardener is added to 1000 g of resin?

10. A car radiator needs a mixture of 50 ml of anti-freeze for every 100 ml of water.
    How much anti-freeze must be mixed with 750 ml of water?

Answers

1. 8 batteries cost £5

So 1 battery costs $\frac{5}{8}$ pounds.

40 batteries cost $\frac{40 \times 5}{8}$ pounds

Cancelling down (dividing by 8) $\frac{{}^{5}\cancel{40} \times 5}{{}^{1}\cancel{8}}$

5 × 5 ÷ 1 = 25

Answer: £25

2. 30 ml of liquid is mixed with 100 ml of water

So $\frac{30}{100}$ ml of liquid is mixed with 1 ml of water.

$\frac{800 \times 30}{100}$ ml of liquid is mixed with 800 ml of water

Cancelling down (dividing by 8) $\frac{{}^{8}\cancel{800} \times 30}{{}^{1}\cancel{100}}$

8 × 30 ÷ 1 = 240

Answer: 240 ml

3. To serve 6 people needs 400 g strawberries

So $\frac{6}{400}$ people can be served with 1 g of strawberries.

$\frac{1200 \times 6}{400}$ people can be served with 1200 g of strawberries

Cancelling down (dividing by 100) $\frac{{}^{12}\cancel{1200} \times 6}{{}^{4}\cancel{400}}$

Cancelling again (dividing by 4) $\frac{{}^{3}\cancel{12} \times 6}{{}^{1}4}$

3 × 6 ÷ 1 = 18

Answer: 18 people

4. 5 ml oil for every 200 ml of petrol

So 1 ml of oil is mixed with $\frac{200}{5}$ ml of petrol.

35 ml of oil is mixed with $\frac{35 \times 200}{5}$ of petrol.

Cancelling down (dividing by 5) $\frac{{}^{7}\cancel{35} \times 200}{{}^{1}\cancel{5}}$

7 × 200 ÷ 1 = 1400

Answer: 1400 ml

5. There are 6 grey tiles for every 10 white tiles

So $\frac{6}{10}$ grey tiles for every 1 white tile.

$\frac{120 \times 6}{10}$ grey tiles for 120 white tiles

Cancelling down (dividing by 10) $\frac{{}^{12}\cancel{120} \times 6}{{}^{1}\cancel{10}}$

12 × 6 ÷ 1 = 72

Answer: 72 grey tiles

6. 450 miles take 50 litres of fuel

So 1 mile takes $\frac{50}{450}$ litres of fuel.

270 miles take $\frac{270 \times 50}{450}$ litres of fuel.

Cancelling down (dividing by 50) $\frac{270 \times {}^{1}\cancel{50}}{{}^{9}\cancel{450}}$

Cancelling again (dividing by 9) $\frac{{}^{30}\cancel{270} \times 1}{{}^{1}\cancel{9}}$

30 × 1 ÷ 1 = 30

Answer: 30 litres

7. 4 pies for £7, so $\frac{4}{7}$ pies for £1 .

$\frac{42 \times 4}{7}$ pies for £42

Cancelling down (dividing by 7) $\frac{^{6}\cancel{42} \times 4}{^{1}\cancel{7}}$

6 × 4 ÷ 1 = 24
Answer: 24 pies

8. 2 cm represent 500 m, so 1 cm represents $\frac{500}{2}$ m .

7 cm represent $\frac{7 \times 500}{2}$ m.

Cancelling down (dividing by 2) $\frac{7 \times {}^{250}\cancel{500}}{^{1}\cancel{2}}$

7 × 250 ÷ 1 = 1750
Answer: 1750 m

9. 5 ml of hardener for 250 g of resin, so $\frac{5}{250}$ ml of hardener for 1 g of resin.

$\frac{1000 \times 5}{250}$ ml of hardener for 1000 g of resin.

Cancelling down (dividing by 5) $\frac{^{200}\cancel{1000} \times 5}{^{50}\cancel{250}}$

Cancelling again (dividing by 50) $\frac{^{4}\cancel{200} \times 5}{^{1}\cancel{50}}$

4 × 5 ÷ 1 = 20
Answer: 20 ml

10. 50 ml of anti-freeze for 100 ml of water, so $\frac{50}{100}$ ml of antifreeze for 1 ml of water.

$\frac{750 \times 50}{100}$ ml of antifreeze for 750 ml of water.

Cancelling down (dividing by 50) $\frac{750 \times {}^{1}\cancel{50}}{^{2}\cancel{100}}$

750 × 1 ÷ 2 = 375
Answer: 375 ml

Ratios

A ratio is a different way of expressing a proportion.

A ratio has two or more numbers separated by **:** (a colon)

The ratio 1 : 8 means
'for every 1 of one thing, there are 8 of another'.

A ratio will have a description to say what the numbers refer to. For example,
In a nursery, the ratio of adults to children is 1 : 8
This means that for every 1 adult there are 8 children.

How do we know that it's 1 adult to 8 children, not 1 child to 8 adults?
The words are written in the same order as the numbers.
The ratio is adults to children, so the first number in the ratio is adults, and the last number is children.

A ratio can have more than two numbers. For example,
A concrete mix has cement, sand and gravel in the ratio 1 : 2 : 4

Looking at the order of the words,

- cement is first, so that's the 1
- sand is next, so that's 2
- gravel is last so that's 4

The concrete mix is 1 part cement to 2 parts sand to 4 parts gravel.

The 'parts' can be any unit, as long as it's the same for all the ingredients.
We can mix 1 bucket of cement with 2 buckets of sand and 4 buckets of gravel, or
1 tonne of cement with 2 tonnes of sand and 4 tonnes of gravel.

Calculating with ratios

Working out amounts in a given ratio is the same as working with other proportions.

Example

In a nursery, the ratio of adults to children is 1 : 8

How many children can there be with 3 adults?

This is how to work out the answer.

The ratio shows there must be 1 adult for 8 children

So $\frac{8}{1}$ children for 1 adult.

$\frac{3 \times 8}{1}$ children for 3 adults.

$3 \times 8 \div 1 = 24$

Answer: 24 children

Using the alternative method, find the numbers that refer to adults and children in the ratio, and set them out in columns.

Number of adults	Number of children
3	?
1	8

Divide the number in the same column.

Multiply your answer by the number in the other column

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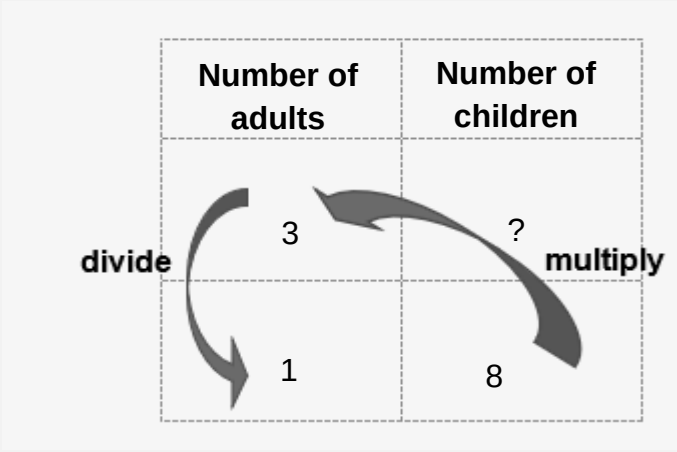


$3 \div 1 = 3$

$3 \times 8 = 24$

Answer: 24 children

This makes sense because there are 8 times as many children as adults.

Example
A concrete mix is made with cement, sand and gravel in the ratio 1 : 2 : 4
A builder uses 1000 kg of gravel in a concrete mix.
How much sand must the builder use?
This is how to work out the answer.
The ratio shows there must be 2 parts of sand for 4 parts of gravel.

So $\frac{2}{4}$ parts of sand for 1 part of gravel.

$\frac{1000 \times 2}{4}$ kg of sand for 1000 kg of gravel.

Cancelling down ((dividing by 2) $\frac{1000 \times {}^{1}\cancel{2}}{{}^{2}\cancel{4}}$

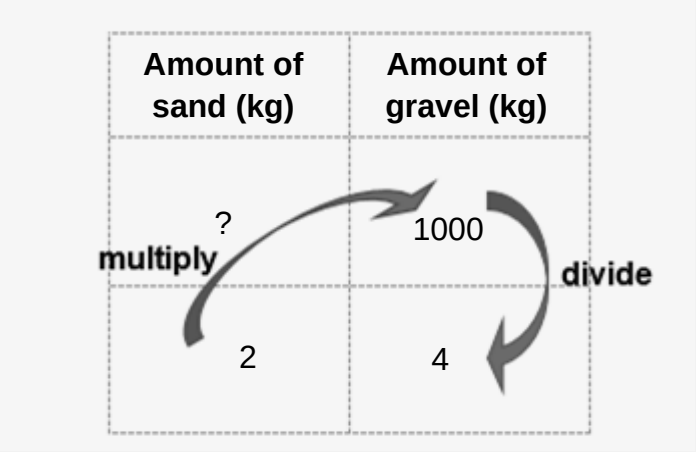
1000 × 1 ÷ 2 = 500
Answer: 500 kg of sand

This makes sense because there are 4 parts of gravel for every 2 parts of sand.
That's half as much sand as gravel.
For 1000 kg of gravel, there will be half as much sand, that is 500 kg.

Using the alternative method, find the numbers that refer to sand and gravel in the ratio, and set them out in columns.

Amount of sand (kg)	Amount of gravel (kg)
?	1000
2	4

Divide the number in the same column.
Multiply your answer by the number in the other column



1000 ÷ 4 = 250
250 × 2 = 500
Answer: 500 kg

Practice questions

1. A drink is made with squash and water in the ratio 2 : 5
   How much water must be used with 50 ml of squash?

2. A workshop produces shirts and dresses in the ratio 3 : 2
   One day, the workshop produces 3000 dresses.
   How many shirts does the workshop produce that day?

3. Blue, white and grey tiles are used on a floor in the ratio 5 : 1 : 2
   There are 120 blue tiles.
   How many grey tiles are there?

4. A designer makes a scale model of a car.
   The sizes on the model and the sizes on the actual car are in the ratio 1: 50
   The length of the actual car is 420 cm.
   What is the length of the model?

5. Fuel for a dirt bike is a mixture of petrol and oil in the ratio 32 : 1
   How much oil must be used with 640 ml of petrol?

Answers

1. The ratio of squash to water is 2 : 5

So 1 part of squash to $\frac{5}{2}$ parts of water.

50 ml of squash for $\frac{50 \times 5}{2}$ ml of water.

Cancelling down (dividing by 2) $\frac{^{25}\cancel{50} \times 5}{^{1}\cancel{2}}$

25 × 5 ÷ 1 = 125

Answer: 125 ml

2. The ratio of shirts to dresses is 3 : 2

So $\frac{3}{2}$ shirts for every 1 dress.

$\frac{3000 \times 3}{2}$ shirts for 3000 dresses.

Cancelling down (dividing by 2) $\frac{^{1500}\cancel{3000} \times 3}{^{1}\cancel{2}}$

1500 × 3 ÷ 1 = 4500

Answer: 4500 shirts

3. The ratio of blue tiles to grey tiles is 5 : 2 (this question does not deal with white tiles).

So 1 blue tile for every $\frac{2}{5}$ grey tiles.

120 blue tiles for $\frac{120 \times 2}{5}$ grey tiles.

Cancelling down (dividing by 5) $\frac{^{24}\cancel{120} \times 2}{^{1}\cancel{5}}$

24 × 2 ÷ 1 = 48

Answer: 48 grey tiles

4. The ratio of the model to the real car is 1 : 50

So $\frac{1}{50}$ cm on the model is 1 cm on the real car.

$\frac{420 \times 1}{5}$ cm on the model is 420 cm on the real car.

Cancelling down (dividing by 10) $\frac{^{42}\cancel{420} \times 1}{^{5}\cancel{50}}$

42 ÷ 5 = 8.4
Answer: 8.4 cm

5. The ratio of petrol to oil is 32 : 1

For 1 ml of petrol, there should be $\frac{1}{32}$ ml of oil

For 640 ml of petrol, there should be $\frac{640 \times 1}{32}$ ml of oil.

Cancelling down (dividing by 8) $\frac{^{80}\cancel{640} \times 1}{^{4}\cancel{32}}$

Cancelling again (dividing by 8) $\frac{^{20}\cancel{80} \times 1}{^{1}4}$

20 × 1 ÷ 1 = 20
Answer: 20 ml

Simplifying ratios

Some ratios are equivalent. This means that they express the same proportion.

If you mix 2 buckets of sand with 1 bucket of cement, the ratio of sand to cement is 2 : 1

Mix 4 buckets of sand with 2 buckets of cement, and the ratio is still 2 : 1

Mix 6 buckets of sand with 3 buckets of cement, and the ratio is the same.
And so on.

2 : 1 = 4 : 2 = 6 : 3
These are **equivalent** ratios.

Ratios are usually given in their simplest form.
That means using the smallest whole numbers possible.
Instead of 40 : 10, it's simpler to use the equivalent ratio 4 : 1

Simplifying a ratio

Divide the numbers in the ratio by a common factor.
(A common factor is a number that will divide into all the numbers without leaving a remainder.)
Keep dividing until there are no common factors.

In the ratio 40 : 10, a common factor is 10
40 ÷ 10 = 4
10 ÷ 10 = 1
The simplified ratio is 4 : 1
Check that the simplified ratio is written in the correct order.
40 : 10 = 4 : 1

Example
Simplify the ratio 36 : 24

Both numbers are even, so a common factor is 2
36 ÷ 2 = 18
24 ÷ 2 = 12

Divide by 2 again
18 ÷ 2 = 9
12 ÷ 2 = 6

A common factor of 9 and 6 is 3
9 ÷ 3 = 3
6 ÷ 3 = 2

There are no common factors of 3 and 2
36 : 24 = 3 : 2

Practice questions

Simplify these ratios

a. 48 : 16

b. 15 : 45

c. 84 : 49 : 14

d. 54 : 12 : 24

e. 135 : 81

f. In a workplace, there are 36 men and 30 women.
What is the ratio of men to women in the workplace?

g. A café serves 24 hot chocolates and 60 coffees.
What is the ratio of hot chocolates to coffees?

h. A recipe uses 450 grams of flour and 300 grams of sugar.
What is the ratio of flour to sugar?

i. A bike dealer sells 140 electric bikes and 105 regular bikes.
What is the ratio of electric bikes to regular bikes?

j. A restaurant receives 72 good reviews and 96 bad reviews.
What is the ratio of good reviews to bad reviews?

Answers

a. A common factor of 48 and 16 is 8
48 ÷ 8 = 6 and 16 ÷ 8 = 2
A common factor of 6 and 2 is 2
6 ÷ 2 = 3 and 2 ÷ 2 = 1
No more common factors
Answer 3 : 1

b. A common factor of 15 and 45 is 5 (as both numbers end in 5 or 0)
15 ÷ 5 = 3 and 45 ÷ 5 = 9
A common factor of 3 and 9 is 3
3 ÷ 3 = 1 and 9 ÷ 3 = 3
No more common factors
Answer 1 : 3

c. A common factor of 84, 49 and 14 is 7
84 ÷ 7 = 12 and 49 ÷ 7 = 7 and 14 ÷ 7 = 2
No more common factors of all three numbers
Answer 12 : 7 : 2

d. A common factor of 54, 12 and 24 is 6
54 ÷ 6 = 9 and 12 ÷ 6 = 2 and 24 ÷ 6 = 4
No more common factors of all three numbers
Answer 9 : 2 : 4

e. A common factor of 135 and 81 is 3
135 ÷ 3 = 45 and 81 ÷ 3 = 27
A common factor of 45 and 27 is 9
45 ÷ 9 = 5 and 27 ÷ 9 = 3
No more common factors
Answer 5 : 3

f. A common factor of 36 and 30 is 6
36 ÷ 6 = 6 and 30 ÷ 6 = 5
No more common factors
Answer 6 : 5

g. The ratio of hot chocolates to coffees is 24 : 60
A common factor of 24 and 60 is 12
24 ÷ 12 = 2 and 60 ÷ 12 = 5
No more common factors
Answer 2 : 5

h. The ratio of flour to sugar is 450 : 300
A common factor of 450 and 300 is 10
450 ÷ 10 = 45 and 300 ÷ 10 = 30
A common factor of 45 and 30 is 5
45 ÷ 5 = 9 and 30 ÷ 5 = 6
A common factor of 9 and 6 is 3
9 ÷ 3 = 3 and 6 ÷ 3 = 2
No more common factors
Answer 3 : 2

i. The ratio of electric bikes to regular bikes is 140 : 105
A common factor of 140 and 105 is 5
140 ÷ 5 = 28 and 105 ÷ 5 = 21
A common factor of 28 and 21 is 7
28 ÷ 7 = 4 and 21 ÷ 7 = 3
No more common factors
Answer 4 : 3

j. The ratio of good reviews to bad reviews is 72 : 96
A common factor of 72 and 96 is 6
72 ÷ 6 = 12 and 96 ÷ 6 =16
A common factor of 12 and 16 is 4
12 ÷ 4 = 3 and 16 ÷ 4 = 4
No more common factors
Answer 3 : 4

Dividing a total by a ratio

Sometimes we need to share a total amount using a given ratio.

Example
A bricklayer makes a mortar mixture with 1 bucket of cement for every 2 buckets of sand.
The builder needs 15 buckets of mixture.
How much cement and how much sand does he use in the mixture?

Mix 1 bucket of cement and 2 buckets of sand, and we have 3 buckets of mixture in total.
One lot of mixture has 3 buckets.
We need to find how many lots of 3 there are in 15
15 ÷ 3 = 5
So the builder needs 5 lots of 3 buckets of mixture
Each lot of mixture has 1 bucket of cement, so for 5 lots, 1 × 5 = 5 buckets of cement.
Each lot of mixture has 2 buckets of sand, so for 5 lots, 2 × 5 = 10 buckets of sand.

Mix 5 buckets of cement and 10 buckets of sand, and we have 15 buckets of mixture.

Example
A company makes desserts from a mixture of fruit juice and yogurt in the ratio 1 : 3
How much fruit juice and how much yogurt is there in a batch of 1000 litres of the mixture?

The total amount of mixture is 1000 litres.

The total of 1 part fruit juice and 3 parts yogurt is 1 + 3 = 4

Divide the total amount of mixture by the total number of parts in the ratio
1000 ÷ 4 = 250

Each lot of mixture has 1 part fruit juice.
1 × 250 = 250 litres of fruit juice

Each lot of mixture has 3 parts yogurt.
3 × 250 = 750 litres of yogurt.

To check, add the amounts together
250 + 750 = 1000

Practice questions

1. A pack contains 600 g of mixed nuts.
   The ratio of almonds to walnuts is 2 : 3
   What is the weight of walnuts in the pack?

2. A shop sells a box of 32 chocolates.
   The box contains dark chocolates and milk chocolates in the ratio 5 : 3
   How many dark chocolates are there?

3. A drink is made with squash and water in the ratio 1 : 9
   You want to make 1500 ml of the drink.
   How much squash do you use?

4. A car screen wash is a mixture of concentrate and water in the ratio 1 : 5
   How much water do you use to make 900 ml of the mixture?

5. A takeaway sells 294 meals.
   The ratio of vegan dishes to meat dishes is 3 : 4
   How many vegan meals does the takeaway sell?

Answers

1. The total number of parts in the ratio is 2 + 3 = 5
   Divide the total weight by the total number of parts 600 ÷ 5 = 120
   Each part is 120 grams
   In the ratio, there are 3 parts of walnuts 120 × 3 = 360

Answer 360 g of walnuts

2. The total number of parts in the ratio is 5 + 3 = 8
   Divide the total number of chocolates by the total number of parts 32 ÷ 8 = 4
   Each part is 4 chocolates
   In the ratio, there are 5 parts of dark chocolates 5 × 4 = 20

Answer 20 dark chocolates

3. The total number of parts in the ratio is 1 + 9 = 10
   Divide the total amount of drink by the total number of parts 1500 ÷ 10 = 150
   Each part is 150 ml
   In the ratio, there is 1 part of squash

Answer 150 ml of squash

4. The total number of parts in the ratio is 1 + 5 = 6
   Divide the total amount of screen wash by the total number of parts 900 ÷ 6 = 150
   Each part is 150 ml
   In the ratio, there are 5 parts of water 150 × 5 = 750

Answer 750 ml of water

5. The total number of parts in the ratio is 3 + 4 = 7
   Divide the total number of meals by the total number of parts 294 ÷ 7 = 42
   Each part is 42 meals
   In the ratio, there are 3 parts of vegan meals 3 × 42 = 126

Answer 126 vegan meals

Test practice questions

Tip: Decide what type of problem each question involves.
Do you know one part and need to work out the other? Are you simplifying a ratio?
Are you sharing a total using a ratio?

1. A café serves 64 cheese sandwiches and 48 chicken sandwiches.
   What is the ratio of cheese sandwiches to chicken sandwiches?

A	4 : 3
B	3 : 4
C	4 : 7
D	3 : 7

2. A breakfast cereal has 360 calories in every 100 g
   How many calories are there in 30 g of the cereal?

A	108 calories
B	117 calories
C	120 calories
D	330 calories

3. Concrete is a mixture of cement, sand and gravel in the ratio 1 : 2 : 4
   A builder uses 28 buckets of gravel to make concrete mixture.
   How many buckets of sand must the builder use?

A	7 buckets
B	8 buckets
C	14 buckets
D	24 buckets

4. A fruit drink is a mixture of pineapple juice and orange juice in the ratio 5 : 3
   How much pineapple juice is used to make 1200 ml of the fruit drink?

A	150 ml
B	240 ml
C	450 ml
D	750 ml

5. A shop sells 54 phones and 36 laptops in one month.
   What is the ratio of phones to laptops sold that month?

A	2 : 5
B	2 : 3
C	3 : 5
D	3 : 2

6. A cake mixture uses 20 g of butter for every 30 g of flour
How much butter is used to make 600 g of the mixture?

A	240 g
B	360 g
C	400 g
D	550 g

7. On a social media site, a video receives 490 likes and 350 dislikes
What is the ratio of likes to dislikes?

A	5 : 7
B	7 : 5
C	5 : 12
D	7 : 12

8. Chickens need shelter at night.
A shelter with a floor area of 3 m^2 is suitable for 8 chickens.
What is the floor area of a suitable shelter for 36 chickens?

A	7.5 m^2
B	13.5 m^2
C	41 m^2
D	96 m^2

9. A snack mixture has 90 g of raisins for every 60 g of nuts.
What is the weight of nuts in a pack of 450 g of the mixture?

A	420 g
B	300 g
C	270 g
D	180 g

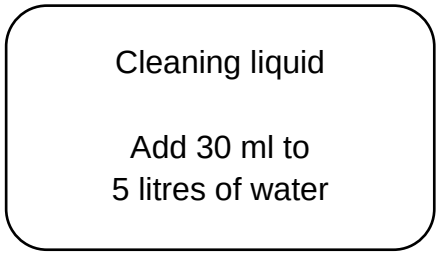
10. A judo club has 32 adult and 56 junior members.
What is the ratio of adults to juniors?

A	7 : 4
B	4 : 7
C	4 : 11
D	7 : 11

11. A sports club raises £54 000 for improvements.
The club spends the money on changing rooms, lighting and team shirts in the ratio 6 : 2 : 1
How much does the club spend on lighting?

A	£6 000
B	£12 000
C	£18 000
D	£27 000

12. This is the label on a bottle of cleaning liquid.



How much cleaning liquid must be added to 12 litres of water?

A	7.5 ml
B	37 ml
C	42.5 ml
D	72 ml

Test practice answers

1. The ratio of cheese sandwiches to chicken sandwiches is 64 : 48
   A common factor of 64 and 48 is 8
   64 ÷ 8 = 8
   48 ÷ 8 = 6
   A common factor of 8 and 6 is 2
   8 ÷ 2 = 4
   6 ÷ 2 = 3
   No more common factors

Answer A 4 : 3

2. 360 calories in 100g of cereal

So $\frac{360}{100}$ calories in 1 g of cereal.

$\frac{30 \times 360}{100}$ calories in 30 g of cereal.

Cancelling down (dividing by 10) $\frac{^{3}\cancel{30} \times 360}{^{10}\cancel{100}}$

Cancelling again (dividing by 10) $\frac{3 \times ^{36}\cancel{360}}{^{1}\cancel{10}}$

3 × 36 ÷ 1 = 108

Answer: A 108 calories

3. The ratio of sand to gravel is 2 : 4

So $\frac{2}{4}$ parts of sand to 1 part gravel.

$\frac{28 \times 2}{4}$ parts of sand to 28 parts of gravel.

Cancelling down (dividing by 7) $\frac{^{7}\cancel{28} \times 2}{^{1}4}$

7 × 2 ÷ 1 = 14

Answer: C 14 buckets

4. The total number of parts in the ratio is 5 + 3 = 8
Divide the total amount of drink by the total number of parts 1200 ÷ 8 = 150
Each part is 150 ml
In the ratio, there are 5 parts of squash 5 × 150 = 750
Answer D 750 ml

5. The ratio of phones to laptops is 54 : 36
A common factor of 54 and 36 is 6
54 ÷ 6 = 9
36 ÷ 6 = 6
A common factor of 9 and 6 is 3
9 ÷ 3 = 3
6 ÷ 3 = 2
No more common factors
Answer D 3 : 2

6. The total of the weights of butter and flour is 20 + 30 = 50
Divide the total amount of mixture by the total of the weights in the ratio 600 ÷ 50 = 12
There are 12 lots of butter and flour
In the ratio, there are 20 g of butter in each lot 12 × 20 = 240
Answer A 240 g

7. The ratio of likes to dislikes is 490 : 350
A common factor of 490 and 350 is 10
490 ÷ 10 = 49
350 ÷ 10 = 35
A common factor of 49 and 35 is 7
49 ÷ 7 = 7
35 ÷ 7 = 5
No more common factors
Answer B 7 : 5

8. 3 m^2 for 8 chickens
So $\frac{3}{8}$ m^2 for 1 chicken.
$\frac{36 \times 3}{8}$ m^2 for 36 chickens.
Cancelling down (dividing by 4) $\frac{{}^{9}\cancel{36} \times 3}{{}^{2}\cancel{8}}$

9 × 3 ÷ 2 = 13.5
Answer B 13.5 m^2

9. The total of the weights of raisins and nuts is 90 + 60 = 150
Divide the total amount of mixture by the total of the weights in the ratio 450 ÷ 150 = 3
There are 3 lots of raisins and nuts
In the ratio, there are 60 g of nuts in each lot 3 × 60 = 180
Answer D 180 g

10. The ratio of adults to juniors is 32 : 56
A common factor of 32 and 56 is 8
32 ÷ 8 = 4
56 ÷ 8 = 7
No more common factors
Answer B 4 : 7

11. The total number of parts in the ratio is 6 + 2 + 1 = 9
Divide the total amount by the total number of parts in the ratio 54000 ÷ 9 = 6000
Each part is £6000
In the ratio, there are 2 parts for lighting 2 × 6000 = 12000
Answer B £12000

12. 30 ml cleaning liquid for 5 litres of water
So $\frac{30}{5}$ ml for 1 litre.
$\frac{12 \times 30}{5}$ ml for 12 litres.
Cancelling down (dividing by 5) $\frac{12 \times {}^{6}\cancel{30}}{{}_{1}\cancel{5}}$

12 × 6 ÷ 1 = 72
Answer D 72 ml