

Chapter 1

Starting from the Beginning

In This Chapter

- ▶ Aligning fractions, decimals, and percents to their place in business
- ▶ Understanding how formulas can help you solve business math problems
- ▶ Using exponents in everything financial
- ▶ Dealing with the math for inventory, overhead, and depreciation
- ▶ Picturing business scenarios using tables, charts, and graphs

Business mathematics involves a lot of arithmetic, some algebra, a touch of geometry, and dubs and dabs of other mathematical topics. But the major portion of mathematics that's found in business is arithmetic.

Getting you off to a good start is the goal of this chapter. You may be looking for answers to some deep, dark mathematical secrets; this chapter helps you light the way toward realizing that the basic math involved in business was never meant to be kept a secret. You may not see the relevance in some mathematical processes. But this chapter makes the necessity for mathematics abundantly clear.

On the other hand, you may have a firm grasp on the business math basics; you're looking for more — for some explanations as to *why*, not just *how*. So, in this chapter, I show you many of these *whys*, and I direct you to even more complex mathematics when the occasion allows.



Most of the math in business isn't compartmentalized into one section or another. Fractions and decimals are found in all applications. Proportions and percents are rampant. And measurements are necessary for many different business processes. In other words, the math of business involves computations shared by all the different aspects. The main trick to doing the math is to know when to apply what. Use the material in this book to help yourself become comfortable with when to use what and how to use it successfully.

Fracturing the Myths about Fractions, Decimals, and Percents

It could be that adding fractions is something that you do every day; in that case, fractions are fresh in your mind, and you find them easy to deal with. On the other hand, you may not have found a common denominator in years (and hope never to have to again). You also may have made it a point not to deal with decimals. But fractions and decimals can't be ignored; they need to be embraced — or, at least, tolerated.

It's an undeniable fact that fractions, decimals, and percents form the basis of much of the math in business. Before you run away, screaming and sobbing, let me tell you that in this book, I ease you into some of the less popular mathematical subjects when they arise. I show you the way to deal with the math in the most quick and efficient way possible.

In Part II of this book, you find fractions cropping up in formulas and with various measurement situations. You probably never complained much when told that you had to take half of an amount to complete a computation. After all, a half is the simplest fraction. But, if you can manage one fraction, you can manage them all. In Chapter 2, I go over some of the operations needed with fractions, and I show you how to change them to percents and back again.



Decimals are the middle ground between fractions and percents. You really can't get around them — nor do you really want to avoid them. When figuring percent increases or decreases in Chapter 3, you see how the change from percents to decimals is necessary. Discounts and markups are often confusing to understand and compute, but Chapter 17 shows you how to handle the ups and downs correctly using our good friends, the percent and decimal.

And how in the world can you deal with the interest earned on your account unless you haul out those delightful decimals? When you compute simple interest, you use the formula $I = Prt$. Nestled between the money amount (P stands for principal) and the number of years involved (t stands for time) is the rate of interest, r , which is given as a percent and changed to a decimal in order to do the computation.



You find percents and decimals cropping up throughout this book. If you come across a conundrum (okay, even just a little challenge), you can always refer to the chapters in Part I, which deal with fractions, decimals, percents, and their basic applications and computations.

Capitalizing on Patterns in Formulas

A *formula* is nothing more than a relationship between values that always works and is always true. Wouldn't it be nice if formulas worked for people, too? But that's the big difference between people and numbers. Numbers are known to behave much better and more predictably than people, which is why you can embrace formulas with such confidence.

Formulas have been around since the beginning of recorded history, but in the Middle Ages, formulas weren't in their current neat-and-compact forms. It was only a couple hundred years ago that algebraic notation became popular and formulas such as $P = 2(l + w)$ and $a^2 + b^2 = c^2$ became a part of mathematical history.



The trick to working with any formula is knowing what the different variables stand for and how to perform the mathematical operations involved. For example, you should know that $A = \frac{1}{2}bh$ gives you the area of a triangle. You simply multiply one side of the triangle (the base, b) by the height of the triangle (h , which is measured from the base) and then find $\frac{1}{2}$ of the product. (Check out Chapter 21 for more on the area formulas.)

In Chapter 5, I go over the different rules for performing more than one operation in an expression. In all of Part II, you see how to use formulas in different settings. It's a splendid situation when you can put a formula into a computer spreadsheet and let the technology do repeated computations for you. So in Chapter 5, I give you some spreadsheet guidance.

Get ready, because you can find some pretty impressive formulas in Parts III and VI, where loans, mortgages, and other financial manipulations play a big part in the discussion. You don't want to memorize the formulas for annuities and sinking funds, however. You just need to become comfortable using the formulas and have confidence in your answers. You can always flip to the actual formula when it comes time to use it.

You probably remember how to do a *mean average*, but do you know whether the *median* or *mode* would be a better measure of the middle in your particular situation? Just use the formulas or rules in this book to find out. For instance, when you're managing rental properties or another business, you need to do some comparisons from month to month and year to year. Your statistics skills, which you can gain in Chapter 8, will put you in good stead for the computations needed. You don't find any heavy-duty statistics or statistical formulas in this book. For further investigations, check out *Statistics For Dummies* (Wiley).

Finding the Power in Exponents

An *exponent* is a power. In other words, it's shorthand algebra that tells you to multiply something by itself over and over again. Exponents are fundamental in compound interest formulas and amortized loan formulas. In fact, they're great for everything financial.

For example, do you want to know what an investment of \$10,000 will be worth in 5 years? Part III presents lots of options for dealing with your money and for doing the computations necessary. Mortgage rates change constantly, and so you often need to make decisions on your mortgages and loans. Those decisions rely heavily on computations using exponents. You find the low-down in Part III and, again, in Part VI.

Are you a little shaky on the use of exponents? Check out Table 1-1, which gives you a quick reminder.

Table 1-1 The Rules for Operations Involving Exponents		
Operation	How to Handle	Example
Multiplying the same bases	Add the exponents.	$a^x \cdot a^y = a^{x+y}$
Dividing the same bases	Subtract the exponents.	$\frac{a^x}{a^y} = a^{x-y}$
Raising a power to a power	Multiply the exponents.	$(a^x)^y = a^{xy}$
Handling negative exponents	Move the power to the denominator (the bottom part of the fraction) and change the sign.	$a^{-x} = \frac{1}{a^x}$
Dealing with roots	Roots change to fractional exponents.	$\sqrt[x]{a} = a^{1/x}$



Use the rules involving multiplication and roots to simplify $9^{3/2} \sqrt{9}$.

First off, change the radical to a fractional exponent. Then multiply the two numbers together by adding the exponents like this:

$$9^{3/2} \cdot 9^{1/2} = 9^{3/2 + 1/2} = 9^2 = 81$$

Okay, that was fun. But you may not be convinced that exponents are all that important. What if I asked you to do a quick comparison of how much more money you accumulate if you invest a certain lump sum for 10 years instead of just 5 years? I show you how the exponents work in the following example. (You can go to Chapter 9 to get more of the details.)



Compare the amount of money accumulated if you deposit an insurance settlement for 10 years in an account earning 8% interest compounded quarterly versus just leaving that money in the account for 5 years (at the same interest rate).

The formula for compound interest is:

$$A = P \left(1 + \frac{r}{n} \right)^{nt}$$

To do the comparison of how much money accumulates, write a fraction with the 10 years compounding in the *numerator* (the top part of the fraction) and the 5 years compounding in the *denominator* (the bottom). Here's what your math should look like:

$$\begin{aligned} \frac{\text{Compounded 10 years}}{\text{Compounded 5 years}} &= \frac{P \left(1 + \frac{0.08}{4} \right)^{4(10)}}{P \left(1 + \frac{0.08}{4} \right)^{4(5)}} \\ &= \frac{P(1.02)^{40}}{P(1.02)^{20}} \\ &= \frac{P(1.02)^{40-20}}{P(1.02)^{20}} = \frac{P(1.02)^{20}}{P(1.02)^{20}} = (1.02)^{20} \approx 1.49 \end{aligned}$$

Performing some reducing of fractions and operations on exponents, you see that the amount of money accumulated is about 1½ times as much as if it's left for 10 years (rather than for 5). You can also use the formula to get the respective amounts of money for the two different investment times, but this equation shows you the power of a power for any amount of money invested at that rate and time.

Doing Some Serious Counting

Keeping track of your inventory means more than taking a clipboard to the storeroom and counting the number of boxes that are there. Even a smaller business needs a systematic way of keeping track of how many items it has, how much the different items cost, and how quickly the items are used and need to be replaced.

So, in Part V, you find information on inventory, overhead, and depreciation. The amount of inventory on hand affects the cost of insurance, and, in turn, the cost of insurance affects the overall profit. *Profit* is determined by finding

the difference between revenue and cost. And each part of the profit equation involves its own set of computations.



One of the best ways of keeping track of inventory and the related costs and revenue is to use a computer spreadsheet. You get some formal explanations on spreadsheets in Chapter 5. I also tell you throughout the book when the use of spreadsheets is possible.

Other types of counting or tallying come in the form of measurements — linear measurements, area, volume, and angles. You find uses for measuring lengths and widths and areas when you're building something new or renovating something old. You need accurate area computations when you're planning for the space needed for production or a particular volume. That way you can store what you've produced.

In these cases and more, you need to be able to switch from one measurement unit to another — from feet to yards, for example — and apply the measures to the correct situations. In Chapter 7, you find the basics of measuring, and you apply these measures in the chapters dealing with insuring spaces, renting properties, figuring acreage, and computing depreciation, just to name a few.

Painting a Pretty Picture

Many people are visual — they learn, understand, and remember better if they have a picture of the situation. I'm one of those people — and proud of it. Present a problem to me, and I'll try to draw a picture of the situation, even if it means drawing stick figures of Ted, Fred, and Ned to do a comparison of their salaries.

Pictures, charts, graphs, and tables are extremely helpful when trying to explain a situation, organize information, or make quick decisions. You find tables of values throughout this book. A *table* is a rectangular arrangement of information with columns of items sharing some quality and rows of items moving sequentially downward. Tables of information can be transformed into spreadsheets or matrices so you can do further computations. (Matrices aren't covered in this book, but if you'd like, you can find information on them in *Algebra II For Dummies*, published by Wiley.)



Charts and graphs are quick, pictorial representations of a bunch of numbers or other numerical information. You don't get exact values from charts or graphs, but you get a quick, overall picture of what's going on in the business. You can find pie charts and line graphs and more in Chapter 6.