Chapter 1

Getting Started

In This Chapter

- Understanding numeracy
- Why you'd take a test
- What you need to learn

Before you really get stuck into this book, I want to ask you a favour, especially if you're someone who often says 'I'm no good at maths' or 'Maths scares the beejeezus out of me'.

I'd like you to start talking positively about maths. I don't mean you have to say 'I'm a super-genius and I'm going to win the next series of *Countdown*!' (although that's not a bad ambition). Whenever you're next tempted to say 'I'm no good at maths,' say something different. Here are some ideas:

- 'I used to struggle with maths, but I'm putting that right.'
- 'I'm much better at maths than I thought.'
- 'I'm working on my maths skills.'

It sounds crazy, but it makes a big difference to the way you approach studying. I'm convinced that the reason people tend to have a bad day on Mondays is that they've decided that Monday is going to be a bad day – and the same thing happens with maths.

This book can help you make those positive statements true. I help you build your maths confidence and skills so that you can sail through any numeracy test that gets thrown at you.

In this chapter, I run you through what numeracy is, which organisations ask you to take numeracy tests and how the tests are structured.

Covering the Basics

You may have a mental image of a mathematician – enormous forehead, crazy hair, thick glasses, tweed jacket over a tasteless shirt with pens neatly arranged in the breast pocket, gibbering manically away at a blackboard covered in crazy equations.

Actually, I *do* know mathematicians like that – but we're not all so poorly adjusted. Being good at maths doesn't automatically turn you into a socially awkward egghead.

That's not the only good news: you're also excused from having to understand all those crazy equations. There's virtually no algebra in the numeracy curriculum (just a few simple formulas). All you need to be able to do is:

- **Add, take away, divide and multiply confidently.** If you can do all of these, you're going to rock. If not, you're still going to rock, but you may want to spend some time getting a solid foundation in place.
- **Figure out the right sum to do.** This can be tricky, but if you can keep a clear head and think through what the question is asking, it will make sense in the end. Promise.
- **Make sense of measures.** 'Measure' doesn't just mean being able to use a ruler, although that's a good starting point. It's also about weighing, taking temperatures, telling the time and working with shapes. There are a few simple formulas you may need to know for area and volume.
- **Read and understand graphs and basic statistics.** Once you 'get' graphs, the answers start to jump off the page at you – there are only a handful of types of graph you need to care about, and you just need to figure out where each of them is hiding the information. Until you know that, graphs can be a bit confusing – but don't worry, I take you through them as gently as I can!

Defining numeracy

The UK Numeracy Standards define numeracy like this:

> *Numeracy is a proficiency which is developed mainly in mathematics, but also in other subjects. It is more than an ability to do basic arithmetic. It involves developing*

> *confidence and competence with numbers and measures. It requires understanding of the number system, a repertoire of mathematical techniques, and an inclination and ability to solve quantitative or spatial problems in a range of contexts. Numeracy also demands understanding of the ways in which data are gathered by counting and measuring, and presented in graphs, diagrams, charts and tables.*

This definition makes me want to cry. A repertoire of mathematical techniques? You're not a performing seal.

Here's my less technical, more useful definition. Numeracy is *the maths the average person needs to stay out of trouble*. Unless you're doing something pretty technical, you probably don't have much need for algebra, trigonometry or calculus in your daily life – but you may well need to be able to work out lengths and volumes, percentages, or to interpret graphs.

So, numeracy is about *useful* maths skills that you could conceivably need to use at work, at home or anywhere else, and those skills are usually the ones that numeracy tests cover.

What numeracy tests typically cover

Numeracy test questions tend to break down into four broad categories (although sometimes the questions bleed across the boundaries):

- **Whole number arithmetic** is about being able to deal with adding, taking away, multiplying and dividing. This is really the basis for all of the other categories, so knowing your number facts and methods really pays off.
- **Fractions, decimals, percentages and friends** are about working with the slightly more awkward but still useful sums.
- **Measures, space and shape** are used to talk about the world, whether you're describing how long a journey should take or how warm it is.
- **Graphs and statistics** come up all the time: at work, in the news, in adverts and so on. You only need to know a few basic types of graph and statistic for a numeracy test.

Opening Up Your Options with Numeracy Tests

Many employers ask for some level of maths skill when recruiting – more often than not, a good GCSE grade 'or equivalent'. Some of them – particularly the armed forces, emergency services and recruitment agencies – ask you to take a specific numeracy test to show that you have a good grounding in maths.

If you don't have a maths qualification, a lot of these doors are currently closed to you, so taking and passing a numeracy test is a good step towards qualifying for a job (or, of course, a better job) – and also makes it possible for you to take more advanced qualifications that open even more doors for you.

Improving your chances

You may need a maths qualification if you want to begin training or studying for certain professions and degrees. If you want to be a teacher or start any kind of medical study, you need to pass a numeracy test covering the kinds of situations you may need to deal with in practice.

Numeracy skills are generally a good thing to have – making it easier for you to follow presentations, understand the news and work out the best deals on anything you might want to buy.

Examining Common Numeracy Tests

Different qualifications (and different jobs) have different ideas about exactly what numeracy skills you need to have. This makes sense – if you're going to be a teacher, you're probably going to need more maths in a day-to-day setting than if you're going to be a soldier. (I say 'probably' – plenty of jobs in the armed forces need excellent maths skills, and plenty of teachers manage to avoid anything to do with maths – but they're missing out on all the fun.)

In this section, I tell you about the contents of the main types of numeracy test you may have to take.

Acing ALAN

The ALAN qualifications (Adult Literacy and Adult Numeracy) are sometimes called Adult Basic Skills, and are the exams you usually take if you're doing classes in numeracy or basic maths.

The numeracy qualifications are divided into five levels – Entry Levels 1-3 and Levels 1 and 2, which cover material from counting through to GCSE-level maths. The ALAN numeracy test isn't quite as broad-ranging as a GCSE, but some jobs and colleges accept it as an equivalent. If things go wrong, you're allowed to retake the test at a later date.

The qualifications themselves are assessed either by an on-screen or paper multiple-choice exam, which generally contains 40 questions you need to answer in an hour and 15 minutes (so you have a little less than two minutes per question). You can't use a calculator in the ALAN numeracy test.

Find out more on the ALAN website: `www.edexcel.com/quals/skillsforlife/alan/`.

Training to be a teacher

At the time of writing, the Government is making sweeping changes to the way teachers train. The details in this section are based on the current proposals, but it's not possible to be 100 per cent sure of what the future will hold. It's always a good idea to check out the TDA website at `www.tda.gov.uk` to see the most up-to-date information.

You currently have two numeracy hurdles to jump if you want to be a teacher: you need to pass a GCSE-equivalent test in maths before you start teacher training, and you need to pass a second numeracy test to reach Qualified Teacher Status (or QTS). These tests are quite different in scope, and I talk about them in more detail in the following sections.

Starting in late 2012, the two hurdles are likely to be replaced with one: if you want to become a teacher, you'll have to pass a test, probably similar to the QTS, *before* you begin teacher training.

Initial Teacher Training (ITT) prerequisite

Before you even begin teacher training, you need to have qualifications in English and maths equivalent to a C grade or above at GCSE. If you already have those qualifications, congratulations, there's no problem – assuming you meet the other entry requirements, you can start training.

If you don't have those qualifications, you'll almost certainly need to sit a maths test of roughly the same difficulty and breadth as the GCSE before you can begin training. Unfortunately, the details of these tests are rather vague and vary between training institutions. Some colleges offer a 'brush up on your maths' type of course to help you get up to speed – they may offer this as part of your teacher training or ask you to take it beforehand. The best way to find out what you're meant to know for your course is to call up the institution you want to study at and ask what their requirements are.

Some institutions may even ask you to take a GCSE in maths. This book isn't a Maths GCSE textbook, but it can help you get to grips with the basics. There are some topics in the GCSE – particularly algebra and trigonometry – that are beyond the scope of this book, but if you understand everything I present here, you'll have a good foundation for success in your test.

Qualified Teacher Status

Even if you do have a good Maths GCSE, you have to pass tests in numeracy, literacy and using computers (ICT) before you can achieve Qualified Teacher Status (QTS).

Fortunately, the scope of the QTS numeracy test is much narrower than the GCSE, and you're currently allowed several attempts to pass it. It consists of two parts: mental arithmetic, which is a quickfire non-calculator test, and on-screen questions, which involve statistical information (such as graphs and tables) and real-world maths.

- **Mental arithmetic:** This section of the test stands alone, and you have twelve minutes to answer twelve questions given to you through headphones. The name isn't completely accurate – you're allowed to write things down rather than do everything in your head. You're not allowed to use a calculator, though. You hear each question twice but that's it – you're not able to go back and listen to questions again. In this part of the test, you need to be able to

deal with questions on basic arithmetic, fractions and percentages, as well as time and conversion problems.

- **On-screen questions:** In the on-screen section of the test, you need to be able to read, understand and answer questions involving graphs and tables, and to apply general arithmetic to situations that might come up in your teaching career. You're allowed to move back and forth between the questions, and you have access to the computer's calculator.

Most of the QTS questions involve you typing your answer as a number into the computer, although some involve selecting the correct answer with a mouse.

You can find details of the QTS tests, including practice papers, at `www.tda.gov.uk/trainee-teacher/qts-skills-tests/numeracy.aspx`.

Fighting your way into the armed forces

All the branches of the British Armed Forces require numeracy skills before you're allowed to enroll. In most cases, your score in the test is used to work out what jobs within the service you're a good fit for, so the better you do, the more technical the jobs you qualify for.

You can find an example of each of the army recruitment tests by visiting `www.army.mod.uk/join/` and following links from there.

Army numeracy test

If you want to join the British Army, you need to go through a series of recruitment tests, including numeracy, literacy, teamwork, memory and the *BARB* (British Army Recruitment Battery), which is about reasoning and understanding information. The good news is that the numeracy test doesn't require many of the more difficult sections of this book, and you're provided with a calculator.

For some of the questions, you need to type in a number as your answer, while some are multiple-choice questions where you simply select the right answer. You're allowed to retake the test if you feel you could get a better result.

Army Technical Selection Test (TST)

If you're looking for a more technical job in the army, you also need to do well in the Technical Selection Test (or TST). This involves some more advanced maths, roughly up to GCSE standard. One or two topics are slightly beyond the scope of this book (particularly transposing formulas, powers, standard form and factorising), but I cover everything else that's in the test.

You have 45 minutes to answer 55 questions, so there's not much time for hanging around. You're provided with a calculator, but need to bring your own pen! (Damn those budget cuts. . . .) You may be allowed to retake the test if you're disappointed with your result.

Royal Navy Recruit Test (RT)

To join the Royal Navy, you need to pass the Recruit Test (or RT), which tests your literacy, numeracy, problem-solving and mechanical skills. As with the army numeracy test, you're unlikely to need all of the material in this book. Don't worry too much if you don't pass first time – you're allowed to take the test again.

You can find a booklet of a sample Recruit Test at `www.royalnavy.mod.uk/careers/how-to-join`.

Royal Air Force Airman/Airwoman Selection Test (AST)

If you want to join the Royal Air Force as an airman or airwoman, you need to take seven aptitude tests:

- **Verbal Reasoning,** which assesses how well you can interpret information from written text.
- **Numerical Reasoning,** which tests your ability to work with fractions, decimals and formulas, as well as interpreting graphs and tables.
- **Work Rate,** in which you show how accurately and quickly you work through routine tasks.
- **Spatial Reasoning,** which examines how well you deal with shapes.
- **Electrical Comprehension,** which looks at your ability to work with electrical concepts, including vocabulary and circuit diagrams.

- **Mechanical Comprehension,** which tests how well you work with mechanical concepts and diagrams.
- **Memory,** which tests your ability to remember sequences of letters and patterns.

This book helps you with the Numerical Reasoning part of the test, in which you have four minutes to answer 12 questions on fractions, decimals and formulas, followed by 11 minutes to answer 15 questions on graphs and tables.

You need to pass all seven tests and reach an overall points total to qualify. After taking the exam, your results are valid for a year; if you fail, you have to wait a year before you reapply.

You can find some sample questions at `www.raf.mod.uk/careers/applicationzone/aptitudetests.cfm`.

Helping out with the emergency services

If you're beginning a career in the emergency services, you need to pass stringent qualification tests, including role-plays, interviews, fitness, written communication and – of course – numeracy. Here are the details for each of the branches.

Police Numerical Reasoning Tests

When I was growing up, I was told that if I wanted to know the time, I should ask a policeman. It makes sense, then, that police officers need a decent level of maths skills – although, obviously, this isn't the only reason you need to be passable at maths for a career in the police.

As part of your initial recruitment, you need to sit a short non-calculator exam, in which you have 12 minutes to answer 25 multiple-choice questions. The test covers topics such as working with money, speed and distance, averages, and shape. Chapters 4, 6 and 9 should cover almost everything you need to know.

You can find more details of the tests at `www.police-recruitment.co.uk/police_test.html`.

UK Fire and Rescue Service Working with Numbers test

To become a firefighter, you need to pass a whole battery of tests covering your physical and mental aptitude for the job. Listed sneakily under Psychological Tests is the Working with Numbers test.

The test contains 32 questions covering six scenarios you're likely to encounter as a firefighter. They involve combinations of adding, subtracting, multiplying and dividing, as well as estimating quantities. Chapters 4, 6 and 9 cover pretty much everything you need to know for this test.

The fire service psychological test website is at `www.fireservice.co.uk/recruitment/psychological-tests`.

Ambulance service

Because the ambulance service has such a wide variety of roles, there isn't a specific numeracy test that applicants have to pass. However, the jobs within the service do require you to have a good all-round level of education, generally including a GCSE grade C or better in maths and some roles require you to pass an appropriate numeracy test.

You can learn about all manner of NHS careers at `www.nhscareers.nhs.uk/`.

Maritime and Coastguard Agency

You don't need to take a particular numeracy qualification to become a volunteer coastguard rescue officer. However, you are expected to be able to understand and exchange complex information by phone or radio, which requires at least basic maths skills.

You can find out more about the MCA at `www.dft.gov.uk/mca/`.

UK Clinical Aptitude Test (UKCAT)

To qualify for a university course in medicine or dentistry, you usually need to pass the UK Clinical Aptitude Test (or UKCAT) – a series of papers that determine how suitable you

are to become a medical or dental professional. UKCAT consists of four tests:

- **Verbal Reasoning,** which tests your ability to take in and analyse information in written form.
- **Quantitative Reasoning,** which is about interpreting numerical and graphical information and doing calculations from it.
- **Abstract Reasoning,** which is about finding patterns using odd shapes.
- **Decision Analysis,** which tests how well you interpret codes.

This book helps you with the Quantitative Reasoning test. Pay particular attention to the chapters on statistics and graphs (Chapters 8, 11 and 12), but you may well be asked about anything in this book. You can learn more about the UKCAT at `www.ukcat.ac.uk`, and check out *UKCAT For Dummies* by Chris Chopdar (Wiley).

And the rest . . .

While the tests explained in the previous section are the most common, they're not the only ones. Big companies may have aptitude tests they ask candidates to take as part of their application procedure, and I've had to take numeracy tests at employment agencies. (I have a PhD in maths, but they still asked me to do a numeracy test. I almost refused, but I needed the money.)

I can't tell you what is likely to come up in these tests, simply because they're too varied and too numerous. In general, though, unless you're applying for a job or course that requires specialised mathematical knowledge, the content in this book should be more than enough to steer you through.

Good luck!

Reviewing Common Test Types

Most numeracy tests are made up of two or three different topics to find out how well you understand various techniques

in maths. You're usually allowed a calculator for some parts of the test – depending on the exam, you may be able to bring your own or (in computer exams) use a calculator program, but you may also have a strict non-calculator section where you have to work things out on paper or in your head.

The topics of the test are usually chosen from the following three: mental arithmetic (working things out in your head or on paper), general maths (normally using a calculator) and handling data (interpreting graphs, charts and so on).

Mental arithmetic

The mental arithmetic portion of a numeracy test isn't as accurately named as it could be. You're not normally expected to work everything out in your head without writing anything down, which is good: working sums out on paper is usually much easier than trying to do them in your head, especially if the sum is rather complicated.

What it does mean, though, is that you're not allowed to use a calculator in this part of the test. You need to be pretty sharp with your arithmetic skills to do well here – particularly adding, taking away, multiplying and dividing.

The different flavours of test ask you questions on widely varying topics – some tests only want you to be able to do basic arithmetic without a calculator, but it's more common to be tested on fractions, percentages, time and money problems.

Real-world maths

Real-world maths questions do exactly what they say on the tin! It's a wide-ranging review of all of the everyday maths you may have to deal with.

That may sound a little frightening, but don't worry – they're not going to throw advanced calculus or quantum physics at you. Instead, the questions are likely to cover topics such as weights and measures, understanding time, and dealing with money. Depending on the exact type of test, there may even be topics here you don't need to worry about; on the other

hand, there may be a few gaps if you're doing a specialised maths test (the other topics most likely to come up are algebra and trigonometry).

Find out as much as you can about the test you're taking as early as possible, including whether you're allowed to use a calculator – check out the website or call them up and ask for information. The more you know about what you're facing, the more efficiently you can prepare.

Handling data

Any numeracy test you sit will probably involve at least one graph or table. Handling data is one of the areas most likely to require some maths of you in a real-life professional situation, and it's important to be able to pick out the relevant information quickly and efficiently.

The types of graph you need to deal with and the kinds of sums you're asked to do really depend on the test. Particularly in the UKCAT and the QTS exams, you need a fairly deep understanding of reading graphs and tables and of interpreting and analysing the data. Some of the other numeracy tests just need you to be able to look at a bar chart and draw a sensible conclusion or make a decision based on a bus timetable.

Again, forewarned is forearmed: have a good look at your test's website and see what kinds of questions it asks. Don't waste time learning the ins and outs of working out averages from scatter graphs if you only need to read values from less complicated graphs!

Taking the Test

Not many people like exams. You don't want to fall apart under the pressure, so here are a few tips to help you keep your head in the exam.

Chapters 2 and 3 give you a lot more detail on preparing for an exam in terms of covering the material, staying calm and working under pressure. The Part of Tens chapters near the end of the book are helpful, too!

Depending on the kind of exam you take, and where you live, you may need to travel for your numeracy test. If your test is for a specific job in a specific location, you'll probably need to go there for an interview and do the test while you're there. Alternatively, your exam may take place in a test or recruitment centre in your nearest big town or city.

You can normally find out where the test is likely to be from the organisation's website, from their promotional material or by calling up and asking. Don't be afraid to ask for details! The more you know, the less you have to worry about.

The experience of sitting the exam also depends on the type of test you take. It's almost certainly not like the olden days where you file silently into the sports hall with two hundred other stressed-out students.

Instead, you're likely to be in an office or a classroom. You may be the only student there, or there may be a few others. If it's a computer test, you sit in front of a PC and fill out your answers using a mouse and keyboard; if not, you sit at a desk and answer on paper, either writing out your answers or filling in multiple-choice boxes. In either case, you receive clear instructions about what you need to do.

Computerised tests are far more common for numeracy exams than for exams at school and university. Normally, you're also given scrap paper to do your working out on – this is very useful, especially for spoken questions where you need to write down the information as you hear it so you can figure out what sums you need to do.

In a written exam, you may or may not have access to scrap paper, but you never lose marks for showing your working in the margins of the paper!

Find out what type of test you'll be taking and practise appropriately. Many websites have sample tests you can do on your own computer.

Knowing what to expect

The more practice you have with the exam you're going to be sitting, the less likely it is to throw up unpleasant surprises when you sit down to take it. I strongly encourage you to get

hold of past papers or sample tests wherever you can (check out the websites listed in the 'Examining Common Numeracy Tests' section earlier in this chapter and the tests in Part II of this book).

Preparing from past papers has all kinds of benefits, such as:

- **Confidence.** The more familiar you are with something, the less fear you have of it. You can build your confidence by working through sample papers and (hopefully) seeing your scores increase each time.
- **Focus.** If you often slip up on a particular type of problem, that's priceless information – it tells you that you may want to revisit your notes on that topic and focus your practice on that kind of question until you find it comes a bit more naturally.
- **Timing.** Working against the clock is something I recommend once you've built up some confidence – but make sure you can get questions right before you try to do them fast! It also gives you a sense of how much of a paper you can get done in a given time and whether you'll have time at the end to go back to check your answers and fix any mistakes.
- **Topics.** When you work through a paper, you can see which topics you definitely need to know about and get a grip on how deeply you need to cover them. For example, if you notice one type of graph comes up in every paper, you may want to make sure you understand it inside out!
- **Wording.** All examiners phrase questions slightly differently – and they can sometimes be a bit cryptic. By working on past papers beforehand, you can get a feel for the kind of wording examiners in your field use.

Calming yourself down

Dreading exams is quite normal. It can feel as if everything is at stake, and it's easy to work yourself up into a serious fluster about them.

If you're the kind of person who stresses out about tests, I want you to do two things right now. First, take a great big deep breath, and then head over to Chapter 14 to learn some techniques for keeping your head.

Meanwhile, remember that doing poorly in a test isn't the end of the world – I won't tell you how many attempts it took me to pass my driving test! Just as with driving tests, you can usually retake your numeracy test until you get a score you're happy with.

Check the details of your particular test – although many tests allow you to try several times, yours may be different.

Obviously it's easier, cheaper and less time-consuming to do well first time, but it's not the end of the world if things go a bit pear-shaped.