

# Contents

<i>List of tables and charts</i>	vii
<i>Foreword to the first edition</i>	viii
<i>Foreword to the second edition</i>	x
<i>Preface to the second edition</i>	xii
<i>Note to the reader and acknowledgements</i>	xiv
<b>Introduction</b>	1
<b>Part one: Learning and you</b>	5
Introduction	5
1.1 Getting to know yourself as a learner	5
1.2 Developing learning strategies and study skills	6
1.3 Time and stress management	11
1.4 Calculating and estimating under pressure	15
<b>Part two: Calculations in the nursing and healthcare context</b>	19
Introduction	19
2.1 Monitoring vital signs	19
2.2 Measuring weight and height	27
2.3 The fluid balance chart	34
2.4 Nutrition	35
2.5 Infant feeding	43
2.6 Giving medication	45
2.7 Staffing and budget calculations	53
2.8 Demographic profiles	58
<b>Part three: Maths refreshers</b>	66
Introduction	66
3.1 Whole numbers	67
3.2 The 'four rules' of arithmetic: addition, subtraction, multiplication and division	69

**vi** Contents

<b>3.3</b>	<b>Decimals and fractions</b>	79
<b>3.4</b>	<b>Percentages</b>	88
<b>3.5</b>	<b>Ratios</b>	92
<b>3.6</b>	<b>The metric (SI) system</b>	94
<b>3.7</b>	<b>The 24-hour clock</b>	98
<b>3.8</b>	<b>Conversions</b>	99
	<i>Answers</i>	102
	<i>Bibliography</i>	111
	<i>Index</i>	114

# Part one

## Learning and you

### ► Introduction

This chapter aims to help you to get to know yourself better as a learner in order to tackle the maths you need for healthcare.

### ► 1.1 Getting to know yourself as a learner

Start by reflecting on your past and present experiences with maths. One way to do this is by writing your 'maths life history' (see Coben & Thumpston, 1996, for a report on research into adults' maths life histories).

Take some time to think about the following questions in relation to your past and present experiences with maths in any aspect of your life. Note down your thoughts as you go and use your notes as the basis for writing your own maths life history.

#### **Your maths life history**

- 1 How would you describe your feelings about mathematics? In what circumstances do these feelings arise?
- 2 Describe one thing that you enjoy and one thing that you hate that involve maths.
- 3 Thinking back over your past life, what events involving maths stand out in your memory?
- 4 How would you describe your school experiences of maths?
- 5 In what circumstances do you work out something mathematical . . .
  - in your head?
  - on paper?
  - with a calculator?
  - another way . . . how?

## 6 Learning and you

- 6 When and how do you calculate accurately . . .
  - using whole numbers ?
  - using fractions, including decimal fractions?
- 7 When and how do you estimate rather than calculate accurately?
- 8 Describe situations in which you measure each of the following: length; weight; capacity.
- 9 What activities do you engage in which involve an appreciation of, or the manipulation of, shape and spatial relationships?
- 10 What effect do you think your experience of maths has had on your opportunities in life?

When you have written your maths life history, put it aside in a safe place; we'll ask you to look back on it later. You don't need to show it to anyone else unless you want to.

### ► 1.2 Developing learning strategies and study skills

Writing your maths life history is designed to get you thinking about the maths in your life in ways you may not have done before. It's a first step towards developing learning strategies and study skills that will stand you in good stead as you progress through this book.

#### **Keeping a maths diary**

The next step is to start a 'maths diary' in which to record:

- notes on maths as it arises in a healthcare context
- your thoughts and feelings about the maths that you encounter
- any points of information about maths
- any study tips that you want to remember.

Your maths diary may take any form; most people use either an exercise book or a ring binder, but some prefer a 'proper' diary with the dates already printed. You'll need to allow at least a page a day and to allocate time to writing it up – choose a time that suits you and the pattern of your days.

Keeping a maths diary will make you more aware of the maths in your life: you'll find you notice things that you might previously have missed and you'll become more aware of yourself as a learner in an aspect of your life which you might previously have ignored.

You will find references to your maths diary throughout this book. As with your maths life history, you don't need to show it to anyone else unless you want to.

### **Talking to colleagues**

This may not sound like a learning strategy but it can be very effective. Find a colleague or fellow-student who shares some of your own feelings about maths (preferably someone who has also written his or her maths life history) and talk to each other about the maths in your lives. Ask them to be your 'learning partner' and agree to help each other, working through this book together.

It's important to agree ground rules so that you know what you can expect of each other. Here are some ideas:

- Share strategies for working out maths problems – remember there's nearly always more than one way of doing a mathematical operation and the 'right' way is the way that works – it's also a good idea to double-check your answer using a different method.
- Talk through your feelings about maths – if something doesn't feel right to you, even if you know it gives the correct answer, talk it over with your partner and you may find that a different way of looking at the problem helps you to see it more clearly.
- Talk over the situations you come across that involve maths, especially those which involve doing maths under pressure, and share strategies for remaining calm and doing the maths.

### **Getting to know your number-crunching skills**

In this section you are going to look at how you tackle a range of calculations, for example:

- What kinds of number-crunching strategies do you use?
- What do you do when things go wrong?

Calculations vary in terms of how difficult they are and different people prefer different ways of tackling them. For all methods you have to do some thinking first, but when you start doing the number-crunching you have a choice: you can do the calculations on paper or in your head, or you can use a calculator. Whichever method you choose, it's a good idea to use a different method to check your result.



## Activities - Learning and you

### Task 1 Which number-crunching method do you prefer?

Spend about 20 minutes doing this exercise with your learning partner.

The aim of the exercise is for you to observe which number-crunching method you're inclined to use in different situations.

You don't have to do the actual calculations at this stage; just observe your reactions and which method you're inclined to favour. Sometimes you may need to start the problem so that you can decide which number-crunching method you'd prefer to use; but don't try to finish them.

**Read** each problem, and **record** on Table 1 which number-crunching method (with a calculator, in your head, or on paper) you prefer to use. Use the third column in the table to write down your reaction to the problem, for example:

- *easy*
- *made me panic*
- *this kind of problem always gives me trouble.*

Spend about five minutes on this. Then discuss your observations with your learning partner.

**Table 1** Which number-crunching method do you prefer?

	<i>Problem</i>	<i>Your method</i>	<i>Comments</i>
1	A 1.8m-tall man weighed 100kg on admission to hospital. He was put on a special diet and is losing weight at a rate of 3kg each week. How long will it take him to reach a target weight in the range 58–83kg?		
2	A baby's birth weight is 4kg. She loses and then regains 10% of her birth weight in her first two weeks of life. How low does her weight go during the first two weeks?		

<i>Problem</i>	<i>Your method</i>	<i>Comments</i>
3 A drug dose of 62.5mg is available as 25mg in 1ml. What is the dose in millilitres?		
4 Convert 0.075mg to micrograms.		

**Task 2 Analysing errors**

In this section we ask you to complete some calculations and to think about possible sources of error.

Look back at the problems in Task 1, and this time do the calculations. Then fill in the “how confident . . .” column in Table 2. Check your answers with ours (at the back of the book) and record in the third column whether you got them right or wrong.

**Table 2** *Analysing errors*

<i>How confident I feel</i>	<i>Whether I was right or wrong</i>
1	
2	
3	
4	

If you were confident about all of them, and you got them all right, try this exercise with another set of calculations drawn from elsewhere in the book.

If you were not very confident, or if you got some wrong, what do you think might have gone wrong?

You might have:

- misread the numbers in the question
- made an arithmetic slip, e.g.,  $3.0 + 4.5 = 7$
- used the wrong formula
- used the right formula but put in the wrong numbers
- multiplied or divided the wrong numbers.

In your maths diary, note down the kinds of error you made.

**Task 3 How do you react to any errors?**

Now think about your reactions if you got some answers wrong.

What were you inclined to do or think?

Tick the boxes below which apply to you:

**Table 3** *How do you react to any errors?*

Forget my first attempt and start again	
Forget the whole problem and do something else	
Try to do the same operation but with easier numbers	
Go back to the problem to read it more carefully	
Check my written work to look for mistakes	
Wish I'd written something down so that I could check it	
Ask somebody else to look at my work and check it for me	
Take a break to clear my head	
Look up the formula somewhere	
Blame the calculator	
It doesn't surprise me that I got it wrong	
There must be a mistake in the book	

Now you know what you tend to do when you get stuck, read through the other options again and consider using some of them as well.



**Task 4 Developing a feel for what's likely**

Another important aspect of analysing errors is developing a feel for what's likely and spotting the unlikely in a healthcare context.

Which of the following is unlikely?

**Table 4** *Developing a feel for what's likely*

---

Injecting 50ml of digoxin

---

Giving a patient 50ml of medicine orally

---

A prescription of phenobarbitone 180mg orally at night

---

Giving 0.02ml as an oral dose

---

An application of ichthammol ointment 3 times daily

---

Giving a child 6 tablets in one dose

---

Look again at the 'unlikely' options in Table 4. What do you think might have gone wrong in each case?

- A mistake in the calculation?
- The prescribing doctor has made a mistake?
- The dosage has been misread or misheard?
- The stock solution is mislabelled?

As you see, not all errors involve calculation.

Cultivate an awareness of different types of error and you will be able to spot errors more easily and take appropriate action.

Use a *British National Formulary (BNF)* to check the prescription whenever you feel unsure.

► **1.3 Time and stress management**

Even the most meticulously careful person is more likely to make a mistake when working under pressure – something which healthcare professionals have to do for much of the time. It's important, therefore, to learn how to calculate and estimate under pressure.

This section is designed to help you to manage your time and stress levels to enable you to calculate and estimate under pressure.

### **Time management**

Good management of time means making the best use of whatever time is available. Nurses and other healthcare professionals need to manage their time as efficiently as possible in order to cope with the increasing complexity and volume of work involved in providing an efficient health-care service.

The key to effective time management is *planning and prioritising in relation to context* – i.e. the type of healthcare setting (for example, long-stay continuing care or acute care, hospital or community-based) and the healthcare team of which you are a part.

Planning and prioritising effectively ensures that while everything may not be done in the time available, that which has been identified as high priority by the healthcare team is done; the rest is kept on the agenda for future action.

But what counts as high priority? Time spent with patients and their relatives/carers assessing the patients' needs and planning, delivering and evaluating their care is important, but is it more important than ensuring that medication is given correctly? Time must also be allocated to those aspects of healthcare which underpin patient care, such as ensuring that enough staff are available to maintain the quality of the service.

Your priorities and the scope of your planning will depend to some extent on the nature of your particular responsibilities as a member of the healthcare team.

You must also be able to distinguish between that which is *important* and that which is *urgent* – these are not always the same thing. For example, it may be urgent that a sample of a patient's blood is sent for testing before the laboratory closes, while it may be important to spend time with a dying patient. Priorities often conflict and you will need to make a professional judgement in each instance. In the above situation, you would need to consider whether a colleague could take the blood sample, or alternatively, spend time with the dying patient. If there is no one else available, you would need to weigh up the amount of time needed to take the sample, against the likelihood of the patient dying in the meantime. You would also need to consider the 'opportunity cost' (that which would be lost) if one or other is not done. Ask yourself 'What is the worst that could happen in this situation?'

In his book *Effective Time Management*, John Adair sets out 'Ten Steps Towards Better Time Management' (Adair, 1988: 151):

- Develop a personal sense of time

- Identify long-term goals
- Make middle-term plans
- Plan the day
- Make best use of your time
- Organise office work
- Manage meetings
- Delegate effectively
- Make use of committed time
- Manage your health.

Tick off the items on the list which apply to you – for instance, you may not have anyone to whom you can delegate work, or you may not be involved in meetings on a regular basis, but you *can* develop a personal sense of time, for example by keeping a record of your use of time over a period of a week in your maths diary and then reviewing your use of time. Write down each point which applies to you in your maths diary.

Now see if any of the items you have *not* ticked can be adapted to suit your circumstances. For example, you may not do any ‘office work’ as such, but perhaps you could organise your notes so as to make it easier to find topics and so make the best use of your time for study. Add the adapted items to your list.

Are there any other items which you think should be added? If so, add these to the list – but *don't* make the list too long.

Look again at your list. Make a note beside each point of the circumstances in which it comes into play. For example, ‘plan the day’ could be something you choose to do each morning in the bathroom or on the bus, or you could set aside a few minutes at the end of each day to plan the next day.

Try managing your time on this basis for a week and then review your progress in your maths diary, noting down and changing anything that didn't work out. Review your progress again after one month.

If you're successful in improving your management of time, you should find you have more time to do the things you enjoy and that you enjoy life more now that you are able to pace yourself – you should notice a reduction in the amount of stress in your life. The next section looks at stress management.

### **Stress management**

Caring for people who are ill, bereaved or having problems can be very stressful, so does this mean that the health of all nurses and other health-care professionals is at risk? The answer is ‘yes’ and ‘no’. Stress is not a

disease, and can lead to improved performance when sustained for short periods. Stress becomes a problem and can lead to illness when it is repeated and prolonged. Stress is inherent in healthcare: it can't be avoided altogether but it can be minimised and you can learn to manage stress productively.

People experience and deal with the effects of stress in different ways, physically, emotionally and socially, and it is known that people with certain personality types suffer more from the effects of stress than others. It is also often easier to see the effects of stress on others and overlook the effects on yourself.

Becoming aware of the stress in your life is the key to developing coping mechanisms which enable you to meet the demands of your work – mathematically and otherwise – and enjoy a balance between work and the rest of your life.

But self-awareness is only part of the picture. It is part of a manager's responsibility to reduce unnecessary stress among staff. Unfortunately signs of stress are sometimes seen by managers as indications of failure and consequently staff may be reluctant to seek help.

If you feel that the level of stress in your life is too high and you don't feel able to talk to your manager, talk to your learning partner, or to your partner or a close friend. Often the relief of talking to someone is enough to put the problem into perspective. If not, then you may need to seek professional help from a counsellor.

Meanwhile, try doing a *stress review*.

First, jot down in your maths diary three things which have caused you stress recently. These might include, for example: a row with a colleague; the death of a patient; missing an important study deadline.

Now jot down what you could have done to alleviate the stress you felt in each instance – could you have avoided the problem altogether – for example, by organising your time better so that you didn't miss the study deadline? Could you have minimised the damage, for example by talking over the problem that led to the row with your colleague with her after you'd both calmed down? Was there anything you could or should have done differently in the case of the patient who died? If not, then allow yourself to grieve; it's important to balance professional detachment with compassion and to accept that there are some things that you cannot change.

In each case you can learn from your experience by reflecting on it in order to improve your future performance – and in so doing you will reduce stress.

Repeat your stress review after one week and one month. In the meantime: try to improve your general health through improved diet and exer-

cise; develop ways of relaxing; make time for your nearest and dearest and for yourself. Look again at the section on *time management* – working under constant time pressure is very stressful and if you can improve your management of time you'll find that other things fall into place. Remember that stress in moderation can 'tone you up' – it's too much stress that does damage.

#### ► 1.4 Calculating and estimating under pressure

Once you've done your best to alleviate the ill effects of excessive stress and improved your management of time, you can look at ways of calculating and estimating under pressure.

The key here is to start from where you are and develop your strengths in order to minimise any weaknesses.

##### **Start from where you are**

First, do a *maths stress review*, similar to your general *stress review* (see above) but focusing particularly on the maths in your life. You might find it helpful to look back at your *maths life history* at this point.

Jot down three things involving maths which have caused you stress recently. These might include, for example: calculating the dosage of a drug with which you are unfamiliar; having to complete a set of calculations in a hurry while someone waits for the results; making a presentation to a group of your colleagues or fellow-students on the basis of some research you have done which involves maths.

Now jot down what you could have done to alleviate the stress you felt in each instance – look at how you tackled the problem and what aids were available to you. In the case of the drug calculation, did you try to do it in your head, on paper or with a calculator? Why did you choose to do it that way? In retrospect, could you have done it better using another method? Were you in too much of a hurry – could you have tackled the calculation if you'd given yourself more time to think? Were you trying to calculate in an unsuitable environment (with distractions, a high level of noise etc.)? Were you tired or tense? If so, look back at the sections on time and stress management and see if you could improve matters. Discuss the problem with your learning partner – what does she or he do in a similar situation?

What if you are unsure of the maths involved *whichever* method you chose in this instance and whatever the circumstances? If so, work through section 2.6 *Giving medication* (p. 45).

### **Develop your strengths**

What are your strengths in relation to the maths in your life? The first step towards developing your strengths is to identify them. Look back at your maths life history. If you find it difficult to identify any strengths, sit down with your learning partner and share ideas – it's often easier to see someone else's strong points than your own.

Perhaps you are good at working methodically through problems, or at remembering techniques for problem solving. Perhaps you can see a solution to a problem even if you're not always sure how you got there. You may be good at estimating, or mental arithmetic.

Once you've identified your strengths, make a note of them in your maths diary for future reference. Think of circumstances in which they are particularly useful and of ways in which you can build on them. For example, if you are methodical you probably have considerable patience and good attention to detail, qualities which come into their own in many of the routine tasks required in healthcare. A good memory is very useful; if you can harness your memory to a good understanding of maths so that you use the techniques stored in your memory appropriately, you will go far.

If you have a good intuitive grasp of maths but are less secure on the technical details, learn to value your insights. If you can see what the answer to a problem is but don't know the right method, work backwards – try a few ways of working it out until you find a way that suits the case in point and then try the same method on a similar problem. Remember that there is usually more than one way of solving a maths problem – if the one you try works for several different problems, it's probably OK. If the numbers concerned are awkward, try substituting easier numbers – this may help you to identify an appropriate method. If you're still not sure, look for a similar problem in this book or check with someone whose knowledge and experience you respect.

Many people assume that estimating is a weakness rather than a strength, forgetting that in many situations accurate calculation is not necessary. The important thing is to know when accuracy is required and when estimating is more appropriate. This is partly a matter of common sense and partly of experience – *never* estimate an intravenous (IV) drug dosage, for example, but it is perfectly safe to estimate a patient's fluid loss through perspiration on a fluid balance chart.

If you are good at mental arithmetic, rejoice in the amount you'll save on biro's and calculator batteries! This is a really useful skill which will stand you in good stead in many aspects of the maths in healthcare.

Make the most of your strengths. Start thinking of yourself as someone

who *can* do maths, rather than as someone who finds maths difficult. Difficult maths is just the maths you can't do – yet!

### **Minimise any weaknesses**

As with your strengths, the first thing to do is to become aware of your weaknesses. Look back at your maths life history. Discuss your weaknesses with your learning partner. Make a list of them in your maths diary and next to each one write down what you can do to overcome it or compensate for it.

For example, if your memory is poor, you probably already make notes or have other techniques for reminding yourself of what you're doing. What helps you to remember things? How could you improve your memory and improve your techniques for remembering things?

If you are careless, prone to making arithmetic slips, train yourself to 'edit' your maths – take your time and *always* check your calculations (you may need to put the calculation aside for a while and come back to it before you notice a mistake).

If you find it difficult to know where to start with a maths problem, take a deep breath, remember your strengths and try to understand what the problem actually entails. This may sound obvious, but people are often unable to 'see through to the maths' in a problem because they're trying – and failing – to remember what they did when they came across a similar problem in the past, or to remember how they were taught to tackle maths problems at school. Either of these approaches might work, but they might also stop you seeing the problem in the light of your *present* knowledge and experience.

The best way to minimise any weaknesses in relation to the maths in your life is by becoming aware of them, seeing them as part of the picture, not the whole thing, and overcoming or compensating for them wherever possible.

It usually helps to discuss the problem with someone – ideally your learning partner – and to write it out in your maths diary as clearly as possible, together with a commentary on what it is you find off-putting about it and your thoughts on how to tackle it.

Some people find maths so frightening that they feel totally unable to face it. If you recognise yourself in this description – don't despair. This book has been written with your needs in mind and there are other books designed to help with maths (see, for example, Coben & Black, 2005) and with maths anxiety (see Zaslavsky, 1994).

Maths is an important aspect of healthcare. As the author of a critical review of the literature on competence in practice-based calculation in nursing education puts it:

## 18 Learning and you

We need to develop a broader conception of 'competence' that values the ability to use number skills in creatively interpreting clinical situations, and which incorporates the idea that confidence and competence in number will be clinically useful and professionally valuable. (Sabin, 2001: 39)

We agree: as a nurse or healthcare professional, you need to be

- *competent*
- *confident* and
- *comfortable*

with the maths in your life.

These *three C's* spell success in calculations for nursing and healthcare.

# Index

- abbreviations 94–5
  - for SI units 94–5
- Adair, John 12
- Adalat LA 49
- Adalat Retard 49
- addition 66, 69–71, 76
  - of decimals 80–1
  - of fractions 83–4
- administrator 57
- adult learning, research on 1, 2
- Adults Learning Mathematics: A Research Forum (ALM) xi
- adverse drug actions and interactions 46
- amaranth solution 47, 52
- aminophylline 52
- anaesthesia, weight in relation to 30
- annual leave calculations 56–7
- anti-inflammatory analgesic 52
- apothecaries' units 94
- atomic weight 96
- atoms 96
- Attendance Allowance 62
  
- basic operations 69, 73
- bioavailability 48
- birth weight 43–5
- Bisacodyl 52
- blood loss 34
- blood pressure 24–6
  - diastolic 24, 25
  - systolic 24, 25
  
- BMI (body mass index) score 40
- body fat percentage 39
- body mass index (BMI) 38–9, 46
- Body Surface Area 40, 46
- body temperature 20–3
- 'borrowing' method of subtraction (also known as the 'equal addition' method) 73
- Boys' Growth Assessment Chart 30, 31
- bradycardia 24
- brick wall 2
- British National Formulary (BNF)* 11, 46, 48, 95, 96
- calculators 19, 40
- website 19
- budget calculations 53
  
- calculating 11, 83, 87
  - identifying when to calculate accurately and when to estimate in your head 5, 6, 7, 69, 70
  - on paper 70, 72–5, 88, 89
  - substituting easier numbers 10, 16, 78
  - under pressure 11, 15–18
  - with a calculator 75–6, 88–9, 91
- calculations
  - budget 53
  - staffing 53

- calculators, use of 66, 70, 75–6, 78, 82, 88  
 research into nurses' use of 4
- calories 42, 66
- cancelling 83, 84, 90
- canula 50
- capital costs 54
- capsules 46
- carbon dioxide 24
- cc (cubic centimetre) 96
- cefotaxime 33
- Celsius 20, 66, 68, 80, 100–1
- Census, 2001 in England and Wales 59–64
- Centigrade 20, 100
- centile chart 30, 31, 32
- Cernik & Wearne 58
- checking 4, 59
- chloroform spirit 47
- cholesterol 39
- Citalopram 49
- citric acid monohydrate 47, 48
- clinical assessment 48  
 management 48
- common denominator 84
- common fractions 82
- community health worker (district nurse or health visitor) 59
- community needs, assessment of 58  
 nursing 58
- compassion 14
- competence 18  
 in practice-based calculation in nursing education 17
- concentrated anise water 47
- confidence 18, 53
- contingency fund 54
- continuous infusion 50–1
- converting decimals to fractions 86–7
- converting fractions to decimals 83, 86–7
- 'counting on' (method of subtraction) 73
- cross-infection, risk of 23
- decimal point 67–8
- decimals (decimal fractions) 28, 66, 67, 68, 69, 77, 78, 90, 9579–82  
 in medication 46–7  
 rounding off 80
- decomposition method of subtraction 73
- dehydration 34
- demographic profiles 58–9
- denominator 83, 84, 85, 86  
 common 84
- Department for Work and Pensions 60, 62–3
- dependency level 54
- dermatological preparations 50
- developing a feel for what's likely and spotting the unlikely in a healthcare context 11
- dextrose 35, 52, 96
- diagnosis 24, 34, 48
- diastolic blood pressure 24–5
- diet 35, 38
- dietary history 38
- digoxin 46, 47, 48
- diluent 92
- dilution 92, 93
- direct intermittent drug administration 50
- Disability Living Allowance 62
- disease prevention 58
- district nurses 48, 59
- dividing a decimal by a decimal 82

- dividing a fraction by a fraction 85
- division 66, 69–70, 72, 74, 76
  - of decimals 81–2
- doing sums 70
- door marked 'Mathematics' 2
- drugs
  - actions and interactions 46
  - administration 45–53
  - calculation 45ff.
  - dosages 32, 96
  - error-critical 4, 46
  - intravenous (IV) 50–1
  - packaging 49
  - research on ways in which
    - expert nurses calculate error-critical drug dosages 4
- Dynamap Automated Blood Pressure Sphygmomanometer 26
- equal addition method of subtraction (also known as the 'borrowing' method) 73
- error analysis 9–11
- errors, reaction to 10
- estimating 11, 15–18, 69, 75, 80
- European directive 56
- exercise 14
- Extended Nurse Prescribing course 48
- factors 70–1
- faeces (stools) 34
- Fahrenheit 20, 66, 100–1
- feelings about maths 5
- financial year 54
- fluid and energy requirement 44
- fluid balance chart 34, 35, 36–7
- fluid, intake and output of 44
  - intravenous 34
  - oral 34
  - rectal 34
  - subcutaneous 34
- fluid loss 34
- Fluoxetine 49
- Food Standards Agency 39
- 'four rules' of arithmetic 66, 69–79
- FP10 (prescription form) 49
- fractions 66, 69, 74, 75, 79, 82–7, 90, 93
  - common 82
  - improper 85, 86
  - mixed 85, 86
- glibenclamide 47
- gram (g; weight or mass) 33, 94, 95, 96
- health promotion 58
- health visitors 48, 49
  - training 58
- healthcare assistants 93
- heart disease 34, 92
- height, measurement of 27–8, 29, 31, 32, 33, 38, 39, 40, 100
- Home Office 60, 65
- Hoyles, Noss & Pozzi 3, 4
- Hutton, Meriel 2, 3, 4
- hydrocortisone (as sodium succinate) 52
- hypertension 25
- hypotension 25
- ibuprofen 52
- ichthammol ointment 11
- imperial units 66, 99
- improper fraction 85, 86
- Income Support 63
- independent nurse prescribers 48

- indices 77
- infant feed, calculation of 44
- infant feeding 43–5
- infusion set 50, 51, 52
- inhalers 49–50
- injections 48, 50
- integers *see* whole numbers
- intermittent transfusion 50
- interpreting clinical situations 18
- intravenous (IV) drug administration 50–1
- invisible maths 2
  
- Jobseeker Allowance (JSA) 63
- joule (J; energy) 42, 94
- junior doctor 56–7
  
- kilocalories (kcal; energy) 42, 101
- kilogram (kg; weight) 27, 28, 33, 95, 96
- kilojoule (kJ; energy) 42, 66, 101
  
- Land Registry 60
- learning partner 7, 17
- learning strategies 6
- Lewisham, London Borough of 60–5
- liquid doses 48
- lithium carbonate 48
- lithium citrate 48
- litre (L, l or ℓ; capacity or volume) 94, 95, 96
  
- magnesium trisilicate 51
- malnutrition, risk of 35, 40
- Malnutrition Universal Screening Tool *see* MUST
- maths anxiety 17, 66
  - research on 1
- maths diary 6–7, 10, 28, 32, 66, 67, 71, 78
- maths, experience of, at school 5
- maths life history 5–6, 15
- maths refreshers 66–101
- maths stress review 15
- medication, giving 45–53
  - research on calculation errors in nursing practice 4
- memory 17
- mental arithmetic 16
- metre (m; length) 27, 32, 33, 94, 95
- metric (SI) system 27, 32, 42, 66, 67, 94–7
- metric conversion 99–101
  - food energy values 101
  - height 100
  - temperature 100–1
  - weight 99
- metric units 94
- micro (mu: written  $\mu$ ; pronounced 'mew') 95
- microgram 46, 47, 95
- mid-upper-arm circumference (MUAC) 38
- milligram 33, 95, 96, 97
- millilitre 95, 96
- millimetres of mercury (mmHG) 24
- millimoles (mmol) 96
- mole (mol; molecular weight) 94, 96
- molecular weight (mole) 94, 96
- molecules 96
- MST (Morphine Sulphate tablets) 48
- multiplication 66, 69–72, 74, 76, 77, 78, 88
- multiplication square 71–2

- multiplying a fraction by a fraction 85
  - multiplying a fraction by a whole number 85
  - multiplying decimals 81
  - MUST 38, 40–1
  - MXL (Morphine Sulphate capsule) 48
- National Health Service (NHS) 53, 56, 94
- negative numbers 68
- neighbourhood study 58
- non-medical prescribers 48
- non-parenteral or oral
  - administration (meaning administration by mouth) 45
- normal saline 35, 52
- number-crunching 7–9, 90
- numeracy 2
- numerator 83, 85, 86
- Nurse Prescribers' Formulary 48
- nutrition 35, 38
- obesity 38, 40
- Office for National Statistics (ONS) 58
- older people 30, 35, 46
- open learning 1
- optometrists 48n.5
- order of operations (when using a calculator) 76–7
- organisation of nursing/healthcare 4
- oxygen 24
- paracetamol 96
- parenteral drug administration
  - (administration other than by mouth) 45
- Paroxetine 49
- penicillin V 46
- pensioners 60, 62–4
- percentages 66, 88–92
- Periodic Table 96
- perspiration 34
- pharmacist 46, 48, 49
- phenobarbitone 11
- physiotherapists 48n.5
- Pirie, Susan 1
- place value 67, 71
- pneumonia 43
- podiatrists 48n.5
- positive numbers 68
- potassium chloride 35
- practice 3–4
- prefixes: mega, kilo, milli, micro 95
- prescription 49, 50
- problem solving 16
- proportion 4, 82
- proportional-reasoning strategies 4
- pulse 23
- pressure 25
- qds 46, 49
- radiographers 48n.5
- ratios 66, 92–4
- ready reckoner 71
- Record of Weight Chart 28, 30
- relaxation 15
- renal disease 34
- research
  - on adult learning 1, 2
  - on different types of medication
    - calculation errors in nursing practice 4
  - on mathematics anxiety 1
  - on mathematics in nursing and healthcare 1, 4

- research – *continued*
- on mathematics life history 2
  - on nurses' use of calculators 4
  - on ways in which expert nurses calculate error-critical drug dosages 4
- respiration 24
- resting heart rate 39
- Risperidone 52
- robaxin 51
- rounding off 53, 80, 87, 91
- Salbutamol 49–50
- Sertraline 49
- shape 6
- 'significant other' 2
- Simple Linctus BP 47, 51, 52
- simplifying fractions 83, 84, 93
- situated learning 2
- space 6
- spatial relationships 6
- staffing calculations 53–5, 93
- standard form 77–8
- stock solution 92, 93
- stools (faeces) 34
- stress management 13–15
- stress review 14–15
- study skills 6–7
- subtraction 66, 69, 71, 73, 76
- 'borrowing' method 73
  - 'counting on' method 73
  - of decimals 81
  - decomposition method 73
  - 'equal addition' or 'borrowing' method 73
  - of fractions 84–5
- supplementary prescribers 48, 48n.5
- syringe 50
- syrup 47, 48
- Système International d'Unités (International System of Units) 27, 94, 99
- systolic blood pressure 24–5
- tablets 48
- tachycardia 24
- temperature 20, 23, 80, 100
- hyperpyrexia 21, 23
  - hypothermia 21, 23
  - per axilla* 20
  - pyrexia 21, 23
  - taken orally 20
  - taken rectally 20
  - tympanic membrane 20
- thermometer
- mercury 21, 23, 80
  - tympanic 21
- 'three Cs' – competent; confident; comfortable 18
- time management 11–13
- developing a personal sense of time 12
  - distinguishing between that which is important and that which is urgent 12
  - planning and prioritising in relation to context 12
- times tables 71
- trial and error multiplication 74–5
- 24-hour clock 34, 66, 98
- urine 34, 35
- vital signs 19–26
- vomit 34
- vulgar fractions 82
- weight, measurement of 27–8, 30, 32, 33, 38, 39, 40, 99

weight gain 27, 44  
Well Persons' Clinic 59  
whole numbers (integers) 67-9, 71  
Whole Time Equivalents (WTEs)  
53  
wound drainage 34