Helpful explanations of...

- Fractions
- Decimals
- Percentages
- Ratios
- Averages

And more, all in one handy booklet.

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Number skills
for care workers

Part of the Learning through Work series

skillsforcare

Number skills for care workers - Part of the 'Learning through work' series (2011)

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Contents

Using this booklet

Numbers play a vital role in care work today, so it's helpful to feel confident using them.

This booklet explains how numbers work:

- Multiplication, division
- Fractions, decimals
- Percentages... and more

It also explains the **language** we use when we talk about numbers.

The booklet is divided into **topics** (one per page).

It is designed for busy people – each topic can be read in less than three minutes.

You will find **learning questions** to discuss and also things you can do to **learn more**.

Important There are **many different ways** of using numbers and solving problems. This booklet can show only a **few**. The ones you know may be just as **good** or **even better**!

PS It's **OK** to use a **calculator** with this booklet.

How to use this booklet

- Find a couple of colleagues
- Read a topic together
- Agree what it means
- Discuss what else you know about the topic
- Decide how you can use what you have learned to improve the quality of care

Talking with colleagues is the key

The moment you start **talking** about something, you're **thinking** about it.

Once you start **thinking** about it, you're **learning.**

Tip Start with a topic that interests you.
Don't feel pressured – learn at your own pace and remember what they say:
Days that make us happy, make us wise!

1. Numbers in care work

We use numbers at work in many ways:

- Daily care tasks
- Monitoring changes in people's health and well-being (to support care planning)
- Admin for our employer

In fact, numbers are an essential part of care work. Listen to these care workers (managers as well as staff) talking about numbers at work:

You actually use maths in a lot of things you do, without realising.

I'm not the kind of person who can do things in my head. I think maths is hard. If you get it wrong it can throw everything out. And it's so easy to get it wrong!

If we only have to do a percentage calculation once a month, we may forget the method.

If I could feel more comfortable with maths, I would feel more confident.

What are **your** views on numbers at work?

How many of these are part of your job?

- Time schedules, appointments
- Food service, cooking
- Fridge, freezer temperatures
- Fluid balance, nutrition, calories
- Weight monitoring, BMI charts
- Blood pressure, blood glucose levels
- Medication, MAR sheets
- Body, bath, room temperatures
- Games, activities
- Shopping, other financial transactions
- Ordering supplies, stocktaking
- Spreadsheets
- Equipment instructions
- Timesheets, mileage claims
- Pay slips

This is a long list.

Can you add anything else you do at work that involves numbers?

2. Confidence matters

How we feel affects how we learn.
How **confident** do you feel about numbers?

Learning builds confidence

Many of us lack confidence with numbers. We feel anxious about things that involve numbers. Some of us feel we just can't ***do*** numbers.

That sort of anxiety saps our confidence. The less confident we feel, the harder it is to learn.

This booklet will help you learn about the numbers you use at work – and at home. Learning will make you feel more confident.

Feeling more confident will help you learn – and go on learning.

Learning tips

Value your learning – numbers are **important.**

Learn with colleagues – talk about what you're doing. Encourage each other.

It's OK to make mistakes. We **learn** from mistakes.

When you want extra help go to people who are **patient** and **encouraging**, not critical.

Practise what you learn!
(Otherwise you'll soon forget it.)

Learning question

How exactly will you practise what you learn?

Did you know?

The word *calculate* comes from *calculus*, Latin for a *small pebble.* The Romans used these pebbles in their abacuses. (If you don't know what an abacus is, find a colleague who does.)

3. How numbers work

How many numbers are there?

So far as we know, numbers go on for **ever**, in two directions – bigger and bigger, smaller and smaller. There is an **infinite** number of numbers.

That is a **mind-boggling** thought.

Amazingly, we can write this infinite number of numbers using just these **ten figures**

1 2 3 4 5 6 7 8 9 0

We call these figures *digits*.

We use **digits** to **write numbers.**

10 is a two digit number. **125** is a three digit number. **1025** is a four digit number. The numbers **1** to **9** are one digit numbers.

Our number skills are based on this system, so it's worth taking a moment to understand it.

Did you know?

Digit comes from *digitus*, Latin for *finger* and *toe*. (Latin used the same word for both.)

Place value

Compare these five numbers:

2500 250 25 2.5 0.25

They use the same digits: **2** and **5**, but the **value** of the digits is **different** in each number.

E.g. **5** is *five* in *25* and *fifty* in *250*.

The **position** of the digit in the number determines its **value**.

Learning question

How does **0** affect the value of **5** in *50* and *500*?

Did you know?

Our number system was invented 2000 years ago in India. Arab scholars brought it to Europe about 1000 years ago.

Before that we used the seven **Roman numerals**

I (*1*) **V** (*5*) **X** (*10*) **L** (*50*) **C** (*100*) **D** (*500*) M (*1000*)

Here is how the Romans wrote 1 to 10

I – II – III – IV – V – VI – VII – VIII – IX – X

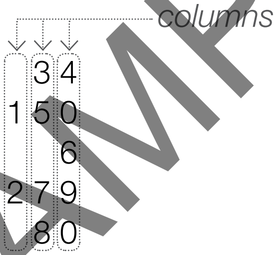
There was no **0**.

4. Number columns

On record sheets, receipts, bank statements and other documents containing lists of numbers, the numbers are often written in **columns**.

They are written this way to make the **value** of each digit **clear**.

Digits of similar value go in the same column.

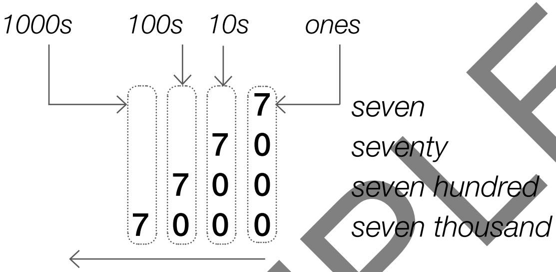


This makes it easy to see that the **3** in *34*, the **5** in *150*, the **7** in *279* and the **8** in *80* have similar values: *thirty*, *fifty*, *seventy* and *eighty*. They are all in what we call the *tens* column.

Learning question

What column are the **1** and **2** in?
What column are the **4**, **6** and **9** in?

How the columns work



The first column is the *ones* then come the *10*s, the *100*s etc. Each column is x10 bigger.

- Ones: 1 to 9 *then...*
- Tens (ten ones) *then...*
- Hundreds (ten 10s) *then...*
- Thousands (ten 100s) *then...*
- Ten thousands (ten 1000s) *then...*
- Hundred thousands (ten 10 000s) *then...*
- Millions (ten 100 000s) *then...*
- Ten millions (ten 1 000 000s) and so on...

Learning question

If you won **£35 721 596** on the lottery, how much would that be? (See last page for the answer.)

5. Decimal fractions

– *Go on, have the last piece of cake!*
– *Let's share it. I couldn't eat the* ***whole*** *piece.*
– *OK. I'll cut it in* ***half.***
– *Just give me a* ***quarter.***

$^1/_2$ and **$^1/_4$** are typical, everyday fractions.

We use another type of fraction every day too, the **decimal fraction**:

£0.50 0.25 kg 0.75 litres 37.1°C

Decimal means *based on 10*.

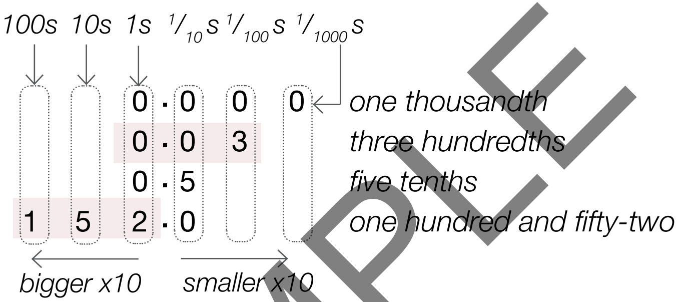
Decimal fractions are fractions based on *10*.

We count things in groups of ten: *1*s become *10*s then *100*s then *1000*s and so on – each group is **ten times bigger** than the last.

When we count things that are **less than one**, i.e. parts or fractions of a whole, we do this in tens too. We count *tenths*, *hundredths, thousandths* and so on.

Each fraction is **ten times smaller** than the last.

How decimal fractions work



Decimal point

Decimal fractions start with what looks like a full stop. We call it the **decimal point.** It always comes **after** the number in the *1*s column and **before** the number in the $^{1}/_{10}$ s column.

The decimal point can be hard to see so to avoid confusion we usually put 0 in front of it, e.g. **0.1**

0.25 0.5 0.75

Tip Many countries use a decimal **comma**, but in the UK we use a decimal **point**. Be careful about this, especially with medicine.

6. Working with decimals

We use decimal fractions for:

- metric measures (metres, kilograms, litres etc)
- money
- temperature

Calculators and spreadsheets work in decimals.

Useful decimals

0.2 = $\frac{1}{5}$ **0.25** = $\frac{1}{4}$ **0.5** = $\frac{1}{2}$ **0.75** = $\frac{3}{4}$

Fluid

100 centilitres (cl) = 1 litre 1cl = 0.01 litre
1000 millilitres = 1 litre 1ml = 0.001 litre

Weight decimals

1000 milligrams (mg) = 1 gram (g) 1mg = 0.001 g
1000 grams = 1 kilogram (kg) 1g = 0.001 kg

Length / height / distance decimals

100 centimetres (cm) = 1 metre (m) 1cm = 0.01m
1000 millilmetres (mm) = 1m 1mm = 0.001m

Money decimals

100p = £1 1p = £0.01 10p = £0.10

Decimal hour 0.1 hr = 6 mins 0.25 hr = 15 mins
0.5 hr = 30 mins 0.75 hr = 45 mins

Note: 3.5 hr = 3 hr 30 min **not** ~~*3hr 5 min*~~

Calculating with decimals

Which is more: 0.5 or 0.25 litres of juice?

Which is less: 0.05 or 0.1 litres?

Tip Check the columns: tenths, hundredths, thousandths etc.

0.5 litres = $^{5}/_{10}$ 0.25 litres = $^{2}/_{10} + ^{5}/_{100}$

0.05 litres = $^{5}/_{100}$ 0.1 litres = $^{1}/_{10}$

0.5 is **more** than **0.25**. **0.05** is **less** than **0.1**.

When **adding** or **subtracting decimals** be sure to line the sum up correctly, e.g.

```
0 . 1     +      0 . 5     –
0 . 0 5          0 . 2 5
0 . 1 5          0 . 2 5
```

Tip We say *nought point two five* not ~~*nought point twenty-five.*~~ 0.75 = *nought point seven five* not ~~*nought point seventy-five*~~

7. Fractions

A fraction is a **part** of a **whole thing.**
The *thing* might be a plate of food, a cup of tea, an hour or a group of people.

Everyday fractions

Half a biscuit

A third of our residents

Three quarters of an hour

Writing fractions

We write fractions like this $^{1}/_{2}$

The bar that separates the two numbers means *divided* or *split into*.

$^{1}/_{2}$ = *one part of something that has been split into two parts*. E.g. An apple cut in two

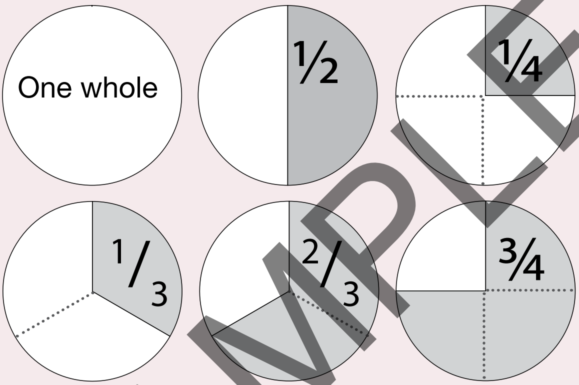
$^{1}/_{4}$ = *one part of something that has been split into four parts*.

$^{2}/_{3}$ = *two parts of something that has been split into three parts*

Did you know?

We call the top number the <u>*numerator*</u>
and the bottom number the *denominator*

One whole divided into different fractions



Useful to know

The higher the **denominator**, the smaller the fraction (it's been split into more parts).

E.g. $^{1}/_{12}$ of a thing is much less than $^{1}/_{3}$ of it.

Fractions that **look different** may be **equal**, e.g.

$$^{1}/_{2} = {}^{2}/_{4} = {}^{10}/_{20} = {}^{50}/_{100}$$

Learning question

Which is more: $^{1}/_{4}$ of £1.00 or $^{1}/_{2}$ of £0.50?

8. Signs, symbols

+	*Add, plus, positive*
-	*Subtract, minus, negative*
X	*Multiply, of, times*
*	*Spreadsheet symbol for multiply*
÷	*Divided by, shared between*
/	*Divided by (spreadsheet symbol for ÷)*
.	*Decimal point (e.g. 1.5)*
=	*Equals*
≠	*Does not equal*
≈	*Approximately equals, is about equal to*
%	*Per cent, out of a hundred (cent = hundred)*
‰	*Per mil, out of a thousand (mil = thousand)*

< *Is less than*

> *Is more than*

≤ *Less than or equal to*

≥ *More than or equal to*

( ) *Brackets show a sum within a sum, e.g.* (C x 9) / 5 + 32 = F *means* To convert Celsius to Fahrenheit, multiply the Celsius temperature by 9, divide by 5, add 32

x^2 *Multiplied by itself (squared) e.g.* 2 x 2

x^3 *Multiplied by itself twice (cubed)* e.g. 2 x 2 x 2

º *Degrees, º C = Celsius, º F = Fahrenheit*

' *Feet, also used for minutes*

˝ *Inches, also used for seconds*

9. Addition

Most of the calculations we do involve addition and/or subtraction.

Addition means *bring together*, *combine*

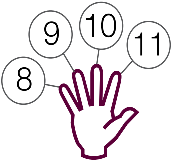
E.g. 7 cups and 8 cups give us 15 cups together.

7 + 8 = 15

Addition words *Add make plus total sum increase together*

Tips for adding

Counting on is an easy way to add smaller numbers, e.g. 7 + 4 = ?
Start at 7 and count on four:
Eight, nine, ten, eleven. 7 + 4 = 11
Do it in your head or out loud. Using fingers is fine.



Tip Counting **off** works well for **subtraction.**
E.g. 11 - 4 = ? *Eleven, ten, nine, eight*: 11 - 4 = 7

Number bonds: Use your knowledge of how numbers combine, e.g. 11 = 7 + 4

Useful number bonds

Learn these bonds the easy way: **notice** them in the calculations you do every day.

5 = 1 + 4	2 + 3	*also*	*5 - 1 = 4*	*5 - 2 = 3*		
6 = 1 + 5	2 + 4	3 + 3				
7 = 1 + 6	2 + 5	3 + 4				
8 = 1 + 7	2 + 6	3 + 5	4 + 4			
9 = 1 + 8	2 + 7	3 + 6	4 + 5			
10 = 1 + 9	2 + 8	3 + 7	4 + 6	5 + 5		
11 = 2 + 9	3 + 8	4 + 7	5 + 6			
12 = 3 + 9	4 + 8	5 + 7	6 + 6			
13 = 4 + 9	5 + 8	6 + 7				
14 = 5 + 9	6 + 8	7 + 7				
15 = 6 + 9	7 + 8					
16 = 7 + 9	8 + 8					
17 = 8 + 9						
18 = 9 + 9						

Learning question

How do number bonds help with subtraction?

10. Subtraction

Subtraction means *take away, separate*

Subtraction words *From minus decrease less / fewer than reduce between* ***difference***

We use subtraction to calculate what will be left if we take something away. E.g.

I'll take 7 of the 15 cups. That'll leave you 8.
15 - 7 = 8

We also use subtraction to measure the **difference** between two things. E.g.

Fluid intake: 430 ml Fluid output: 275 ml
430 - 275 = 155 Balance = 155 ml

Tip Calculate the difference by counting on from the smaller number to the bigger number, e.g.
275 + **25** = 300 + **130** = 430 **25 + 130 = 155**

Did you know?

You can check subtraction with addition.
E.g. If *8 + 7 = 15* then *15 – 8* must = 7
and *15 – 7* must = 8. (It's about number bonds.)

How columns help with subtraction

The sum **126** – **89** has two tricky bits.

100s	*10s*	*ones*	
1	2	6	–
	8	9	

The tricky bits are taking **8** away from **2** and **9** away from **6**

To solve this problem, **rearrange 126**.
Move one of its two tens over to the *ones* column.
Then move the hundred into the *10s* column.

100s	*10s*	*ones*	
	11	1	
~~1~~	~~2~~	6	–
	8	9	

10s	*ones*	
11	16	–
8	9	
3	**7**	

Now there are **11** tens in the *10s* column and **16** in the *ones* column.
It still adds up to **126**, just rearranged.
110 + 16 = 126.
Now take **9** away from **16** (= **7**) and **8** tens away from **11** tens (= **3** tens). **Answer = 37**

11. Multiplication

Many of the calculations we do involve multiplication and/or division.

Multiplication is fast addition.

Multiply means *add many times*.

Examples: *3 x 4* = *3 + 3 + 3 + 3* = 12

2 x 7 = 2 + 2 + 2 + 2 + 2 + 2 + 2 = 14

X is the symbol for multiply. **X** means *of*.

Example: 2 x 7 = two lots **of** seven.

We also say *times* for **X**.

Two times seven means *two lots of seven*.

Tip Many problems are easier to solve if we know some **multiplication facts.**
Imagine you want to share 14 sandwiches equally between seven people.
Knowing *7 x 2 = 14* tells you that each person can have two sandwiches (14 ÷ 7 = 2).

Learning question In multiplication, does the **order** of numbers matter, e.g. does *2 x 3 = 3 x 2* ?

Multiplication square: tables from 2 to 10

Do you see how it works?

The answer always sits where the lines cross.

E.g. *8 x 3 = 24* *3 x 8 = 24*

The grey squares show *2 x 2*, *3 x 3*, *4 x 4* etc.

10	20	30	40	50	60	70	80	90	100
9	18	27	36	45	54	63	72	81	90
8	16	24	32	40	48	56	64	72	80
7	14	21	28	35	42	49	56	63	70
6	12	18	24	30	36	42	48	54	60
5	10	15	20	25	30	35	40	45	50
4	8	12	16	20	24	28	32	26	40
3	6	9	12	15	18	21	24	27	30
2	4	6	8	10	12	14	16	18	20
x	2	3	4	5	6	7	8	9	10

If you don't know these tables by heart, learning them is **really** worth the effort.

You'll use them everyday – *promise!* ☺

12. Division

We **divide** things so we can **share** them.

Cut the cake so everyone has a piece.

When we divide something, we split it up into smaller parts.

÷ is one symbol for divide.

It means 'separated into equal parts' or 'shared equally between'.

12 ÷ 3 means *12 separated into 3 equal parts*

or, *12 shared equally between 3*

Imagine seating 12 people at 3 dining tables.

12 ÷ 3 = 4

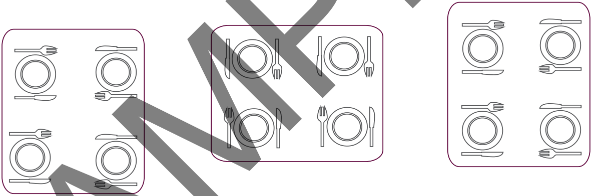
So: 12 people shared equally between 3 tables means 4 people per table.

Remainders Numbers that cannot be divided equally leave a 'remainder' (e.g. 13 ÷ 4 = 3 r1).

Tip Multiplication tables really help with division. Knowing that *3 x 4 = 12* tells us that *12 ÷ 3 = 4*.

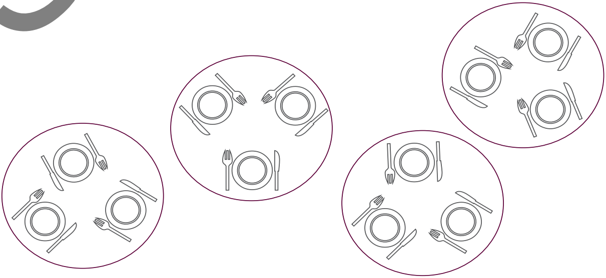
12 can be divided into 3 groups of 4.

We write this **12 ÷ 3 = 4**



It can also be divided into 4 groups of 3.

We write this **12 ÷ 4 = 3**



13. Estimation, approximation

Estimation means thinking **roughly** what the answer to a sum will be, **before** you do the sum.

Use estimation to avoid calculator errors

Calculators are reliable tools, but can only use what information we give them.
Typical calculator mistakes include pressing the **wrong button**, **forgetting to press** a button and doing the **wrong calculation**.

Learning question

First, estimate an answer for each of these sums.

(a) $21 \div 7$ (b) 4×9 (c) $1.5 + 2.75$

(d) 12 people at 4 tables, how many per table?

Now look at one person's **wrong** answers.

(a) = ~~*147*~~

(b) = ~~*0.444444*~~

(c) = ~~*276.5*~~

(d) ~~*48 at each table*~~

With each, what went wrong?

Approximation means accepting a figure that is **about right**, but **not exactly accurate.**

Approximation is an important skill, but be sure to use it **wisely. Measurements for care records need to be exactly accurate.** *Never ~~use approximation for care records~~.*

Rounding

Imagine a car journey of 80.3 miles. On a mileage claim, we would record this as 80 miles.

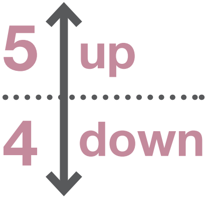
Imagine spending 18 minutes and 51 seconds with a person. On a timesheet, we would record this as 20 minutes.

For someone on £7.75 an hour, 3.5 hours = £27.125, but they would be paid £27.13.

We call this sort of approximation **rounding**. Here is how it works:

Round 5, 6, 7, 8 and 9 **up**

Round 4, 3, 2, and 1 **down**



14. Percentages

Percentages are a type of **fraction.**

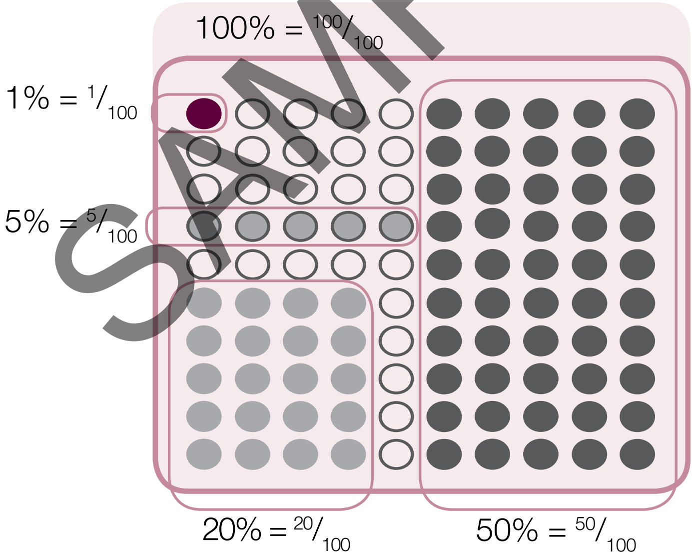
Per cent means *out of one hundred*.

A **percentage** is a **fraction** with 100 on the bottom.

$1\% = {}^{1}/_{100}$ $20\% = {}^{20}/_{100}$ $50\% = {}^{50}/_{100}$

$100\% = {}^{100}/_{100}$ ${}^{100}/_{100} = 1$

100% = the **whole** of something.



We use percentages to talk about parts of a **whole.**
They help us **compare** wholes of **different sizes.**

Imagine four care homes.

Home A: 30 places and **26** residents *100% = 30*

Home B: 45 places and **38** residents *100% = 45*

Home C: 15 places and **11** residents *100% = 15*

Home D: 25 places and **18** residents *100% = 25*

Which has the highest occupancy rate?

% = residents ÷ places, X 100 This tells us:

Home A is 87% full Home B = 84%

Home C = 73% Home D = 72%

Learning question

I spend 50% of my day on the phone.
What **whole** is this administrator talking about?

Did you know?

Per means *for each* in Latin. *Cent* is from *centum*
Latin for *hundred* (C = Roman numeral for 100).
Century = 100 years Euro = 100 cents

15. Calculating percentages (1)

Like so many things in life, percentages are easy to do – when you know how!

Here are five common types of percentage problem with a step-by-step guide to solving them.

1. One number as a percentage of another

x = what % of y?

E.g. Four out of 21 staff are off sick. What percentage are off sick?

How to solve it

1. Divide the number you want to know as a percentage, in this case 4, by the other number, in this case 21: 4 ÷ 21 = 0.19

2. Multiply the answer by 100: 0.19 x 100 = 19

Answer 19% off sick

Tip Four out of 21 is a sort of fraction ($^4/_{21}$) and this method will work with any fraction.

E.g. $^2/_5$ = *?%* → *2÷5 = 0.4 x 100 = 40* $^2/_5$ = *40%*

Method Top number divided by bottom, x 100

2. Adding a percentage *x + y% = what?*

E.g. Staff get a pay rise of 3.75%. How much will staff who were on £7.75 an hour get now?

How to solve it

1. Add the percentage to 100, in this case 3.75 + 100 = 103.75
2. Divide total by 100: 103.75 ÷ 100 = 1.0375
3. Multiply the answer by the original value, in this case 1.0375 x 7.75 = 8.04

Answer 3.75% increase means staff who were on £7.75 will now get £8.04 an hour.

3. Removing a percentage *x - y% = what?*

E.g. Bill total = £68.40 *incl* VAT @ 20%. How much was the bill **before** VAT?

1. Multiply the bill total (including VAT) by 100, in this case 68.4 x 100 = 6840
2. Divide the answer by 100 + the VAT rate, in this case 6840 ÷ 120 = 57

Answer £57.00 before VAT

16. Calculating percentages (2)

4. What percentage is the increase?

From x to y = what %?

E.g. Price of gloves rises from £1.85 to £1.97. What percentage increase is that?

How to solve it

1. Subtract old value from new: 1.97 - 1.85 = 0.12
2. Divide answer by old value: 0.12÷1.85 = 0.065
3. Multiply by 100: 0.065 x 100 = 6.5

Answer 6.5% increase

5. Percentage decrease *x – y% = what?*

Example A care organisation decides to cut its agency spend of £27 500 by 18%. How much will it have left to spend on agency staff?

How to solve it

1. Subtract percentage from 100: 100 - 18 = 82
2. Divide answer by 100: 82 ÷ 100 = 0.82
3. Multiply by original value: 0.82 x 27500 = 22550

Answer £22 550 left to spend after 18% cut

Can you ever have *more* than 100%?

In everyday speech, *giving 110%* means making an extra effort. *I want you to give 110% on this!*

As 100% already means **all** of something, is **more** than 100% actually possible?
With effort, **no** – 100% is all we can give, but...

Imagine we borrow £100 at 10% interest for one year. One year later, we repay our lender the £100 we borrowed, plus £10 interest. We have just repaid 110% of what we borrowed.

100% = the whole of something.
If over time that thing changes, we can **measure the change** using percentages

E.g. I am working ten hours a week.
10 hours = 100% of my working week.
Then, in June, I agree to do 15 hours a week.
My working hours are up 50%. They are now **150%** what they were **before** June.
10 = 100% → 5 = 50% of 10 → 15 = 150% of 10

150% = $1^1/_2$ 200% = double 300% = triple

17. Ratios

We use **ratio** to compare the size of two or more quantities. Ratio is written ***x*:*y*** (*x* to *y*)

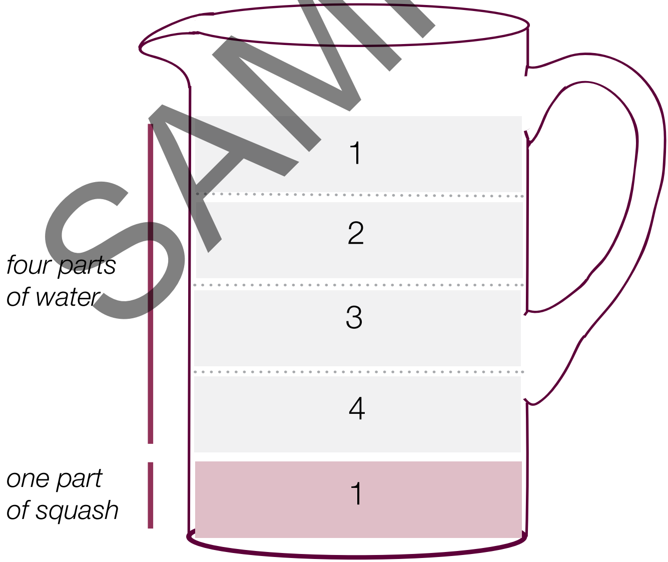
Example 1

Mix one part squash to four parts water

The ratio is 1:4

Mix four parts water to one part squash

The ratio is 4:1



Example 2

A care home tries to ensure a five to one ratio between residents and staff.

Five residents to **one** member of staff = **5:1**

One member of staff to **five** residents = **1:5**

Example 3

An organisation cares for 40 people with dementia, 20 with a learning disability and 10 frail elderly people.

The ratio is 40:20:10 or **4:2:1**

For every four people with dementia, the organisation cares for two with a learning disability and one frail elderly person.

Learning question

What is the ratio of staff to people who use services in your organisation?

18. Averages (1)

We say something is **average** when we think it is usual, normal and to be expected.

We **calculate** the average when we want to compare one thing with a group of similar things or when we want to find out what to **expect**.

There are **three** ways to calculate the average value of a set of numbers or data*****.

Mean Add all the numbers together. **Divide** that total by however many numbers there are.

Median List the numbers in size order. The **median** is the **middle number**.

Mode Identify which number in the set occurs **most often**. That is the **mode**.

***Did you know?**

Data means *fact* or *information*, especially numerical information. It is Latin for *given*.

Imagine we want to know **how long** people are usually in our care.
Another way of saying that is how long they are in our care *on average*.

Records show ten people were in our care for

18, 14, 60, 9, 13, 11, 14, 3, 14 and 12 months.

We will use this as our **data**.

Mean First, total the ten numbers
18+14+60+9+13+11+14+3+14+12 = 168
Then divide the total by the number of numbers
168 ÷ 10 = 16.8 **Mean = 16.8 months**

Median List the values in size order
3 – 9 – 11 – 12 – 13 – 14 – 14 – 14 – 18 – 60
Then find the middle values = 13 and 14
Middle of 13 ,14 = 13.5 **Median = 13.5 months**

Mode Identify the number that occurs most often.
14 occurs three times. **Mode = 14 months**

Of our three different averages: **16.8**, **13.5** and **14 months**, which is **truest**? To find out, turn the page.

19. Averages (2)

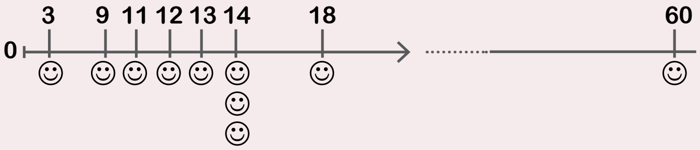
Records show ten people were in our care for 18, 14, 60, 9, 13, 11, 14, 3, 14 and 12 months. From that data, we can calculate the mean, median and mode averages:

- Mean = 16.8 months
- Median = 13.5 months
- Mode = 14 months

The **median** and the **mode** averages are close together. The **mean** is rather higher. Why? Also, which average gives us the best idea of how long we can normally expect to care for a person?

To answer this question, check the **range**. **Range** looks at how widely spread apart the numbers are. Here is our data:

Number of months ten people spent in our care



Shortest stay = 3 months
Longest = 60 months *60-3 = 57*

The **range** (i.e. the difference between the two) is **57 months.** That's a very big difference!
The difference between the range and all three of our averages is also big.
Averages = 13.5, 14 and 16.8 months
Range = 57 months

Why is the range so high?

One person was with us for **much** longer than anyone else – four times as long as most people! This doesn't affect the **median** or the **mode**, but it does **distort** the **mean.**

So, in this case, **median** and **mode** are **truer**.

Tip When the range is high, **median** and **mode** may be **truer** than the **mean** average.

Learn more

Calculate what the mean average would be if we excluded the person who stayed 60 months.

20. Charts, graphs

Charts and graphs display numbers **visually.**

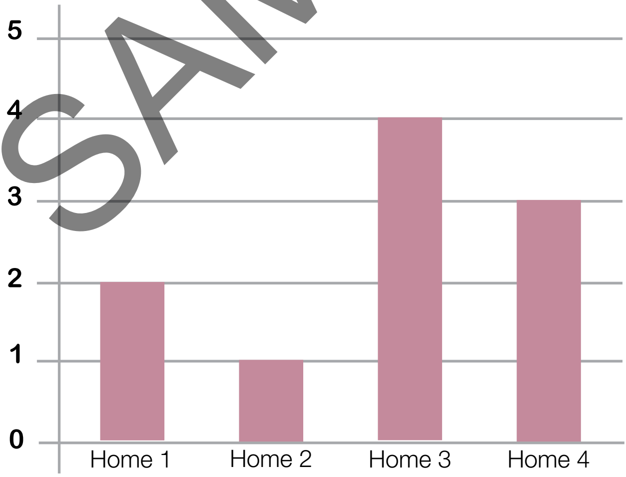
They often make it easier to understand what numbers **mean.**

The **bar chart, pie chart** and the **line graph** are three commonly used types of chart or graph.

Bar chart

Use it to compare groups of things.

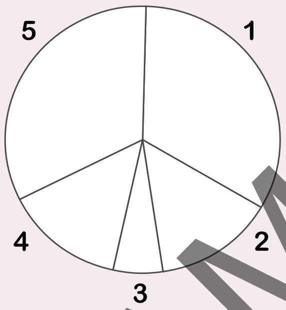
Bed vacancies at four care homes



Pie chart

Use it to show how different parts make a whole.

Healthy diet

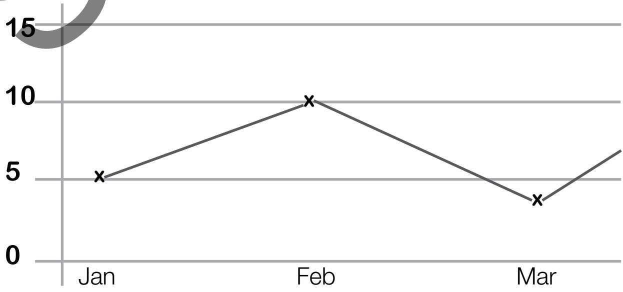


1. Starchy foods (e.g. bread, rice, potatoes, pasta etc)
2. Dairy (milk, cheese etc)
3. Foods high in fat and/or sugar
4. Meat, fish, eggs, beans
5. Fruit, vegetables

Line graph

Use it to show changes over time.

New clients taken on by one agency



21. Quiz

1. We don't actually use numbers much at work – true or false?

2. How does learning boost confidence?

3. How many digits in this number **157.49**?

4. What value does the digit **5** have in these two numbers: **75** and **6527**?

5. What value does the digit **5** have in these two numbers: **0.5** and **0.75**?

6. How many minutes in **1.25** hrs?

7. Which is bigger: $^1/_3$ or $^1/_4$?

8. What do these symbols mean: < and >?

9. What are *number bonds*?

10. What's a good way to check the answer to a subtraction sum?

11. Is *three lots of five* a multiplication or a division sum?

12. How can multiplication help solve this division problem: **15 ÷ 3**?

13. How can estimation help us avoid errors when using a calculator?

14. Which is more: 75%, $^3/_4$ or 0.75?

15. How do we calculate what percentage **5** is of **22**?

16. How can we ever have more than 100%?

17. How many litres of water do we need to dilute 1.5 litres of squash at a ratio of 4:1?

18. What's the difference between mean, median and mode?

19. How might range distort the mean average?

20. What is a pie chart good at showing?

The information you need to answer these and many more questions is in this booklet.

For answer 1, see page 1. See page 2 for answer 2 etc.

Bonus Q!

What does this number round to: **4.49**?

For help with the answer, see p13

What next?

Other booklets in this series that you may find useful include:

Using numbers in care work covers measurement, temperature, time and more.

Talking about how much, how often looks at how we talk about numbers, time and more

Physical health explains important aspects of how the body works, including the numbers we use to measure health and well-being.

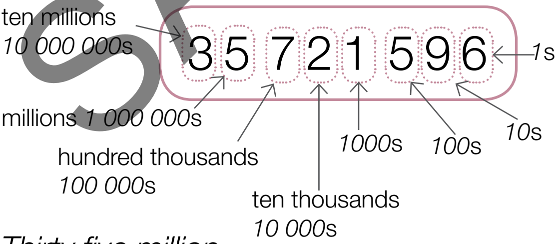
For more on developing your **care work** knowledge and skills, including qualifications:

- Visit the **Skills for Care website** at
- www.skillsforcare.org.uk
- Go to the *Developing skills* section

Learning through Work series

- > **Reporting** and other care work writing
- > **Writing skills** for care workers
- > Talking about **bodily functions and feelings**
- > **Physical health**
- > **Using numbers** in care work
- > **Number skills** for care workers
- > Talking about **how much, how often**

Your big lottery win – congratulations!



Thirty five million
Seven hundred and twenty-one thousand
Five hundred and ninety-six

Notes