

# Practical Business Math Procedures

BRIEF SEVENTH EDITION

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# Practical Business Math Procedures

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**JEFFREY SLATER**

*North Shore Community College*  
Danvers, Massachusetts

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## PRACTICAL BUSINESS MATH PROCEDURES

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## PREVIEW OF SPECIAL FEATURES



Before looking at how to succeed in each chapter, let's look at some special features.

1. **The toll-free, 24-hour hotline.** This toll-free number for students allows you to call anytime and get extra help on any of the 22 summary practice tests located at the end of each chapter. As the author, I have recorded messages on how you should solve each problem. Think of this hotline as a pre-exam tune-up. The toll-free number is 1-800-338-9708.
2. **Group activity: Personal Finance, a Kiplinger Approach.** In each chapter you can debate a business math issue I raise based on a *Kiplinger's Personal Finance* magazine article that is presented. This is great for critical thinking, as well as improving your writing skills.
3. **The Wall Street Journal newspaper.** This newspaper insert helps explain how to read *The Wall Street Journal*, as well as show how business math relates to it. The newspaper is page-referenced to the text and is helpful for those who have never followed stocks, bonds, and mutual funds.
4. **Business Math Handbook and Study Guide.** This reference guide contains all the tables found in the text. It makes homework, exams, etc. easier to deal with than flipping back and forth through the text. The *Handbook* also features a built-in study guide that provides self-paced worksheets that review each chapter's vocabulary, theory, and math applications. A set of 10 extra word problems for each chapter is included. Also included is a calculator reference guide with advice on how to use different calculators.
5. **Blueprint aid boxes.** For the first eight chapters (not in Chapter 4), blueprint aid boxes are available to help you map out a plan to solve a word problem.
6. **The Business Math Tutorial.** This software is a tutorial that guides you through the entire text. It is highly visual and user friendly.
7. **Spreadsheet templates.** Excel<sup>®</sup> templates are available for selected end-of-chapter problems. You can run these templates as is or enter your own data. The templates also include an interest table feature that enables you to input any percentage rate and any terms. The program will then generate table values for you.
8. **Business Math Internet Resource Guide.** This Guide lists websites covering topics from each chapter, as well as descriptions of what you can expect to find at each site. It is referenced on the Scrapbook page in the text and includes group projects you can work on using the exciting possibilities of the Web.
9. **New DVD-ROM.** The DVD packaged with the text includes practice quizzes, business math tutorial software links to websites listed in the Business Math Internet Resource Guide, the Excel<sup>®</sup> templates, PowerPoint, videocases, and videos—which feature tutorials by Jeff Slater of all Learning Unit Practice Quizzes.
10. **The Slater Business Math website.** Visit the site at [www.mhhe.com/slater7e](http://www.mhhe.com/slater7e) and find the Internet Resource Guide with hot links, tutorials, practice quizzes, and other materials useful for the course.

Excel



## HOW TO READ AND USE THE BOOK

The colors in this text have a purpose. You should read the description below, then look at several pages to see how it works.



**Blue:** Movement, cancellations, steps to solve, arrows, blueprints



**Gold:** Formulas and steps



**Green:** Tables and forms



**Red:** Key items we are solving for

**CHAPTERS**

Each chapter is broken down into learning units. Each learning unit covers a key concept or a small group of concepts.

**LEARNING OBJECTIVES**

At the beginning of each chapter you'll find a list of learning objectives. Each is page referenced.

**PRACTICE QUIZZES**

At the end of each learning unit is a practice quiz, followed by solutions. These provide you with immediate feedback on your understanding of the unit. These are all solved on the DVD. Check with your instructor for availability.

**CHAPTER ORGANIZER**

At the end of each chapter is a quick reference guide called the Chapter Organizer. Key points, formulas, and examples are provided. A list of vocabulary terms is also included. All have page references. (A complete glossary is found at the end of the text.) Think of the chapter organizer as your set of notes.

**CRITICAL THINKING DISCUSSION QUESTIONS**

Factual, as well as thought-provoking, questions appear after the chapter organizer.

**PROBLEMS**

At the end of each chapter is a complete set of drill and word problems. Check figures for the odd-numbered problems are located in Appendix B.

**CHALLENGE PROBLEMS**

The last two word problems in each chapter let you "stretch" your business math skills. These are harder and require more effort.

**ADDITIONAL HOMEWORK ASSIGNMENTS BY LEARNING UNIT**

At the end of the text in Appendix A is a complete set of drill and word problems arranged by learning unit. These can be used for additional reinforcement. Your instructor may ask you to turn these in. Check figures for the odd-numbered problems are shown in Appendix B. On the inside back cover of the book is a table showing page references for each assignment.

**SUMMARY PRACTICE TEST**

This is a test before the test. All questions are page referenced back to the topic so you can check your methods. The test is a combination of drill and word problems. Check figures for *all* practice tests are in Appendix B. Remember: There is a toll-free hotline to review these tests at 1-800-338-9708.

**BUSINESS MATH SCRAPBOOK**

At the end of each chapter you will find actual clippings from *The Wall Street Journal* and various other publications. These articles will give you a chance to use the theory provided in the chapter to apply to the real world. It allows you to put your math skills to work.

**CUMULATIVE REVIEWS**

At the end of Chapters 3 and 8 are word problems that test your retention of business math concepts and procedures. Check figures for *all* cumulative review problems are in Appendix B.

**VIDEO CASES ON DVD**

There are three video cases applying business math concepts to real companies such as American President Lines, Washburn Guitars, and Online Banking. Video clips are included on the student DVD. Some background case information and assignment problems incorporating information on the companies are included at the end of Chapters 6, 9, and 11 (pages 161, 240, and 277).

**Jeffrey Slater**

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## COMPANY/APPLICATION(S)

H. J. Heinz— <i>Whole numbers</i>	Carmines, New York— <i>Subtracting decimals</i>	Coca-Cola Co.— <i>Converting percents to decimals, Solving for the unknown</i>
McDonald's Corp.— <i>General problem solving, Sweatshops, Financial reports, Product liability</i>	Heaven on Seven, Chicago— <i>Subtracting decimals</i>	PepsiCo, Inc.— <i>Converting percents to decimals</i>
Southwest Airlines— <i>Reading, Writing, Whole numbers</i>	Grill 23, Boston — <i>Subtracting decimals</i>	Wm. Wrigley Jr., Co.— <i>Percents</i>
United Airlines— <i>Reading, Writing, Whole numbers</i>	Docks, New York— <i>Subtracting decimals</i>	American President's Lines— <i>Video case</i>
American Airlines— <i>Reading, Writing, Whole numbers</i>	E*Trade— <i>Rounding, Web trading commissions</i>	Jones Apparel Group— <i>Introduction to trade discounts</i>
Delta— <i>Reading, Writing, Whole numbers, Percent decrease and increase, Pay scales</i>	Ipswich Bank— <i>Banking</i>	Nine West— <i>Introduction to trade discounts</i>
US Airways— <i>Reading, Writing, Whole numbers</i>	Bank One— <i>Trends in banking</i>	Kodak— <i>Introduction to trade discounts</i>
Tootsie Roll Industries— <i>Dissecting word problems</i>	Wells Fargo— <i>Trends in banking</i>	Federal Express— <i>Freight</i>
Continental Airlines— <i>Adding and subtracting whole numbers</i>	Citigroup— <i>Trends in banking</i>	CVS— <i>Kiplinger's</i>
Ford— <i>Subtracting whole numbers</i>	First Union— <i>Trends in banking</i>	Eckerd— <i>Kiplinger's</i>
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M&M Mars— <i>Fractions</i>	Fleet Bank— <i>Trends in banking</i>	True Value— <i>Introduction to retailing</i>
Wal-Mart— <i>Types of fractions, Discounts</i>	Visa USA— <i>Banking</i>	Bluefly, Inc.— <i>Markup</i>
AltaVista— <i>Addition and subtraction of fractions</i>	UPS— <i>Solving for the unknown</i>	JCPenney Co.— <i>Markdowns</i>
AMC Theatres— <i>Addition and subtraction of fractions</i>	Disney Co.— <i>Solving word problems, Theme parks, Financial reports</i>	Sears— <i>Kiplinger's</i>
Lowes Theatres— <i>Addition and subtraction of fractions</i>	Unilever— <i>Solving for the unknown</i>	Family Dollar Store— <i>Kiplinger's</i>
Regal Cinemas— <i>Addition and subtraction of fractions</i>	Procter & Gamble— <i>Solving for the unknown</i>	UAL Corp.— <i>Pay scales</i>
Showcase Cinemas— <i>Addition and subtraction of fractions</i>	Goodyear— <i>Solving for the unknown</i>	Universal Pictures— <i>Work for hire</i>
United Artists Theatres— <i>Addition and subtraction of fractions</i>	Sumitomo Rubber Industries— <i>Solving for the unknown</i>	Washburn Guitars— <i>Video case</i>
United Air— <i>Adding and subtracting decimals</i>	Zipcar.com— <i>Kiplinger's</i>	AT&T Corp.— <i>Interest introduction</i>
	Bank of America— <i>Kiplinger's</i>	Cisco Systems— <i>Promissory notes</i>
	Orbitz— <i>Kiplinger's</i>	Treasury Department— <i>Online sales</i>
	Expedia— <i>Kiplinger's</i>	Xerox— <i>Lines of credit</i>
	Sidestep— <i>Kiplinger's</i>	Home Depot— <i>Loans, Kiplinger's</i>
	Travelocity— <i>Kiplinger's, Trade discounts</i>	Conseco— <i>Introduction to compounding</i>
	Bb&T— <i>Kiplinger's</i>	Upromise— <i>Rebates, Kiplinger's</i>
	U.S. Small Business— <i>Kiplinger's</i>	Hewitt Associates— <i>Kiplinger's, 401K</i>
	Wendy's— <i>Introduction to percents</i>	American Express— <i>Tax payment, Online security</i>
		Debt. Solutions— <i>Settling debt, Kiplinger's</i>

Europay—MasterCard—*Smart Card*  
 Saturn Corp—*Video case*  
 Fannie Mae—*Jumbo mortgage*  
 Freddie Mac—*Jumbo mortgage*  
 Eloan—*Mortgage*  
 Lendingtree.com—*Mortgages*  
 Homespace.com—*Mortgages*  
 DIC Entertainment Holdings—*Financial reports*  
 Golden Books Family Entertainment—*Financial reports*  
 Rent-Way Inc.—*Financial reports*  
 Kimberly-Clark—*Income statement, Inventory control*  
 Motorola—*Trend analysis*  
 GemStar—T.V. Guide International—*Business models, Kiplinger's*  
 Show Boats International—*Floating condominium*  
 Land Rover—*Depreciation*

Campbell Soup Co.—*Inventory*  
 Amazon.com—*Perpetual inventory*  
 Circuit City—*Inventory strategy*  
 America Online—*Tax on Internet*  
 MCI World.com—*Tax on Internet*  
 Time Warner—*Tax on Internet*  
 Gateway—*Tax on Internet*  
 Bed Bath & Beyond—*Profit margins*  
 GE Financial—*Nursing home care*  
 Savings Bank Life—*Level premium*  
 Insurance (Massachusetts)—*Level premium*  
 Royal Caribbean Cruises, Ltd.—*Earnings per share*  
 Land O' Lakes—*Buyout*  
 Purina Mills Inc.—*Buyout*  
 Krispy Kreme—*Stock price*  
 Charles Schwab—*Web trading commissions, Tax on Internet*

Fidelity Investments—*Web trading commissions*  
 TD Waterhouse—*Web trading commissions*  
 Ameritrade—*Web trading commissions*  
 DLG Direct—*Web trading commissions*  
 Datek Online—*Web trading commissions*  
 National Discount Brokers—*Web trading commissions*  
 Federal Signal Corporation—*Video case*  
 BMW—*Median age*  
 Internal Revenue Service—*E-filing*  
 Ford Motor—*India car market*  
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# Practical Business Math Procedures

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## Case of Not Enough Ketchup for Meatloaf Squeezes H.J. Heinz

\* \* \*  
Company Agrees to Overfill  
Products in California, Pay  
\$180,000 After Investigation

By CHRISTINA BINKLEY  
Staff Reporter of THE WALL STREET JOURNAL  
LOS ANGELES—H.J. Heinz Co. has  
some catching up to do after two Califor-  
nia district attorneys found it had been  
underfilling millions of ketchup bottles  
sold in this bastion of consumer protec-  
tion.

Caught red-handed after a four-year in-  
vestigation, the Pittsburgh-based ketchup  
manufacturer agreed yesterday to make  
up for shorting its customers by overfilling  
its 18- to 64-ounce bottles in California. So  
for the next year, California ketchup buy-  
ers can anticipate getting a tiny freebie—a  
little less air and about one extra ounce of  
ketchup in a bottle of Heinz. "We're going  
to return about 10 million ounces to the  
people," said Thomas A. Papageorge,  
head of the Los Angeles district attorney's  
consumer-protection division. That is ex-  
pected to cost Heinz about \$650,000.

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WITH REAL HEINZ TOMATO KETCHUP

# CHAPTER

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## Whole Numbers; How to Dissect and Solve Word Problems

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### LEARNING UNIT OBJECTIVES

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#### **LU 1-1: Reading, Writing, and Rounding Whole Numbers**

- Use place values to read and write numeric and verbal whole numbers (*p. 5*).
- Round whole numbers to the indicated position (*pp. 6–7*).
- Use blueprint aid for dissecting and solving a word problem (*p. 7*).

#### **LU 1-2: Adding and Subtracting Whole Numbers**

- Add whole numbers; check and estimate addition computations (*pp. 9–10*).
- Subtract whole numbers; check and estimate subtraction computations (*pp. 11–12*).

#### **LU 1-3: Multiplying and Dividing Whole Numbers**

- Multiply whole numbers; check and estimate multiplication computations (*pp. 13–14*).
- Divide whole numbers; check and estimate division computations (*pp. 15–16*).

People of all ages make personal business decisions based on the answers to number questions. Numbers also determine most of the business decisions of companies. For example, click on your computer and go to the website of a company such as eBay and note the importance of numbers in the company's business decision-making process.

The following *Wall Street Journal* clipping illustrates how McDonald's fast-food chain plans to increase its profit numbers by changing its business strategy.

## Will Big Mac Find New Sizzle In Shoes, Videos?

By JENNIFER ORDONEZ  
Staff Reporter of THE WALL STREET JOURNAL

McDonald's Corp. wants to supersize its brand name.

Led by a new brand-extension executive, the burger giant is quietly developing or expanding several lines of McDonald's-brand consumer goods. Already, German consumers are buying McDonald's-brand ketchup, and for some time American parents have been picking up McKids clothing and shoes at Wal-Mart stores. Under consideration now are McDonald's-brand snacks and other packaged goods, as well as a line of McDonald's books and videos.

"A few years from now, people will say, 'I remember when McDonald's was a restaurant,'" says Peter Oakes, a restaurant analyst for Merrill Lynch Global Securities who has caught wind of the strategy and is preparing a report on it. "Why not do something more than just sponsor Saturday morning cartoons?"



Jack Greenberg

McDonald's has yet to announce the strategy, whose initial thrust will likely be overseas. But a year ago it created a new executive position—vice president for corporate strategy—to explore ways of extending the McDonald's brand. Mats Lederhausen, who holds the title, reports directly to Chief Executive Jack Greenberg.

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Companies often follow a general problem-solving procedure to arrive at a change in company policy. Using McDonald's as an example, the following steps illustrate this procedure:

<b>Step 1.</b>	State the problem(s).	The restaurant business is very competitive. A new strategy is needed that broadens the scope of sales and results in a continued increase in profits.
<b>Step 2.</b>	Decide on the best method(s) to solve the problem(s).	Create new products (ketchup; McKids clothing and shoes) with McDonald's brand name.
<b>Step 3.</b>	Does the solution make sense?	Test market new products overseas (ketchup). Sell McKids clothing and shoes at Wal-Mart.
<b>Step 4.</b>	Evaluate results.	All test markets will be evaluated before world-wide distribution begins.

Have you seen the new H. L. Heinz Company's green ketchup? McDonald's-brand ketchup was introduced in Germany to compete with the Heinz ketchup—the No. 1 seller of ketchup in Germany. How well is McDonald's-brand ketchup performing in the Heinz market? As you may expect, a spokesman for Heinz answers, "Not very well, consumers tell us ours is better." The driving force behind McDonald's desire to add new products such as ketchup to its brand name is higher profit numbers.

Your study of numbers begins with a review of basic computation skills that focuses on speed and accuracy. You may think, "But I can use my calculator." Even if your instructor allows you to use a calculator, you still must know the basic computation skills. You need these skills to know what to calculate, how to interpret your calculations, how to make estimates to recognize errors you made in using your calculator, and how to make

calculations when you do not have a calculator. (How to use a calculator is explained in the *Business Math Handbook* and on the Slater website.)

The United States' numbering system is the **decimal system** or *base 10 system*. Your calculator gives the 10 single-digit numbers of the decimal system—0, 1, 2, 3, 4, 5, 6, 7, 8, and 9. The center of the decimal system is the **decimal point**. When you have a number with a decimal point, the numbers to the left of the decimal point are **whole numbers** and the numbers to the right of the decimal point are decimal numbers (discussed in Chapter 3). When you have a number *without* a decimal, the number is a whole number and the decimal is assumed to be after the number.

This chapter discusses reading, writing, and rounding whole numbers; adding and subtracting whole numbers; and multiplying and dividing whole numbers.

## LEARNING UNIT 1-1 | READING, WRITING, AND ROUNDING WHOLE NUMBERS

### Click and Soar

The top 10 U.S. airlines, ranked by Internet revenue.

AIRLINE	1999	2000*
<b>Southwest</b>	\$877,000,000	\$1,280,000,000
<b>United</b>	505,000,000	1,190,000,000
<b>American</b>	416,000,000	1,060,000,000
<b>Delta</b>	671,000,000	1,040,000,000
<b>US Airways</b>	450,000,000	800,000,000

\*Estimated.

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We often use whole numbers in business calculations. For example, look at *The Wall Street Journal* clipping “Click and Soar.” Note that in 2000 the Internet revenue of Southwest airline increased to \$1,280,000,000. From the information in this unit, you will learn that you can read this numeric whole number as one billion, two hundred eighty million. Now let's begin our study of whole numbers.

### Reading and Writing Numeric and Verbal Whole Numbers

The decimal system is a *place-value system* based on the powers of 10. Any whole number can be written with the 10 digits of the decimal system because the position, or placement, of the digits in a number gives the value of the digits.

To determine the value of each digit in a number, we use a place-value chart (Figure 1.1) that divides numbers into named groups of three digits, with each group separated by a comma. To separate a number into groups, you begin with the last digit in the number and insert commas every three digits, moving from right to left. This divides the number into the named groups (units, thousands, millions, billions, trillions) shown in the place-value chart. Within each group, you have a ones, tens, and hundreds place.

In Figure 1.1, the numeric number 1,605,743,891,412 illustrates place values. When you study the place-value chart, you can see that the value of each place in the chart is 10 times the value of the place to the right. We can illustrate this by analyzing the last four digits in the number 1,605,743,891,412:

$$1,412 = (1 \times 1,000) + (4 \times 100) + (1 \times 10) + (2 \times 1)$$

So we can also say that in the number 745, the “7” means seven hundred (700); in the number 75, the “7” means 7 tens (70).

To read and write a numeric number in verbal form, you begin at the left and read each group of three digits as if it were alone, adding the group name at the end (except the last units group and groups of all zeros). Using the place-value chart in Figure 1.1, the

**FIGURE 1.1**

Whole number place-value chart

**Whole Number Groups**

Trillions				Billions				Millions				Thousands				Units			
Hundred trillions	Ten trillions	Trillions	Comma	Hundred billions	Ten billions	Billions	Comma	Hundred millions	Ten millions	Millions	Comma	Hundred thousands	Ten thousands	Thousands	Comma	Hundreds	Tens	Ones	Decimal Point
		1	.	6	0	5	.	7	4	3	.	8	9	1	.	4	1	2	.

number 1,605,743,891,412 is read as one trillion, six hundred five billion, seven hundred forty-three million, eight hundred ninety-one thousand, four hundred twelve. You do not read zeros. They fill vacant spaces as placeholders so that you can correctly state the number values. Also, the numbers twenty-one to ninety-nine must have a hyphen. And most important, when you read or write whole numbers in verbal form, do not use the word *and*. In the decimal system, *and* indicates the decimal, which we discuss in Chapter 3.

By reversing the above process of changing a numeric number to a verbal number, you can use the place-value chart to change a verbal number to a numeric number. Remember that you must keep track of the place value of each digit. The place values of the digits in a number determine its total value.

**Rounding Whole Numbers**

Many of the whole numbers you read and hear are rounded numbers. Government statistics are usually rounded numbers. The financial reports of companies also use rounded numbers. All rounded numbers are *approximate* numbers. The more rounding you do, the more you approximate the number.

Rounded whole numbers are used for many reasons. With rounded whole numbers you can quickly estimate arithmetic results, check actual computations, report numbers that change quickly such as population numbers, and make numbers easier to read and remember.

Numbers can be rounded to any identified digit place value, including the first digit of a number (rounding all the way). To round whole numbers, use the following three steps:

**Rounding Whole Numbers**

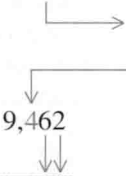
**Step 1.** Identify the place value of the digit you want to round.


**Step 2.** If the digit to the right of the identified digit in Step 1 is 5 or more, increase the identified digit by 1 (round up). If the digit to the right is less than 5, do not change the identified digit.

**Step 3.** Change all digits to the right of the rounded identified digit to zeros.

**EXAMPLE 1** Round 9,362 to the nearest hundred.

**Step 1.** 9,362      The digit 3 is in the hundreds place value.

**Step 2.**       The digit to the right of 3 is 5 or more (6). Thus, 3, the identified digit in Step 1, is now rounded to 4. You change the identified digit only if the digit to the right is 5 or more.

**Step 3.**  9,400      Change digits 6 and 2 to zeros, since these digits are to the right of 4, the rounded number.



By rounding 9,362 to the nearest hundred, you can see that 9,362 is closer to 9,400 than to 9,300.

We can use *The Wall Street Journal* clipping “McDonald’s Restaurants in Selected Cities” to illustrate rounding to the nearest hundred. Note that the number of restaurants in Chicago is 440 and in Sao Paulo, 182. Round these numbers to the nearest hundred as shown above and you can say, “Chicago has 400 McDonald’s restaurants; Sao Paulo has 200 restaurants.” Numbers rounded to the nearest hundred can either be relatively less than the actual number, as in the Chicago restaurants, or a little more than the actual number, as in the Sao Paulo restaurants. Next we show you how to round to the nearest thousand.