Ratio Level 2

How to Guide

Name: _____

Date: _____

Skills Check

Rate how confident you feel about the skills tested in this section:

Skill	Not a clue!	I know a little	I feel okay with this	I feel quite confident	I feel very confident
Write numbers as a ratio					
Find ratio parts					
Split an amount into a ratio					

When you have finished the booklet, use a different colour to mark your confidence levels again.

Ratio

Introduction

A ratio is a way of comparing amounts with each other. We tend to refer to ratio parts with the parts adding up to make the whole total. The units should be the same for all parts of the ratio or, if not, units should be labelled. Always be clear about the units you are working with.

There are various methods to working with ratios and if you have a different method that you find works well then you don't have to change it.

Ratios are used in many everyday situations such as recipes, medicine, construction and health and safety.

Writing Numbers as Ratios

The numbers (parts) should always be written in the same order the question is written in.

Ratios are written with a colon : between the different parts.

Ratios are often written in the simplest form so you may need to simplify your ratio by division. All parts of the ratio should be whole numbers in the final answer.

Example

In a recipe you need to mix 300g flour, 200g butter and 200g sugar. Show this as a ratio in its simplest form.

ANSWER

First write the ratio in the order it is written 300 : 200 : 200 then use division to simplify

Divide each part by 100 to give

3 : 2 : 2

Try it Out

Question 1 – write the following as ratios in their simplest form

a) To make a cleaning solution you must mix 5ml of bleach to 100ml of water.

b) Mix a fruit cocktail by adding 200ml orange juice, 150ml pineapple juice and 100ml of mango juice.

c) A builder uses 14kg of sand and 3.5kg of cement to make a concrete mixture. What is the ratio of cement to sand?

Find Ratio Parts

When a ratio is directly proportional you can find missing elements by filling in the gaps in a ratio.

You usually are given at least three bits of information you can fill in and have one part missing.

It's a good idea to set out the key information with clear headings.

You then use multiplication or division to find the factor or relationship between the parts you know.

You use this factor to calculate the missing part or parts.

Write the answer clearly.

Example

A painter always mixes paint in the following ratio. 15ml of blue paint, 10ml of red paint, 5ml of yellow paint.

He wants to use 30ml of blue paint for his next painting and needs to know how much red and yellow paint to use.

ANSWER

First write out all the amounts you know clearly.

blue : red : yellow

15ml : 10ml : 5ml

30ml : ? : ?

Look at the relationship between the blue paint

15 x 2 = 30 so the factor is 2 we can x 2 to go from top row to bottom row or divide by 2 to go from the bottom row to the top row. We can multiply all the amounts on the top row by 2 to complete the bottom row.

blue : red : yellow

15ml : 10ml : 5ml

x2

30ml : 20ml : 10ml

The painter needs to use 20ml of red paint and 10ml of yellow paint.

Try It Out

Question 2

a) To mix concrete a builder uses a base mix of 1 part cement, 5 parts sand and 3 parts aggregate. For one job she knows she needs to use 20kg of sand. How much of the other materials should she use?

b) On Monday at a theme park there are 850 visitors and they travelled in 150 cars. The manager wants to predict how many visitors there will be if 120 cars arrive on Tuesday and the visitors and cars remain in the same ratio.
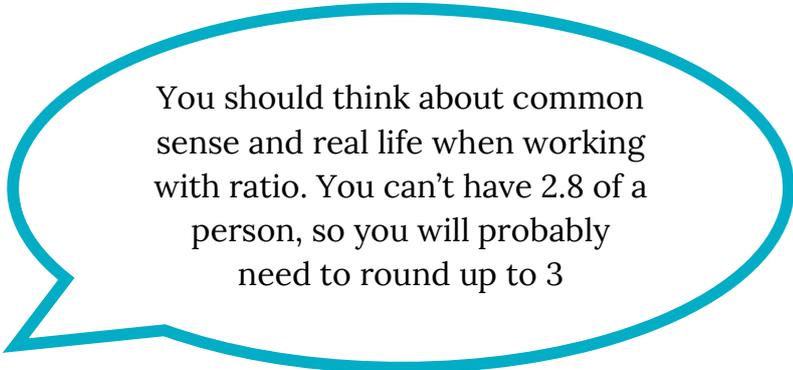
You should think about common sense and real life when working with ratio. You can't have 2.8 of a person, so you will probably need to round up to 3

c) In a nursery, the ratio of staff to children is a minimum of one staff member to five children. If they are expecting 36 children on Wednesday, how many staff members must they have on duty?

Splitting Amounts into Ratios

Ratios are made up of parts and you are often not told the total amount. You can easily work it out by adding up all the parts.

You may need to split an amount into parts by dividing it by the total number of parts. This tells you what one part is worth. If you know one part, you can double it for two parts or multiply it by 5 for five parts etc.

It can be useful to add an extra column at the end to write down the total.

Check your answer by adding up all the parts to make sure they give the total you want.

Example

A painter always mixes paint in the following ratio. 15ml of blue paint, 10ml of red paint, 5ml of yellow paint. He wants to make a mixture of 300ml of paint. How much of each colour should he use?

ANSWER

Add an extra column to the end and write out all the amounts you know.

$$\text{blue : red : yellow = total}$$

$$15\text{ml : } 10\text{ml : } 5\text{ml } = 30\text{ml}$$

$$? \ : \ ? \ : \ ? \ = 300\text{ml}$$

As before, find the relationship or factor between the parts you know which is the 30 and 300. We know that 30 x 10 = 300 or 300 ÷ 10 = 30

This tells us the amounts on the top row are multiplied by 10 to get the amounts on the bottom row

$$\text{blue : red : yellow = total}$$

x 10 $\qquad$ 15ml : 10ml : 5ml $\quad$ = 30ml $\qquad$ x 10

150ml : 100ml : 50ml $\quad$ = 300ml

Check they add up correctly to give the total of 300

150 + 100 + 50 = 300

The painter needs to use 150ml blue paint, 100ml red paint, 30ml yellow paint.

Try it Out

Question 3

a) Juprit and Sara invest money in a business in the ratio of 5 to 1. The profit is split between them in the same ratio. In year one the business makes £12000 profit. How much do they each get?

b) To mix concrete a builder uses a base mix of 1 part cement, 3 parts sand and 3 parts aggregate. For one job she knows she needs 28kg of concrete. How much of each material should she use?

c) A hotel makes up a mixed fruit juice for breakfast. They make 3 litres of juice by mixing orange, mango and pineapple juice in the ratio of 3 : 1 : 4. How much of each ingredient do they use?

Mixed Questions

a) Find the ratio of 60 days to 1 year in its simplest form. (Assume the year is a non-leap year.)

b) Jo, Tony and Mike invest in a business in the ratio of 1:4:5. They divide the profits up according to the number of shares. If the profit is £54,000, how much money do they get each?

c) At a conference, there are going to be 50 delegates. Each delegate will be allowed 2 glasses of juice. Each glass holds 200ml. A bottle of juice holds 1 litre. How many bottles should they buy? *Hint: make sure the units are the same.*

d) Sam works in a hospital and has to change the beds and restock. For each patient he allocates 2 pillowcases, 3 sheets, and 1 blanket.

i) If there are 30 patients on the ward how many pillowcases, sheets and blankets will he need?

ii) If Sam fills his trolley with 72 sheets, how many pillowcases and blankets should he take with him to make sure he returns with an empty trolley?