

Ratio Levels 1 & 2

Care Practice Book

Name: _____

Date: _____

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

Skill	Not a clue!	I know a little	I feel okay with this	I feel quite confident	I feel very confident
Writing numbers as ratios					
Simplifying ratios					
Finding ratio parts					
Working with different metric units					

Introduction to Ratio

A ratio is a way to compare parts. You can compare 2, 3, 4 or even more parts at the same time using a ratio. In care, you might use ratios if you have to administer medication or to ensure correct staffing levels.

This workbook focuses on ratios you might see as a carer in a care home setting or when caring for someone in their own home. They may also be relevant to other types of care settings.

You will find questions labelled as either L1 or L2 or both. We suggest that L2 students also try the L1 questions, as they will help you practise your skills.

Writing Ratios

We write ratios using the colon : between the different parts. Ratios are nearly always written as whole numbers.

Example

One nursing home tries to keep a ratio of 1 staff member for every 5 residents during the daytime.

What is the ratio of staff to residents? 1 : 5

What is the ratio of residents to staff? 5 : 1

Always write in the ratio in the order you see the information in the question.

Try it Out – Level One & Level Two

Question 1

A nursing home has 20 residents for every 3 staff members. What is the ratio of staff to residents?

Question 2

A patient requires two staff members to lift him using a hoist. What is the patient to staff ratio?

Question 3

A client is receiving a fluid infusion through a pump. The infusion is given as 40ml per hour. What is the ratio of fluid to time?

If the units of each part of the ratio are different, they should be labelled in the final ratio or all converted to the same unit if this is possible.

Ratio Parts

Ratios are all about relationships or factors. For example, if one part of the ratio gets three times bigger, we say it has increased by a factor of 3.

If one part gets three times bigger, the other parts also get three times bigger.

$$\begin{array}{ccc} \text{Staff} & : & \text{residents} \\ 1 & : & 5 \\ \times 3 \curvearrowright & & \curvearrowleft \times 3 \\ 3 & : & 15 \end{array}$$

If the number of residents increases by a factor of 3, we get $5 \times 3 = 15$ residents

The staff must also get three times bigger

Try it Out

Question 4

A nursing home has 20 residents for every 3 staff members. The number of residents doubles. How many staff members do they need now?

Question 5

a) A carer reads the instructions on a bottle of bleach. It says to mix 50ml per litre of water. The carer decides to use half the amount of bleach. How much water should they mix with it?

b) The carer finds a stronger bottle of bleach. It says to mix 40ml bleach with 1500ml of water. The carer decides to triple the amounts. How much bleach and water will they use?

Factors

You might have to find the factor/relationship yourself using division.

Example

A residential home wants to have a minimum of 4 clean bed sheets available per person.

If they have 80 sheets in the supply cupboard, how many residents can they supply with sheets?

It is useful to write all the information clearly using headings.

sheets	:	person	
4	:	1	Divide the sheets to find the factor
80	:	?	$80 \div 4 = 20$
sheets	:	person	The sheets have gotten 20 times bigger
$\times 20$ 4	:	1	The people must also get 20 times bigger
80	:	20	$1 \times 20 = 20$

You can supply 20 residents with sheets.

Try it Out

Question 6 – level 1

a) A carer reads the instructions on a bottle of bleach. They find that 50ml of bleach should be used per litre of water. They have a bucket with three litres of water. How much bleach should they use?

Question 7 – level 2

A carer reads the instructions on a bottle of bleach. They find that 50ml of bleach should be used per litre of water. They want to use 40ml of bleach. How much water should they mix with it?

Question 8 – L1 & 2

a) A carer measures a client's pulse for 15 seconds. They use ratio to estimate the pulse per minute.

Complete the working out to show the pulse per minute.

Pulse : Time

19 beats : 15 seconds

: 60 seconds

b) The next day a different carer counts the client's pulse for a total of three minutes. The total is 222 beats. How many beats per minute if the beats stay in the same ratio?

Question 9 – L1

A carer has a thickener for a patient who has difficulty swallowing following a stroke. It has to be mixed with water. Each scoop should be mixed with 80ml of water. If the dosage is 3 scoops, how much water should they use?

Question 10 – L2

A carer has a thickener for a patient who has difficulty swallowing following a stroke. It has to be mixed with water. Each scoop should be mixed with 80ml of water. If the dosage is 4.5 scoops, how much water should they use?

We can see ratios written in different ways

Sometimes on a medication label or leaflet you might see the dosage or active ingredient recorded using the / symbol.

For example

Oxycodone hydrochloride 10 mg/ml solution for injection or infusion

The / symbol is the same as saying the word 'per'. It can also be written using the ratio sign

10 mg : 1 ml

This means that every ml (millilitre) of the medication contains 10 mg (milligrams) of the active ingredient.

Worked Example

Oxycodone hydrochloride 10 mg/ml solution for injection or infusion

How much of the active ingredient would be contained in 30ml of the medication?

Fill in the information you have. The ml would go under the ml you already have.

10 mg : 1 ml

? mg : 30ml

Divide 30 by 1 to get the factor. $30 \div 1 = 30$ so the ml is 30 times bigger.

Do the same to the other side of the ratio – the mg must also get 30 times bigger. $10 \times 30 = 300$

300mg : 30ml

There would be 300mg of the active ingredient.

Try it Out

Question 11 L1 & L2

Doug is asked to check some medication that one of his clients has been given. It is a diuretic. Doug needs to make sure his client drinks plenty of water as the medication can cause kidney damage. The medication leaflet says

**FUROSEMIDE 20 MG/5 ML ORAL SOLUTION (FUROSEMIDE)
PL 20046/0037**

We could write this as 20 mg : 5 ml

This means there are 20 mg of the active ingredient for every 5ml of liquid.

If someone needs 40mg of the active ingredient, how much liquid would they be having?

Question 12 L2

Celia is a carer. One of her clients takes Kaolin morphine to help with an upset stomach.

Celia notices the medication label says it contains

Morphine Hydrochloride 0.458mg/5ml

We could write this as 0.458mg : 5ml

It means that for every 5ml of liquid a person has, they will be getting 0.458mg of morphine hydrochloride.

In one day, Celia's client has 90ml of the medicine. How much morphine hydrochloride would they be getting? (Give your answer in mg).