Basic arithmetic skills

The things you don't want to ask about but need to know

You need to be able to add and subtract to complete patient records accurately.

You must be confident with basic arithmetic skills so that you are able to work out correct drug doses to ensure patient safety.

When you have completed this chapter, you should be able to:

- Understand the different ways in which the four basic operations of arithmetic can be written.
- Add and subtract single and multiple columns of figures without a calculator.
- Multiply and divide simple numbers without a calculator.
- Understand how exponents are used to simplify large whole numbers.
- Use 'BODMAS' to work out calculations that involve different types of operation.
- Use a calculator with care.

The language

Table 1.1 shows the symbols that will be used in this chapter – more later! You are probably familiar with them, which is good, but just refresh your memory of these and the rules that apply to them.

Table 1.1

Symbol	Meaning and uses
+	Plus, the sum, altogether, total or increase all indicate that one number is added to the other, e.g. six plus three: $6 + 3$. The numbers can be added in any order, the answer is the same.
	$^+$ can also be used as shorthand for 'positive'; 've' is sometimes added and is written as $^+$ve with the $+$ sign near the top of the ve.
−	Decrease, difference between, reduce by, minus or 'take away' all indicate that the second number is subtracted from the first, e.g. six minus three: $6 − 3$. The numbers must *always* be calculated in the order in which they are written.
	$^-$ can also be used as shorthand for 'negative'; 've' is sometimes added and is written as $^-$ve with the $−$ level with the top of the ve.
×	Groups of, lots of, product, sets of or 'times' all indicate that one number is multiplied by the other, e.g. six multiplied by three: $6 × 3$.
	Like addition, it does not matter which number is used first, the answer is the same.
÷ or **/**	Divide or 'share' – the first number is divided by the second, e.g. six divided by three, $6 ÷ 3$ or $6/3$, or it can be written as $\frac{6}{3}$.
	Like subtraction, the numbers must *always* be calculated in the order in which they are written.
=	Is equal to. This is usually the answer to a calculation, e.g. $6 + 3 = 9$. If you have six apples and then are given three more, you will have the same number as if you were given all 9 at once.

APPLYING THE THEORY

You will learn more about $^+$ and $^-$ being used to identify positive or negative charges on particles in physiology.

In the UK, blood is identified as being one of four types: A, B, AB or O. In addition, an individual either has or does not have the rhesus factor. The blood is then described as rhesus positive (if the individual has the factor) or negative (if the individual does not) and is written as Rh $^+$ve or Rh $^-$ve.

LOOK OUT

It is important that the correct blood is given to a patient in need of a blood transfusion, so it is safer to write positive or negative in full so that there is no doubt about the rhesus status of the patient or the blood to be transfused.

1.1 ADDITION

YOUR STARTING POINT FOR ADDITION

Without using a calculator, write down the answers to the following questions.

(a) 4 + 5 = _____   (b) 3 + 7 = _____   (c) 12 + 8 = _____

(d) 33 + 67 = _____   (e) 45 + 55 = _____   (f) 47 + 53 = _____

(g) 137 + 21 + 241 = _____   (h) 613 + 13 + 252 = _____

(i) 573 + 37 + 145 = _____   (j) 388 + 133 + 49 = _____

Answers: (a) 9 (b) 10 (c) 20 (d) 100 (e) 100 (f) 100 (g) 399 (h) 878 (i) 755 (j) 570.

If you had these all correct, skip through to Section 1.2 – Subtraction.

Let's start at the beginning – a very good place to start. When you write you begin with ABC, when you sing you begin with doh–ray–me and in maths you start with 123. Each individual figure is a **numeral** but in everyday speech we call them numbers.

Whole numbers are those without fractions, e.g. 7, 21, 155, 3742. They are sometimes called integers.

One of the most important concepts is that of **number bonds**. This is the technical way of adding the numbers together.

Number bonds 1 to 10

<u>0 1 2 3 4 5 6 7 8 9 10</u>

These are the numbers that can be added together to make a total of 10.

Numbers can be added together in any order:

$$0 + 10 = 10$$
$$1 + 9 = 10$$
$$2 + 8 = 10$$
$$3 + 7 = 10$$
$$4 + 6 = 10$$
$$5 + 5 = 10$$
$$6 + 4 = 10$$
$$7 + 3 = 10$$
$$8 + 2 = 10$$
$$9 + 1 = 10$$
$$10 + 0 = 10$$

Can you see a pattern? The first numbers go *up* by 1. The second numbers go *down* by 1.

What is the answer to the following?

$$8 + 2 =$$

$$2 + 8 =$$

Which sum was easier to work out? Why was it easier?

Counting on

<u>0 1 2 3 4 5 6 7 8 9 10</u>

Numbers can be added in any order but it is easier to start with the bigger number and count on. You can also use the line of numbers to check this method if you are not confident. Consider

$$3 + 7 =$$

This can be done as $7 + 3$, keeping 7 in your head and counting on 3.

Hint: Look for the bigger number, keep it in your head and count on.

(a) $2 + 8 =$ _____   (b) $4 + 6 =$ _____

(c) $1 + 9 =$ _____   (d) $3 + 7 =$ _____

You should have got 10 for all these answers.

Now try these. What do you need to make 10?

(a) $9 +$ ___   (b) $5 +$ ___   (c) $7 +$ ___   (d) $10 +$ ___

(e) $2 +$ ___   (f) $1 +$ ___   (g) $3 +$ ___   (h) $0 +$ ___

(i) $4 +$ ___   (j) $6 +$ ___   (k) $8 +$ ___

Answers: (a) 1 (b) 5 (c) 3 (d) 0 (e) 8 (f) 9 (g) 7 (h) 10 (i) 6 (j) 4 (k) 2.

Have you got the idea? If you are confident that you understand the concept of number bonds 1–10, then move on to place value.

Place value

You are now familiar with numbers up to 10 and how they can be added together to make 10. Each time the answer was 10 but the way in which you reached it may have been so automatic that you didn't think about the rule.

Place value is to do with the 'amount a number is worth', depending on where in a line of numbers it is written. If I wrote a cheque for £1, another for £10 and a final one for £100, I would have written 1 three times but in a different place along a line

of numbers. Its value goes from one unit, to one 10, then one 100. What a difference a place makes!

Add these numbers together and think about how you achieved the answer:

(a) 5 + 7 = _____ (b) 9 + 4 = _____ (c) 6 + 8 = _____ (d) 7 + 7 = _____

You should have the following answers: (a) 12 (b) 13 (c) 14 (d) 14.

What answer did you get? You probably used the same method as you did for the bonding of the numbers 1 to 10.

In the examples above you had one 10 and some spare units left over, so you put them in the units column. We use a system of counting called base 10 so that when we write 12, it means that we have one lot of 10 and two units. If you were asked to add 15 and 6 your answer would be 21. This means that you have two lots of 10 and one unit left over.

Number bonds 1–20

<u>0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20</u>

0 + 20 = 20	6 + 14 = 20	11 + 9 = 20	16 + 4 = 20
1 + 19 = 20	7 + 13 = 20	12 + 8 = 20	17 + 3 = 20
2 + 18 = 20	8 + 12 = 20	13 + 7 = 20	18 + 2 = 20
3 + 17 = 20	9 + 11 = 20	14 + 6 = 20	19 + 1 = 20
4 + 16 = 20	10 + 10 = 20	15 + 5 = 20	20 + 0 = 20
5 + 15 = 20			

Again the pattern here is that the first number increases by one as the second number decreases. Look back at the number bonds 0–10 and you will see the same pattern.

TIME TO TRY

(a) 4 + 16 = _____   (b) 18 + 2 = _____   (c) 9 + 11 = _____

(d) 12 + 8 = _____   (e) 7 + 13 = _____   (f) 19 + 1 = _____

You can add these by counting on as you did with the 0–10 bonds. The answer to all these is 20.

What do you need to add to these numbers to make 20?

(a) 11 + _____   (b) 17 + _____   (c) 6 + _____

(d) 10 + _____   (e) 4 + _____   (f) 18 + _____

(g) 15 + _____   (h) 2 + _____   (i) 13 + _____

More about place value

When you had 10 units you wrote 10. Ten lots of 10 overflows the tens column so you write 100, which means that 10 lots of 10 is 100. When you have 10 lots of 100, you write it as 1000 and so on until you run out of energy or ink.

How would you describe, in terms of '10 lots of', 10 000?

This number is 10 lots of 1000, i.e. 'ten thousand'. In this case, saying the number aloud gives you the answer!

Number bonds 1 to 100

Look at **Table 1.2**. The numbers in the rows increase by one each time.

What do you notice about the way the numbers in the columns increase? They are bigger than the number above, by 10.

There are 10 rows of 10, so you can use it to count in tens, e.g. start at a number in the top row, say 6, then go down the column and each one is 10 more than the number above: 6, 26, 36, 46 … .

Use the table to help you test your ability to form number bonds with numbers making 100.

What number needs to be added to 73 to make 100?

There are several ways you could solve this problem. The principles that you used to add together for the numbers 0 to 20 can be used for the numbers 0 to 100.

You can count on 74, 75, 76… until you got to 100, but this takes quite a long time and there are many opportunities to miscount.

You can count to 80, then count in tens up to 100 and add the two numbers together to find your answer: 73 to 80 is 7 and 80 to 100 is 20, so your answer to the question is $7 + 20 = 27$.

You can also count in tens from 73 until you get to 93 and then count to 100 from 93. You will then have $20 + 7 = 27$. Miraculously, the same answer!

Table 1.2 Numbers 1 to 100

1	2	3	4	5	6	7	8	9	10
11	12	13	14	15	16	17	18	19	20
21	22	23	24	25	26	27	28	29	30
31	32	33	34	35	36	37	38	39	40
41	42	43	44	45	46	47	48	49	50
51	52	53	54	55	56	57	58	59	60
61	62	63	64	65	66	67	68	69	70
71	72	73	74	75	76	77	78	79	80
81	82	83	84	85	86	87	88	89	90
91	92	93	94	95	96	97	98	99	100

In arithmetic, it doesn't matter how you get the answer as long as it is the right one and you understand the rules that you use. Practise both methods in your head for the following (counting on is not wrong, it just takes a long time with large numbers and there is room for making a mistake).

TIME TO TRY

(a) 23 + 77 = _____   (b) 50 + 50 = _____   (c) 32 + 68 = _____

(d) 45 + 55 = _____   (e) 72 + 28 = _____   (f) 84 + 16 = _____

(g) 65 + 35 = _____   (h) 59 + 41 = _____   (i) 61 + 39 = _____

The answer to all of these is 100.

What needs to be added to these numbers to make 100?

(a) 90 + _____ = 100   (b) 35 + _____ = 100   (c) 64 + _____ = 100

(d) 78 + _____ = 100   (e) 23 + _____ = 100   (f) 85 + _____ = 100

(g) 17 + _____ = 100   (h) 72 + _____ = 100   (i) 56 + _____ = 100

Answers: (a) 10 (b) 65 (c) 36 (d) 22 (e) 77 (f) 15 (g) 83 (h) 28 (i) 44.

Mastered these? Then move on to the next part. If you want more practice, there are further examples at the end of the chapter.

KEY POINT

● **The position of an individual numeral in a number determines its value.**

So far, you have added two numbers together. Often, several numbers need to be added to get a total, for instance when you have several items of shopping and need to know whether you have enough money.

Place value is even more important when larger numbers are added together. It is vital that the hundreds, tens and units are placed under each other in the sum. Add 121 + 322 + 55.

```
        H  T  U
        1  2  1
add +   3  2  2
           5  5
        _____
        4  9  8
```

The columns must *always* be added starting from the units column on the right.

First the numbers in the units column are added together: $1 + 2 + 5 = 8$
Next the numbers in the tens column are added together: $2 + 2 + 5 = 9$
Then the numbers in the hundreds column: $3 + 1 = 4$

Look at the difference in the answers below if care is not taken to align the numbers correctly.

```
        H  T  U
        1  2  1
add +   3  2  2
        5  5
       _____
        9  9  3
```

TIME TO TRY

Use a page in your notebook to set out the sums as in the above examples.

(a) 52 + 230 + 17 = _____

(b) 324 + 241 + 123 = _____

(c) 144 + 211 + 43 = _____

(d) 73 + 410 + 16 = _____

(e) 114 + 612 + 53 = _____

(f) 725 + 142 + 132 = _____

(g) 450 + 114 + 131 = _____

(h) 212 + 412 + 322 = _____

(i) 186 + 12 + 501 = _____

(j) 127 + 21 + 311 = _____

(k) 538 + 20 + 121 = _____

(l) 523 + 51 + 422 = _____

Answers: (a) 299 (b) 688 (c) 398 (d) 499 (e) 779 (f) 999 (g) 695 (h) 946 (i) 699 (j) 459 (k) 679 (l) 996.

If you want more practice, there are further examples at the end of the chapter.

You may have noticed that when you added each column, the answer was no more than 9. That was deliberate so that you could gain confidence before having to carry over a group of 10 to the next column. Let's look at how this is done. You only have to learn one rule and then apply it to as many columns as needed.

As you have already seen, our counting system uses **base 10**. All that you need to remember is that when the number is one greater than 9, that is 10, then you put 1 in the next column to the left.

Just remember that when you have 10 lots of 1 you write 10, for 10 lots of 10 you write 100 and when there are 10 lots of 100 you write 1000. When there are 10 lots of 1000, then it is written as 10 000 (ten thousand). The next step is hundreds of thousands and then 10 lots of 100 000 is a million, which is written as 1 000 000.

In these numbers, the zeros are crucial as they indicate the place value of the 1. They do not have any value in themselves but are **place holders**, keeping the 1 in the correct position. In scientific notation, there are no commas between the numbers but a gap is left between each group of three numbers, as here, starting from the right.

LOOK OUT

When dealing with patients' prescriptions, decimal points are often used when writing the dose. If commas are used, then they can be easily confused with a decimal point, which can result in a drug error.

KEY POINT

- Numbers must be aligned under each other to ensure that they are not added incorrectly.

Carrying over a group of 10 to the next column

You have probably skipped through the chapter so far, which is the idea of the exercise. Don't hang around reading every bit if you are confident that you understand the rule and how to use it. Understanding is important, otherwise you will not be able to complete more complicated sums. Most problems arise because individuals have tried to remember the rule without knowing the underlying reason.

Now let's look at the rule of 10 again. The following calculations will test your understanding of addition of numbers that need you to carry one or more groups of 10 to the next column on the left.

$$
\begin{array}{r}
\text{H} \;\; \text{T} \;\; \text{U} \\
\text{add} + 2 \;\; 7 \;\; 6 \\
3 \;\; 5 \;\; 6 \\
\hline
6 \;\; 3 \;\; 2 \\
1 \;\; 1 \;\;\;\;
\end{array}
$$

As in the previous examples of adding hundreds, tens and units together, you must start from the units column on the right.

First the units column: $6 + 6 = 12$. Remember that this means one lot of 10 and two units over. It is useful to put the one 10 under the tens column, because you need to add it to the other tens.

You now have $7 + 5$ and the 1 that was carried over from the units column: $7 + 5 + 1 = 13$ (one lot of 100 and three lots of 10). Again there is one lot to be carried over, but this time it is 100, to go to the hundreds column.

Adding the hundreds column, 2 + 3 and the 1 carried over from the tens column: 2 + 3 + 1 = 6.

The answer to the sum is: 276 + 356 = 632.

This may seem a long-winded explanation, but if you understand the principles, then you can tackle any sum, no matter how many numbers have to be added together.

One more example:

```
          H   T   U
add +     4   7   7
          1   3   9
          3   2   5
          9   4   1
          1   2
```

In this case, the units column added up to 21, so there were two lots of 10 to be carried over to the tens column. What happens if there are more than 10 lots in the hundreds column? Another column has to be added for 'thousands'. You can set out the sum labelled **Th** (to distinguish it from **T** for tens) and put the thousands in that column. Another column to the left of that would be for tens of thousands (**TTh**) and then (**HTh**) hundreds of thousands and then a million (**M**).

In reality, when you are confident about what you are doing, there is no need to label the columns as long as the numbers are correctly aligned under each other. You should be able to do the smaller numbers without writing them down.

TIME TO TRY

(a) 237 + 98 = _____

(b) 173 + 348 = _____

(c) 532 + 389 = _____

(d) 196 + 144 = _____

(e) 372 + 88 = _____

(f) 83 + 594 = _____

(g) 456 + 127 + 197 = _____

(h) 43 + 547 + 18 = _____

(i) 183 + 24 + 519 = _____

(j) 92 + 314 + 675 = _____

(k) 739 + 33 + 92 = _____

(l) 821 + 67 + 814 = _____

Answers: (a) 335 (b) 521 (c) 921 (d) 340 (e) 460 (f) 677 (g) 780 (h) 608 (i) 726 (j) 1081 (k) 864 (l) 1702.

If you had some errors, check that you followed the rules. Make sure that you:

1. Aligned the numbers under each other before adding them together.

2. Carried over the tens and hundreds.

There are further examples at the end of the chapter if you need more practice.

APPLYING THE THEORY

You need to keep a record of the number of people that attend the outpatient department during the course of a week. The numbers for each day are as follows: Monday, 183; Tuesday, 215; Wednesday, 264; Thursday, 192; Friday, 117.

What is the total number of patients for the week?

Answer: 971 patients.

Addition is only one of the four basic operations of arithmetic but now you should be confident that you can cope with any whole numbers that need to be added together.

1.2 SUBTRACTION

YOUR STARTING POINT FOR SUBTRACTION

Without using a calculator, write down the answers to the following questions.

(a) 5 − 4 = _____

(b) 7 − 3 = _____

(c) 12 − 8 = _____

(d) 17 − 13 = _____

(e) 25 − 15 = _____

(f) 47 − 33 = _____

(g) 127 − 111 = _____

(h) 246 − 137 = _____

(i) 323 − 195 = _____

(j) 1376 − 1125 = _____

(k) 3322 − 1782 = _____

(l) 2571 − 1684 = _____

Answers: (a) 1 (b) 4 (c) 4 (d) 4 (e) 10 (f) 14 (g) 16 (h) 109 (i) 128 (j) 251 (k) 1540 (l) 887.

If you had these all correct, skip through to Section 1.3 – Multiplication.

Subtraction means taking one number away from another. The second number is taken from the first. The answer is what is left over.

You can use the number line to help you to become confident about taking away:

0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20

Use the number line to work out this sum: 10 − 4. Start at 10 and count back 4, to the left. You are taking 4 away from 10. This will give you the answer 6. You can check that you are right by adding the number you took away to your answer. It should give you the first number of the sum: 10 − 4 = 6. (Check: 6 + 4 = 10.)

Maybe you are now starting to see the relationship between addition and subtraction?

TIME TO TRY

(a) $7 - 3 =$ _____

(b) $9 - 4 =$ _____

(c) $6 - 2 =$ _____

(d) $8 - 3 =$ _____

(e) $3 - 2 =$ _____

(f) $4 - 1 =$ _____

(g) $9 - 6 =$ _____

(h) $1 - 0 =$ _____

(i) $16 - 9 =$ _____

(j) $18 - 12 =$ _____

(k) $20 - 7 =$ _____

(l) $13 - 7 =$ _____

Answers: (a) 4 (b) 5 (c) 4 (d) 5 (e) 1 (f) 3 (g) 3 (h) 1 (i) 7 (j) 6 (k) 13 (l) 6.

More examples are at the end of the chapter if you need more practice.

You can subtract simple numbers in your head but as they get bigger, you might find it helpful to use one of the following methods:

1. Partitioning, or breaking up the numbers and subtracting them in turn:

$$43 - 36 \text{ is the same as } 43 - 30 - 6$$
$$43 - 30 = 13$$
$$13 - 6 = 17$$
$$43 - 36 = 17$$

2. Use **near numbers** and adjust:

$$43 - 19 = 43 - 20 + 1 = 23 + 1 = 24$$

Here you use a number that is near the number in the sum but is easier to use, which in this case is 20 instead of 19. You have to take this into account in your final answer, so if you have taken off one more than you needed, then you have to add it onto your answer.

3. Counting on. When you worked out the number bonds for 10, 20 and 100, you used the method that was called counting on. You can also use this way to get the answer to subtraction problems.

To work out $53 - 36$, count on from 36 to 53:

Count on from 36 to 40 to get 4
Count on from 40 to 50 to get 10
Count on from 50 to 53 to get 3
$4 + 10 + 3 = 17$

$$36 \xrightarrow{\quad\quad} 40 \xrightarrow{\quad\quad} 50 \xrightarrow{\quad\quad} 53$$
$$\quad\; 4 \qquad\qquad 10 \qquad\qquad 3$$

You may find your own way of making things easier; it doesn't matter which method you use as long as you get the right answer and understand how you got there.

Subtraction is the opposite of addition, so you can check you are right by adding your answer to the number which was subtracted.

To check that $53 - 36 = 17$, add the 17 and the 36 and you should get 53.

If the numbers are too large or too difficult to subtract in your head, you can write them down in columns, as you did with addition; always start subtracting with the units.

```
              H   T   U
              6   5   8
subtract  −   2   2   3
              ―――――――――
              4   3   5
```

Borrowing

Sometimes one of the columns has a smaller number on top, and so the number on top borrows from the number to its left. You will have to carry out a couple more steps to get your answer.

```
              H    T    U
              6   ⁴5̶  ¹8̶
subtract  −   2    2    9
              ―――――――――――
              4    2    9
```

In the units column of this example the top number is 8 and you are asked to subtract 9. The solution is to '**borrow**' a 10 from the tens column, change it to 10 units and add it in the units column. Now you are left with 4 in the tens column and 18 in the units. It is now possible to take 9 away from 18, leaving 9 units.

This method can be used whether the larger number involved is in the units, tens, hundreds, thousands or any other column.

It's a good idea to estimate a rough answer first and always check your actual answer. Thus 658 is nearly 660 and 229 is nearly 230, so an estimate of your answer is $660 - 230 = 430$. (You can do it in your head.) It is even more important to have a rough estimate of the expected answer when you are using a calculator.

Borrowing because of a zero

This is the same because, if one of the columns has a smaller number on top, you borrow from the number to its left.

```
              H    T    U
             ⁵6̶  ¹0   8
subtract  −   2    2    7
              ―――――――――――
              3    8    1
```

When working out the tens in this sum, because 0 is less than 2, you have to borrow 10 from the hundreds column. So 0 becomes 10. In the hundreds column you now have 5 lots of hundreds.

KEY POINT

● When the number in the top row of the subtraction sum is smaller than the one in the bottom row, then you need to borrow one from the next column on the left.

TIME TO TRY

(a) 29 − 18 = _____

(b) 35 − 21 = _____

(c) 47 − 29 = _____

(d) 77 − 48 = _____

(e) 93 − 44 = _____

(f) 84 − 37 = _____

(g) 187 − 75 = _____

(h) 124 − 105 = _____

(i) 278 − 166 = _____

(j) 536 − 218 = _____

(k) 409 − 217 = _____

(l) 627 − 348 = _____

Answers: (a) 11 (b) 14 (c) 18 (d) 29 (e) 49 (f) 47 (g) 112 (h) 19 (i) 112 (j) 318 (k) 192 (l) 279.

More examples are at the end of the chapter.

APPLYING THE THEORY

Many patients need to have the amount of fluid that they drink and the volume of urine passed carefully measured. Normally the difference between intake and output is less than 200 millilitres.

Remember that 'difference' is a word indicating subtraction. If a patient's total intake is 1995 millilitres and the urinary output measures as 1875 then you need to subtract:

$$1955 − 1875 = 80$$

The difference between intake and output is 80 millilitres, which is what would be expected under normal circumstances.

Monitoring fluid balance is important so that the correct treatment is given. There will be more details about fluid balance monitoring in Chapter 8.
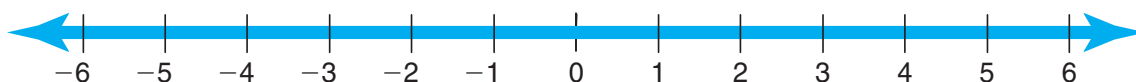
Negative numbers

We write negative numbers like this:

negative 2 is the same as ⁻2

The raised dash is the negative sign. It is usually written slightly shorter and a little higher up than a normal minus sign, but on the Internet and in newspapers you will see it written using a minus sign.

Sometimes negative numbers are called *minus* numbers. Be careful that you don't confuse these with subtraction.

The time when you are most likely to come across **negative numbers** is in the winter weather forecast. If the temperature is below 0°C then it is very cold and as the minus number increases, so the temperature gets colder: minus 5 (-5) degrees centigrade is colder than -2°C. This is the opposite of **positive numbers**, which indicate that the weather is getting warmer as the number increases.

Look at the number line below. Negative numbers are always written to the left of the zero on graphs and number lines and positive ones to the right.

Another instance may be your bank balance at the end of the month! If you owe £3, you are minus three pounds. If someone else owes £5, they have an even greater negative state than you. If you are then given £2, then your $-£3$ is reduced to $-£1$. Find -3 on the number line and add 2; that is, move to the right. You will find that you are at -1. If you are then given a further £5, you will then have a positive balance of £4.

APPLYING THE THEORY

If a patient is given drugs to make them pass more urine, you would expect that when you calculate the difference between the amount of fluid in and fluid out, they would have less fluid intake than output. We say that they have a negative fluid balance. For example,

total intake 1360 millilitres   total output 1950 millilitres

You then need to find out the difference between the two numbers. Take the smaller number away from the larger number: $1950 - 1360 = 590$.

You can see that the body has lost more fluid than was retained. In this case 590 millilitres more has been lost. This is a negative balance: the body has ⁻590 millilitres less than the previous 24 hours.

1.3 MULTIPLICATION

YOUR STARTING POINT FOR MULTIPLICATION

Without using a calculator, write down the answers to the following questions.

(a) $4 \times 5 =$ _____   (b) $3 \times 7 =$ _____

(c) $8 \times 8 =$ _____   (d) $9 \times 7 =$ _____

(e) $5 \times 5 =$ _____   (f) $6 \times 3 =$ _____

(g) 12 × 2 = _____   (h) 10 × 7 = _____

(i) 15 × 6 = _____   (j) 39 × 23 = _____

(k) 115 × 25 = _____   (l) 245 × 100 = _____

Answers: (a) 20 (b) 21 (c) 64 (d) 63 (e) 25 (f) 18 (g) 24 (h) 70 (i) 90 (j) 897 (k) 2875 (l) 24 500.

If you had all these correct, you can move on to Section 1.4 – Division.

Multiplication is much easier if you know your times tables. You can use **Table 1.3** to help you brush up. Choose a number in the left-hand column and one from the top row, and where the column and row meet in the table is the answer to the multiplication, e.g. 6 × 8 = 48. You will also see that if you take 8 in the left-hand column and 6 in the top row, you will get the same answer.

Remember that if you multiply any number by 1, the number doesn't change, but if it is multiplied by 0 your answer is zero. Not logical? If you have no money and you multiply it by 7 you still have no money!

If you look at the table, you will see in the ×10 column that when a number is multiplied by 10, the answer is the number followed by 0, e.g. 5 × 10 = 50, 9 × 10 = 90.

This pattern is true of any number multiplied by 10. What is 273 × 10?

Answer: 2730.

When a number is multiplied by 100, the figures move two places to the left and two zeros are added to the spaces, e.g. 2 × 100 = 200, 345 × 100 = 34 500.

Table 1.3 Multiplication using a grid

×	0	1	2	3	4	5	6	7	8	9	10
0	0	0	0	0	0	0	0	0	0	0	0
1	0	1	2	3	4	5	6	7	8	9	10
2	0	2	4	6	8	10	12	14	16	18	20
3	0	3	6	9	12	15	18	21	24	27	30
4	0	4	8	12	16	20	24	28	32	36	40
5	0	5	10	15	20	25	30	35	40	45	50
6	0	6	12	18	24	30	36	42	48	54	60
7	0	7	14	21	28	35	42	49	56	63	70
8	0	8	16	24	32	40	48	56	64	72	80
9	0	9	18	27	36	45	54	63	72	81	90
10	0	10	20	30	40	50	60	70	80	90	100

APPLYING THE THEORY

You will often have to multiply by 10, 100 and 1000 when converting units for calculating drug doses, so it is important that you can do it quickly and accurately. You will learn more about changing units in a later chapter.

If you are multiplying numbers you need to decide whether to do the calculation in your head or write it down.

When you multiply, remember that you will expect the number of your answer to be bigger than those that you multiplied together.

Multiplication is a quick way of doing addition. If you find that odd, think about this straightforward example: $5 \times 6 = 30$. You may have learned the five times table and know the answer without any trouble and may not have thought about what it really meant. We can think of 5×6 as five lots of six. If you write down five sixes in a column and make an addition sum:

```
        T   U
            6
            6
  +         6
            6
            6
        ─────
        3   0
```

Similarly 25×3 is 25 lots of three. It is tedious writing 3 down 25 times and adding them, but in multiplication it does not matter which number is multiplied by which. So it is just as valid to write 3 lots of 25:

```
        T   U
        2   5
        2   5
        2   5
        ─────
        7   5
        1
```

Place value again

In the number 293, 2 means two hundreds, 9 means nine tens and 3 means three units:

```
  H   T   U
  2   0   0  ─────────▶  two hundreds
      9   0  ─────────▶  nine tens
          3  ─────────▶  three units
  ─────────
  2   9   3
```

You can use this method of breaking up a large number to simplify the multiplication of big numbers. If the sum is 293×6, then one way of doing the sum is to multiply each row by 6:

$$200 \times 6 = 1200$$
$$90 \times 6 = 540$$
$$3 \times 6 = 18$$

The numbers are then added together to get the answer: $1200 + 540 + 18 = 1758$.

Traditional method of multiplication

You may be more familiar with the following way of multiplication. We use the same sum as before, 293×6, using this method.

First we set out the sum in the following way:

```
      Th   H   T   U
            2   9   3
    ×               6
    _____
```

Now we multiply the number in each column by 6, starting with the units:

(a) $6 \times 3 = 18$. Put 8 in the units column and carry 1 to the tens.

(b) $6 \times 9 = 54$. Add the 1 carried over to make 55.

(c) One 5 goes in the tens column and 5 is carried over to the hundreds column.

(d) $6 \times 2 = 12$. Add the 5 carried over to make 17.

(e) The 7 is put in the hundreds column and the one in the thousands.

So $293 \times 6 = 1758$.

```
      Th   H   T   U
            2   9   3
    ×               6
    _____
       1    7   5   8
       1    5   1
```

TIME TO TRY

Use whichever method you prefer for the following or experiment to see which you find easier.

(a) $15 \times 5 =$ _____   (b) $18 \times 0 =$ _____   (c) $37 \times 9 =$ _____

(d) $87 \times 4 =$ _____   (e) $2 \times 385 =$ _____   (f) $643 \times 3 =$ _____

(g) $948 \times 8 =$ _____   (h) $7 \times 587 =$ _____   (i) $467 \times 1 =$ _____

(j) $2791 \times 6 =$ _____   (k) $3755 \times 9 =$ _____   (l) $1768 \times 7 =$ _____

Answers: (a) 75 (b) 0 (c) 333 (d) 348 (e) 770 (f) 1929 (g) 7584 (h) 4109 (i) 467 (j) 16 746 (k) 33 795 (l) 12 376.

More examples, if you need them, are at the end of the chapter.

Even larger numbers

If you have a sum where the numbers that you have to multiply are both two figures or more, each figure is multiplied separately. It is even more important to understand place value because the number that you are multiplying by is broken up.

EXAMPLE

Calculate 376×35. Multiplying by 35 is the same as multiplying by 30 and then by 5.
   First multiply 376 by the unit 5:

(a) $5 \times 6 = 30$. Put the 0 in the units column and carry 3 to the tens.

(b) $5 \times 7 = 35$. Add the 3 carried over, which makes 38.
      8 goes in the tens column and the 3 is carried over to the hundreds column.

(c) $5 \times 3 = 15$. Add the 3 carried over from the tens column, which makes 18.
      8 goes in the hundreds column and 1 in the thousands.

This makes a total of 1880.

   Next multiply 376 by the tens digit 3. When multiplying by tens you must remember to add the zero first in the units column because you are really multiplying by 30. (Remember from Table 1.2 that any number multiplied by 10 has a zero added at the end.)

(a) $3 \times 6 = 18$. Put the 8 in the tens column and carry 1 to the hundreds.

(b) $3 \times 7 = 21$. Add the 1 carried over from the tens column, which makes 22.
      2 goes in the hundreds column and the other 2 is carried over to the thousands column.

(c) $3 \times 3 = 9$. Add the 2 carried over from the hundreds column, which makes 11.
      1 goes in the thousands column and the other one in the tens of thousands.

This makes a total of 11 280.

   To find the answer to the original question, 376×35, we need to add the two sums together: $1880 + 11\,280 = 13\,160$.

$$
\begin{array}{r|ccccc}
 & \text{TTh} & \text{Th} & \text{H} & \text{T} & \text{U} \\
 & & & 3 & 7 & 6 \\
\times & & & & 3 & 5 \\
\hline
 & & 1 & 8_3 & 8_3 & 0 \\
 & 1 & 1_2 & 2_1 & 8 & 0 \quad \text{add} \\
\hline
 & 1 & 3_1 & 1_1 & 6 & 0 \\
\end{array}
$$

APPLYING THE THEORY

Some drug dosages are calculated according to the patient's weight, so it may be necessary for you to multiply the dose per kilogram by the patient's weight in kilograms.

If a patient weighs 64 kg and they have to be given 15 mg for each kilogram of their body weight, in order to find out how much of the drug that they need the amount of drug per kilogram has to be multiplied by the number of kilograms, so 15×64 gives the number of milligrams to be given. This is a total of 960 mg.

```
    H  T  U
       6  4
  ×    1  5
    3  2₂ 0
    6  4  0    add
    9  6  0
```

TIME TO TRY

(a) $478 \times 48 =$ _____

(b) $396 \times 87 =$ _____

(c) $727 \times 57 =$ _____

(d) $592 \times 34 =$ _____

(e) $653 \times 64 =$ _____

(f) $295 \times 76 =$ _____

(g) $589 \times 53 =$ _____

(h) $178 \times 96 =$ _____

(i) $237 \times 85 =$ _____

(j) $344 \times 46 =$ _____

(k) $876 \times 35 =$ _____

(l) $144 \times 69 =$ _____

Answers: (a) 22 944 (b) 34 452 (c) 41 439 (d) 20 128 (e) 41 792 (f) 22 420 (g) 31 217 (h) 17 088 (i) 20 145 (j) 15 824 (k) 30 660 (l) 9936.

Further questions are at the end of the chapter.

1.4 DIVISION

YOUR STARTING POINT FOR DIVISION

(a) $10 \div 5 =$ _____

(b) $21 \div 7 =$ _____

(c) $64 \div 8 =$ _____

(d) $504 \div 9 =$ _____

(e) $105 \div 5 =$ _____

(f) $36 \div 3 =$ _____

(g) $345 \div 15 =$ _____

(h) $121 \div 11 =$ _____

(i) $7125 \div 57 =$ _____

(j) $425 \div 17 =$ _____

(k) $125 \div 25 =$ _____

(l) $812 \div 14 =$ _____

Answers: (a) 2 (b) 3 (c) 8 (d) 56 (e) 21 (f) 12 (g) 23 (h) 11 (i) 125 (j) 25 (k) 5 (l) 58.

If you had all these correct, go to Section 1.5.

Division is really repeated subtraction, and is the opposite of multiplication.

Sharing is a form of division. Say you have a packet of biscuits that has to be shared between five people. You can give a biscuit to each person and share them around until there are no more left in the packet. You find that they have four biscuits each. If five people have four biscuits each and there are none left, the packet must have contained $5 \times 4 = 20$ biscuits.

If you had counted the biscuits before you shared them then you could have divided the number of biscuits by the number of people who were sharing them: $20 \div 5 = 4$. Division problems must be done from left to right. Reading out aloud 'twenty divided by five' helps you to identify the number that is to be divided.

As you saw in Table 1.1, there are several ways of indicating that numbers have to be divided. The number to be divided is called the **dividend** and the number which divides is called the **divisor**. In the examples below, 20 is the dividend and 5 the divisor. The answer is called the **quotient**, which in this case is 4. These are all ways of setting out the same division.

$$20 \div 5 \qquad \frac{20}{5} \qquad 5\overline{)20} \qquad 20/5 \qquad 5\underline{)\ 20}$$

Again you should be able to do these without using a calculator.

You can check your answer to a division by multiplying the answer by the divisor, which will give you the number that was the dividend:

$$72 \div 8 = 9 \qquad 9 \times 8 = 72$$

There are a number of ways that you can make division easier to carry out when you are not using a calculator.

You can break up the number being divided to make it easier to handle. If you want to divide $52 \div 4$, 52 can be split into 40 and 12, both of which can be divided by 4:

$$40 \div 4 = 10 \quad \text{and} \quad 12 \div 4 = 3$$

Add the two answers together: $10 + 3 = 13$. So $52 \div 4 = 13$.

Another way of making life easier is to split the number that is the divisor into its factors (smaller numbers which, when multiplied, make up the divisor). If you want to divide $525 \div 15$, 15 can be split into the factors $5 \times 3 = 15$. Then 525 can be divided first by 5 and the answer divided by 3. This is easier than dividing by 15.

$$525 \div 5 = 105 \quad \text{and} \quad 105 \div 3 = 35$$

So $525 \div 15 = 35$.

TIME TO TRY

(a) $27 \div 9 = $ _____   (b) $72 \div 6 = $ _____   (c) $15 \div 5 = $ _____

(d) $45 \div 5 = $ _____   (e) $189 \div 3 = $ _____   (f) $81 \div 9 = $ _____

(g) $120 \div 8 = $ _____   (h) $150 \div 6 = $ _____   (i) $126 \div 6 = $ _____

(j) $63 \div 3 = $ _____   (k) $35 \div 7 = $ _____   (l) $28 \div 4 = $ _____

Answers: (a) 3 (b) 12 (c) 3 (d) 9 (e) 63 (f) 9 (g) 15 (h) 25 (i) 21 (j) 21 (k) 5 (l) 7.

There are more examples at the end of the chapter.

Long division

The sum 36 265 ÷ 5 can be set out as below to make it easier to handle larger numbers. As long as you know your five times table this is not a problem.

$$
5\overline{)3\;{}^36\;{}^12\;{}^26\;{}^15}
$$
$$
7\;2\;5\;3
$$

If you take this in steps, you will see that this is a straightforward way of doing this type of division. Put each number of the answer above the appropriate column of the dividend.

(a) 5 into 3 won't go, so carry 3 over to the 6.

(b) 5 into 36: 5 × **7** = 35, the remainder of 1 to be carried over to the 2.

(c) 5 into 12: 5 × **2** = 10, the remainder of 2 to be carried over to the 6.

(d) 5 into 26: 5 × **5** = 25, the remainder of 1 to be carried over to the 5.

(e) 5 into 15: 5 × **3** = 15, no remainder.

The answer is 7253.

Long division involving divisors above 10, with the exception of 100, 1000 and 1 000 000, will be discussed later. You will be glad to know that these will be done using a calculator!

TIME TO TRY

(a) 20 ÷ 5 = _____

(b) 63 ÷ 7 = _____

(c) 56 ÷ 8 = _____

(d) 81 ÷ 9 = _____

(e) 105 ÷ 5 = _____

(f) 93 ÷ 3 = _____

(g) 312 ÷ 6 = _____

(h) 132 ÷ 12 = _____

(i) 7125 ÷ 5 = _____

(j) 1968 ÷ 3 = _____

(k) 343 ÷ 7 = _____

(l) 4336 ÷ 8 = _____

Answers: (a) 4 (b) 9 (c) 7 (d) 9 (e) 21 (f) 31 (g) 52 (h) 11 (i) 1425 (j) 656 (k) 49 (l) 542.

There are more examples at the end of the chapter.

APPLYING THE THEORY

Injections of drugs are packaged in glass containers, and often a patient is prescribed a dose that is only part of the amount in the container. This means that you will have to divide the volume in the container to get the right dose. You need to be able to work out the sum and get it right. A calculator should not be relied solely upon for the answer; you need to know what answer to expect.

1.5 EXPONENTS AND SCIENTIFIC NOTATION

You may have heard the expression two squared or two to the power of two. It is written as 2^2. The small number is called an **exponent** or index (plural indices). It means $2 \times 2 = 4$. Similarly $2^4 = 2 \times 2 \times 2 \times 2 = 16$.

In laboratory reports very large and very small numbers are written using exponents in a form called scientific notation. When there is a large number of zeros, it can be confusing to read and one could be added or missed when written.

$$10 \times 10 = 100 = 10^2 \qquad 10 \times 10 \times 10 = 1000 = 10^3$$

$$10 \times 10 \times 10 \times 10 \times 10 \times 10 = 1\,000\,000 = 10^6$$

It is easy to multiply and divide numbers with **indices**. The index tells you how many times the number is multiplied by itself.

$$\text{Multiply} \quad 100 \times 100 = 10^2 \times 10^2$$
$$10\,000 = 10^4$$

As you can see, adding the indices gives you the answer very quickly.

Similarly, you can divide numbers with exponents by subtracting the indices.

$$\text{Divide} \quad 2^6 \div 2^3$$

$$2 \times 2 \times 2 \times 2 \times 2 \times 2 = 64 \div 2 \times 2 \times 2 = 8$$

$$64 \div 8 = 8$$

If you subtract the indices

$$2^6 \div 2^3 = 2^3 = 2 \times 2 \times 2 = 8$$

This is much easier than writing out the sum in full. It eliminates the danger of missing or adding a 2.

You can only add and subtract indices if the big numbers are the same.

There will be more about exponents in later chapters.

KEY POINTS
- Exponents are a convenient way of expressing large numbers.
- Indices can be added if the numbers are to be multiplied or subtracted if the numbers are divided.

APPLYING THE THEORY

Look at the blood reports that come from the laboratory. You will see that a red blood cell count is reported as the number of cells contained in 1 litre of blood. A normal count will be reported as 5×10^{12}/L, which if written out in full would be 5 000 000 000 000 cells per litre.

Using a calculator

At last you can get out your calculator! It is a useful tool but you must not rely on it. You need to check your answer by having done an estimate of the answer. You may not always have a calculator but you do have your head!

Figure 1.1 shows a basic calculator. You don't need a more complicated one but the important thing is that you read the instruction book! It is quite useful if you have a calculator that shows the sum as you put in the figures, because you can check for errors on the way.

First check that the display panel is clear by pressing the ON/C button.

Addition

Adding is straightforward – you just enter the numbers as they come in the sum, e.g. 29 + 48.

What is your rough estimate?

Figure 1.1 Pocket calculator

Now 29 is nearly 30 and 48 is nearly 50, so you would expect your answer to be nearly 80. In fact, with all the practice you have had you don't really need to use the calculator!

Now try putting the sum into the calculator:

Press 2, then 9, then + and then press 4, then 8, then =

The answer, 77, will appear in the display panel.

Try these sums to see if they have been entered into the calculator correctly.

(a) 75 + 84 = 159 (b) 65 + 76 = 131 (c) 34 + 87 = 121

(d) 123 + 124 = 247 (e) 4556 + 8679 = 13225

Sums (b) and (e) both have errors. It is easy to push the wrong button, especially if you have a calculator with small buttons. Many of the free ones fall into this category, so you would do well to look that particular gift horse in the mouth!

Subtraction

Subtraction is carried out in a similar way, entering the numbers as they are written in the sum. Try it on your calculator: say, 87 − 39. Make sure that you have cancelled all your previous calculations before you do by pressing the ON/C key.

The answer is 48.

Multiplication

On some calculators the multiplication symbol is × but on others it is * so check the machine that you are using.

It does not matter which number you put in first but it is good practice to go from the left as you will have to do this later. Try this one: 49 × 25.

Answer: 1225.

Division

The symbol for division varies between calculators. On some, it is a / and on others it is a ÷ sign.

It *does* matter in which order you input the figures. Say the sum aloud if you need to remind yourself which number is the dividend and which the divisor. The dividend has to be entered first. Try this one: 9045 ÷ 15.

Answer: 603.

And finally!

Now you have learned the four basic operations of arithmetic there is one more set of rules for dealing with calculations that involve more than one type of operation. You need to know about **BODMAS**!

Look at the following sum: $4 + 6 \times 3$.

If you calculate $4 + 6$ first you then have $10 \times 3 = 30$
If you calculate 6×3 first you then have $4 + 18 = 22$
Two different answers; which one is right?

This is where BODMAS comes in. It is an acronym to tell you in which order the calculation must be done:

B brackets, e.g. $(7 + 9)$, $(7 - 9)$, $(9 \div 3)$

O other operations, anything that is not one of the four basic operations, e.g. 5^3

D division, e.g. $10 \div 2$

M multiplication, e.g. 4×8

A addition, e.g. $8 + 3$

S subtraction, e.g. $9 - 4$

You might like to make up a phrase to help you remember the order, for example:

Big **O**rang-utans **D**oze **M**oodily **A**fter **S**upper

Try this one:

$$2 + 3 \times 5 - 4$$

You should have multiplied 3×5 first.
    Then the sum is

$$2 + 15 - 4 = 13$$

    Now try this one

$$4 \times (9 - 4)$$

Although multiplication is done before subtraction, because the subtraction part of the question is in brackets, it gets done first.

Answer: 20, i.e. $4 \times (9 - 4) = 4 \times 5 = 20$.

Try these, using the BODMAS rules.

(a) $3 \times 6 + 7 =$ _____

(b) $32 \div (18 - 10) =$ _____

(c) $(5 + 4) \times (7 - 2) =$ _____

(d) $(5 + 4) \times 7 - 2 =$ _____

(e) $8^2 - 6 \times 6 =$ _____

(f) $15 + 3 \times (4 - 2) =$ _____

Answers: (a) 25 (b) 4 (c) 45 (d) 61 (e) 28 (f) 21.

If you remembered the rule then these should have been no trouble! If not, here is how they are worked:

(a) First multiply $3 \times 6 = 18$ then add $7 = 25$.

(b) First subtract 10 from $18 = 8$ then divide 32 by $8 = 4$.

(c) Do the brackets first $5 + 4 = 9$ then subtract 2 from $7 = 5$. Finally multiply $5 \times 9 = 45$.

(d) Brackets first $5 + 4 = 9$. Now multiply $9 \times 7 = 63$ then subtract $2 = 61$.

(e) Exponent first $8^2 = 8 \times 8 = 64$. Multiply $6 \times 6 = 36$, then subtract 36 from $64 = 28$.

(f) Brackets first $4 - 2 = 2$. Now multiply $3 \times 2 = 6$, then add $15 + 6 = 21$.

There will be more use of BODMAS later in calculations of physiological parameters.

RUNNING WORDS

addition	dividend	near number	place value
base 10	division	negative number	positive number
BODMAS	divisor	number bond	quotient
borrowing	exponent	numeral	subtraction
carrying over	indices	partitioning	
counting on	multiplication	place holder	

Answers to the following questions can be found at the end of the book.

What did you learn?

Answer the following questions without using a calculator.

(a) $25 + 47 =$ _____

(b) $291 \div 3 =$ _____

(c) $563 \times 8 =$ _____

(d) $58 - 43 =$ _____

(e) $847 + 362 + 178 =$ _____

(f) $874 \times 46 =$ _____

(g) $2275 \div 7 =$ _____

(h) $5736 - 1845 =$ _____

(i) $4^3 =$ _____

(j) $10^5 \times 10^4 =$ _____

(k) $3 \times 5 + 6 - 2 =$ _____

(l) $4 \times (8 - 2) + 3 =$ _____

More 'Time to Try' examples

Number bonds 1 to 100, page 7

(a) 70 + _____ = 100   (b) 25 + _____ = 100   (c) 47 + _____ = 100

(d) 88 + _____ = 100   (e) 13 + _____ = 100   (f) 51 + _____ = 100

(g) 19 + _____ = 100   (h) 62 + _____ = 100   (i) 46 + _____ = 100

(j) 33 + _____ = 100   (k) 73 + _____ = 100   (l) 57 + _____ = 100

Addition, page 8

(a) 20 + 130 + 19 = _____   (b) 524 + 121 + 153 = _____

(c) 104 + 201 + 93 = _____   (d) 23 + 310 + 46 = _____

(e) 102 + 434 + 63 = _____   (f) 701 + 162 + 132 = _____

(g) 530 + 117 + 241 = _____   (h) 214 + 422 + 362 = _____

(i) 242 + 11 + 43 = _____   (j) 211 + 322 + 163 = _____

(k) 431 + 131 + 332 = _____   (l) 621 + 35 + 143 = _____

Addition – carrying over, page 10

(a) 338 + 68 = _____   (b) 184 + 398 = _____

(c) 325 + 487 = _____   (d) 495 + 686 = _____

(e) 483 + 77 = _____   (f) 63 + 678 = _____

(g) 835 + 236 + 283 = _____   (h) 53 + 583 + 19 = _____

(i) 346 + 42 + 453 = _____   (j) 739 + 27 + 521 = _____

(k) 153 + 356 + 33 = _____   (l) 617 + 546 + 63 = _____

Subtraction, page 12

(a) 9 − 5 = _____   (b) 10 − 5 = _____

(c) 8 − 4 = _____   (d) 7 − 2 = _____

(e) 9 − 2 = _____   (f) 7 − 4 = _____

(g) 10 − 7 = _____   (h) 3 − 0 = _____

(i) 14 − 9 = _____   (j) 14 − 8 = _____

(k) 20 − 6 = _____   (l) 18 − 12 = _____

Subtraction with borrowing, page 14

(a) 43 − 19 = _____

(b) 65 − 26 = _____

(c) 34 − 18 = _____

(d) 84 − 48 = _____

(e) 103 − 44 = _____

(f) 93 − 37 = _____

(g) 152 − 65 = _____

(h) 144 − 106 = _____

(i) 369 − 176 = _____

(j) 836 − 279 = _____

(k) 509 − 229 = _____

(l) 738 − 398 = _____

Multiplication, page 18

(a) 14 × 5 = _____

(b) 15 × 0 = _____

(c) 39 × 9 = _____

(d) 77 × 4 = _____

(e) 2 × 194 = _____

(f) 724 × 3 = _____

(g) 582 × 8 = _____

(h) 7 × 182 = _____

(i) 599 × 1 = _____

(j) 2644 × 6 = _____

(k) 3788 × 9 = _____

(l) 1245 × 7 = _____

Multiplication, page 20

(a) 578 × 58 = _____

(b) 496 × 94 = _____

(c) 827 × 68 = _____

(d) 492 × 24 = _____

(e) 343 × 46 = _____

(f) 235 × 83 = _____

(g) 136 × 53 = _____

(h) 152 × 47 = _____

(i) 293 × 74 = _____

(j) 473 × 62 = _____

(k) 215 × 93 = _____

(l) 579 × 37 = _____

Division, page 21–22

(a) 40 ÷ 5 = _____

(b) 63 ÷ 3 = _____

(c) 56 ÷ 7 = _____

(d) 108 ÷ 9 = _____

(e) 210 ÷ 5 = _____

(f) 84 ÷ 3 = _____

(g) 132 ÷ 6 = _____

(h) 3138 ÷ 6 = _____

(i) 9675 ÷ 5 = _____

(j) 2142 ÷ 6 = _____

(k) 2478 ÷ 7 = _____

(l) 1480 ÷ 8 = _____

Web resources

BBC websites

http://www.bbc.co.uk/skillswise/numbers
This site is aimed at all family members so there are examples at all levels of ability and covering the topics dealt with in this chapter.

http://www.bbc.co.uk/schools/gcsebitesize/maths/
Primarily for preparation for GCSE from foundation to intermediate level, which is roughly the minimum standard you will need to reach.

http://www.bbc.co.uk/schools/ks2bitesize/
Key Stage 2 is a good level to aim at before the end of Chapter 4. You need to concentrate on the material covered in this chapter and move on to other topics as you progress through the book or when you feel ready.

Maths for fun

http://www.mathsisfun.com
Look at the multiplication and division sections. There are animations of the calculations, which may help you if you are better at learning visually. This is an American site so is not so useful later when you need to get to grips with the metric system.

http://www.easymaths.com
This site will convert you to thinking that maths can be fun as well as brushing up on the basic skills.

http://www.headstartinbiology.com
You will have to register for this site (it's free!). Gallery 1 is mainly geared towards maths and measurement used in healthcare.