

# PRACTICAL BUSINESS MATH

AN APPLICATIONS APPROACH

SIXTH EDITION



**MICHAEL D. TUTTLE**

**INSTRUCTOR'S EDITION**

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**AN APPLICATIONS APPROACH**

**SIXTH EDITION**

**MICHAEL D. TUTTLE**

**NORTHWOOD UNIVERSITY**



**Wm. C. Brown Publishers**

Dubuque, Iowa • Melbourne, Australia • Oxford, England

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A Times Mirror Company

Library of Congress Catalog Card Number: 92-83832

ISBN 0-697-12450-9

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Printed in the United States of America by Wm. C. Brown Communications, Inc.,  
2460 Kerper Boulevard, Dubuque, IA 52001

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# To the Instructor

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The sixth edition of *Practical Business Math: An Applications Approach* continues the successful format of previous editions with an added emphasis on an integrated presentation that will make teaching and learning easier. This emphasis is sure to improve student understanding of business math topics. The explanation, example, exercise, assignment, and mastery test format has been continued. This format has been enhanced with a complete cross-reference system of chapter objectives, student mastery test answers, essential calculator keystroke solutions, and topic page location. Clearly identified chapter objectives, practical small business examples, and understandable explanations make *Practical Business Math* an excellent learning tool.

Our changing world has recognized the importance of a market economy. Nations previously opposed to the market decision-making process are now seeking an understanding of business tools. New and developing businesses are responding to these challenges by looking at the world as a global economy. *Practical Business Math* prepares the student for the dramatic changes that are taking place and those that are yet unannounced. The practical nature of the presentation, the realistic business scenarios, and the measurement of success prepare the student for additional courses in business and the world of work.

## About This Book

*Practical Business Math* uses the fundamental tools of basic arithmetic to solve everyday business problems.

- You may select *Practical Business Math*, Brief Edition (chapters 1–17), or
- You may select specific chapters that can be bound through the custom publishing option.

Each of the chapters in *Practical Business Math* consistently follows this format.

**Chapter Objectives** list the specific goals so students know what is expected. The page reference is provided for easy location of the instructional material.

**Sport-A-Merica** is a case study that illustrates real-world use of math skills in a business setting. Some specific problems are introduced here and solved in the chapter examples.



**Explanation-Example-Exercise** format provides clear explanation immediately followed by an illustrative example. Exercises are practice problems designed to reinforce the topics just learned. This material is organized around the chapter objectives.

**Assignments** check the student's understanding of the concepts covered in the chapter and are divided into skill problems, business application problems, and a challenge problem. All sets of problems are arranged in order of increasing difficulty. Answers are given to the odd-numbered problems in the back of the book and essential keystroke solutions are given in the instructor's edition.

**Mastery Test** is designed for take home or in class examination. The answers to all mastery test problems are in the back of the book.

Chapter 23 (available through the custom publishing option) provides a review for the student. Fifty problems are keyed to the chapter/page where the concept is introduced.

## New to This Edition

Consumer Credit is a critical and ever-growing part of today's business. Requests for even more coverage from adopters have resulted in the development of a chapter on Consumer Credit (chapter 11) and a separate chapter on Installment Loans (chapter 12). Both chapters are now a manageable size. The Consumer Credit chapter includes new coverage on credit card sale deposits.

Currency Exchange is presented in Chapter 6, Business Measurements. Students will be able to determine the amount due on an invoice for goods priced in foreign currency and vice versa. This is an important topic in today's growing global economy.

Workers Compensation Insurance has been added to the chapter on Insurance (chapter 8). The cost of this type of insurance has become an important issue for employers. Students will need to become familiar with this type of business insurance. Commission sales compensation has been added to the chapter on Payroll (chapter 5). This consolidation will concentrate the material into one chapter for a full coverage of the topic.

Completed Income Tax Returns (a Form 1040A and a Form 1040) are prepared from sample information. This information is similar to that which would be submitted to a tax adviser. This new material has been included in the chapter on Taxes (chapter 18, available through the custom publishing option).

Writing Across the Curriculum has been integrated into assignment and mastery test problems in all chapters. Students are expected to provide answers to some problems in sentence form.

Suggested Classroom Time and Perceived Difficulty bar graphs have been added to all chapter openings in the Instructor's Edition to aid in planning. This will assist you in determining the amount of time needed for each of the chapters in the course.

Margin Notations for the instructor and the student (boxed) have been added to all chapters. The notations for the instructor (in the Instructor's Edition only) will provide additional information that may be useful to introduce topics to the class. The notations to the student (in both the student and Instructor's Edition) are in the form of alerts, warnings, and reminders to watch for possible errors in solving problems and to clarify misconceptions.

Essential Keystrokes are included in the Instructor's Edition (shown within parenthesis in italics). These keystrokes will provide the important values to solve exercises and problems and possibly aid in the instruction process.

Answers to all exercises and problems are shown in the Instructor's Edition in italics. Answers to all exercises, odd-numbered Skill and Business Application problems are provided in the back of the student edition of the book. Answers along with essential keystroke solutions and the chapter objective for all end-of-chapter Mastery Tests in the student edition are also shown in the back of the book. The answer to the first exercise is shown along with the essential keystrokes in the student edition.

The Instructor's Edition of the text places all of the information that you will need for the classroom in a single source. There is no need to carry several items to class and refer from one to the other to lecture, to provide salient comments, and to give detailed solutions to exercises and problems. No more need to fumble around. It is all right here, in this one item!

### **A Note about the Sport-A-Merica Case**

Though Sport-A-Merica, Inc. is a fictional business, it is based on an actual store operated in the Midwest. The case is designed to provide the student with a scenario of the day-to-day problems faced by small-business owners. The case, introduced chapter-by-chapter, discusses business problems that pertain specifically to the major emphasis in each chapter. One or more business problems are introduced in each chapter's case discussion. Later, as the chapter material is presented, the problems are solved as part of the worked examples. This will draw the student into the reality of the case and the application of math to business. The chapter can also be presented as a stand alone, without the case.

### **Supplements for the Instructor**

In addition to the annotated Instructor's Edition of Practical Business Math, qualified adopters will be provided with a complete supplemental package designed to reduce preparatory work. The teaching aids in this package are extensive and will enhance classroom activity and learning.

Instructor's Edition provides:

- answers to all problems at the location of the exercise or problem.
- essential keystrokes for all exercises, problems, and Mastery Tests at their location to assist in the instruction process.
- Suggested Classroom Time bar graph in each chapter to assist in determining where to spend the most amount of classroom time in the course.
- Perceived Student Difficulty bar graph in each chapter to indicate the areas of the material that have historically been more difficult for students.
- Margin Notations that contain additional information that can be used to enhance the classroom instruction and separately boxed helpful warnings, alerts, and reminders for students.
- Mastery Tests A, B, and C in a tear-out ready to use form.
- a Final Exam consisting of 35 questions that cover the entire text in a tear-out ready to use form.

A computerized test bank of 2,200 problems is available in IBM, and Macintosh versions, or call the WCB testing services. Ask your publisher's representative for details.

The Test Item File, a printout of the test bank problems. Also available in the Test Item File are reproducible withholding tables, APR tables, tax rate tables, and installment payment tables.

Audio Cassettes on which the author discusses all chapter topics. The cassettes could serve as tutorial support for the student. Cassettes are provided for your reproduction.

Calculator/Spreadsheet Workbook in a combined version or split version for purchase by the student. The Calculator/Spreadsheet Workbook instructs the student in the features of these common business machines and provides practice so students can gain confidence.

Business Math Software supports interactive computerized study to strengthen the students' math skills.

With a complete supplemental package designed to reduce preparatory work. The teaching aids in this package are extensive and will enhance classroom activity and learning.

Instructor's Edition provides:

- answers to all problems at the location of the exercise or problem.
- essential keystrokes for all exercises, problems, and Mastery Tests at their location to assist in the instruction process.
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Calculator/Spreadsheet Workbook in a combined version or split version for purchase by the student. The Calculator/Spreadsheet Workbook instructs the student in the features of these common business machines and provides practice so students can gain confidence.

Software to strengthen the students' math skills is available to qualified adopters.

Business Math Transparencies provide colored forms, samples, charts, tables, procedures, in a large format. The transparencies are packaged with a directory cross-referencing the transparencies by topic.

Tax Supplements are available upon request for each year of the edition to provide the instructor with current tax tables and forms.

## Acknowledgments

The creation of a new edition requires the input from many sources. The sixth edition of *Practical Business Math* reflects the suggestions and comments from both adopters and reviewers. I am pleased to acknowledge the following for their valued critiques. I am grateful for their contributions.

Jean Cashion  
Wilkes Community College  
Jim Dowding  
McIntosh College  
Barbara Gile  
Maple Woods Community College

Donald Loomis  
Butler County Community College  
Paul R. Millhouse  
Sheridan College  
Geraldine Moutine  
Northwood University, Michigan Campus  
Roberta Passenant  
Berkshire Community College  
Mary Thoman  
Western Wyoming Community College  
Reid Tillery  
St. Johns River Community College  
James Winner  
Allegany Community College

Additional thanks go to the many instructors who suggested improvements and volunteered valuable suggestions and the many students, including my own, who provided suggestions to further improve this book.

Special thanks must go to James Guyor, St. Clair County Community College, who provided the accuracy check, ensuring the viability of every example, exercise, and problem in this new edition. A special mention must also be made of Stacey Simon Felt-Stevens, whose copyediting skills were invaluable in making this a quality product.

The revision work load was eased by the valued and extensive contributions of Paul Brewer, Sandy Beauvais, and Kathy Tuttle and the proofing skills of Nona Carroll. They have worked to make this the best ever edition of *Practical Business Math*.

This edition was created by an “inside team” of experts. The team members include Earl McPeck, Theresa Grutz, Karen Nickolas, Kristyn Kalnes, Joseph O’Connell, and Carrie Burger. It is reassuring, as an author, to know that there are professionals working on your team who both set the course of the revision and watch all the detail. They have made the sixth edition a valuable learning tool.

An important member of the team was lost last year. It was through his convincing manner, so many years ago, that this book was signed. Ed Jaffe will be missed.

The Sport-A-Merica case involved a lot of work and cooperation from many people. I appreciate your help in making the story line and photos come alive.

**Dale Jacobs**, owner of Western Wisconsin Sports, Platteville, Wisconsin

**Caron L. Townsend**, Assistant Women’s Basketball Coach, University of Wisconsin-Platteville

**Barbara Peterson**, owner of Village Bike Smith, Platteville, Wisconsin

**John D. Trotter**, First Federal Savings, Platteville, Wisconsin

**David and Nancy Kies**, owners of property on Main Street, Platteville, Wisconsin

**Todd R. Bast**, Western Wisconsin Sports, Platteville, Wisconsin

**Melissa Martinez**, graduate University of Wisconsin-Platteville

**Cindy Olsen**, owner of Body Talk, Dubuque, Iowa

**Platteville Chamber of Commerce**, Platteville, Wisconsin

**Bob Coyle**, free-lance photographer

I hope that you enjoy using this book in your classroom.



# To the Student

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This book is all about taking very basic math and applying that math to everyday business problems. This is realistic, practical material for future business managers.

If you are one of many people that never felt strong in math, don't feel threatened by this book. This book has been used by business students for over fifteen years. It has a proven track record for making the subjects understandable. The easy-to-follow explanations, worked examples, and exercises work together to help you learn the material without over doing it! You are first introduced to a bite size concept, shown how it works, and then you have a chance to put the concept to use. Once you understand that concept you can move on to the next concept. At the end of the chapter is an assignment section of mixed problems. You can find out how you are doing on the problems at any point by comparing your answers to the answers in the back of the book. There you will also find the essential calculator keystrokes to the Student Mastery Test as well as the objective for the problem. This will allow you to refer back to the part of the chapter that will give you the review you need before you take your test from the instructor. There is even a review chapter to get you ready for the final exam!

**As you ready yourself for this course, take the few minutes necessary to read this page to learn how this book is designed to make you successful in Business Math.**

1. Each chapter opens with a discussion about a business by the name of Sport-A-Merica. In this discussion, some background is provided and a problem is presented. These are worth reading to give you a feeling of the practical nature of the chapter material.
2. The objectives for the chapter and the page where they appear are shown on the first page of the chapter. This will give you a good cross-reference to use when reviewing the chapter material.
3. Look for the notations in the margin in the chapter. These questions, helpful hints, and warnings will help you solve problems, avoid potential errors, and clarify possible misconceptions. You will also notice business forms located within the chapter. These are business forms of actual companies. They will give you the exposure to the forms that you will use on the job.

4. The chapter is set up to introduce a topic, show an example, and give you an opportunity to practice on some exercises. This piece of the chapter is completed right there in one place.
5. You can assure yourself that you understand the material by checking your answers in the back of the book. You can then go on to the next piece of the chapter.
6. At the end of the chapter you will find the Assignment Section. The problems are arranged in three levels. The Skill problems are similar to those that you completed in the exercises. The Business Application problems are presented in a sentence form. The last problem in the chapter is a Challenge Problem. This problem will be the most difficult problem in the chapter and will challenge you. Answers to the odd-numbered problems are found in the back of the book. Check over your work to see how you are doing.
7. This is a text/workbook. It's design provides adequate room for you to work the exercises and problems in the book. There is no need to carry an extra notebook.
8. At the end of the chapter is a mastery test. This test is a combination of all of the problems in the chapter. It is a good review of the chapter in preparation for the test that your instructor will give you.

The design that has been listed above is used throughout the book. It is a proven approach to learning business math.

*Your approach to using this book will make a difference in your academic success. Though your instructor may have some specific instructions for you to follow in the course, you should also consider the following:*

1. Read the chapter prior to the class session that will discuss the material. You will have an idea of the topic, a feel for the material, and probably some questions to ask. You may even decide to try a few of the exercises prior to the class session.
2. When your instructor presents the chapter material, you will have a second presentation of the topic. This may clear up the questions that you had when you read the chapter by yourself. If questions remain, now is the time to ask.
3. Do the Assignment Section of the chapter thoroughly. The practice will build confidence and identify any additional questions that you may need to review from the chapter material.
4. Go back to the first page of the chapter. Look at each of the objectives listed on the right side of the page. Are you able to do each of the objectives? Do you feel confident that you can pass a test that covers all of the objectives?
5. If you are sure that you understand the chapter material, take the Mastery Test at the end of the chapter without looking back in the chapter for help. You can then check your answers in the back of the book to confirm your understanding.
6. How much time should you spend doing all of this? What is normal? A good place to start is to spend two hours outside of class for every hour that you spend in class. If you do that for yourself, you will probably do the best job academically that you can do.
7. Don't assume that because the arithmetic in this course is very basic that the material is equally easy. This course deals with everyday business activities. Many people who have taken courses similar to this one are doing those activities. They are successful because they learned this material. You can do the same!

Best wishes to you in Business Math!

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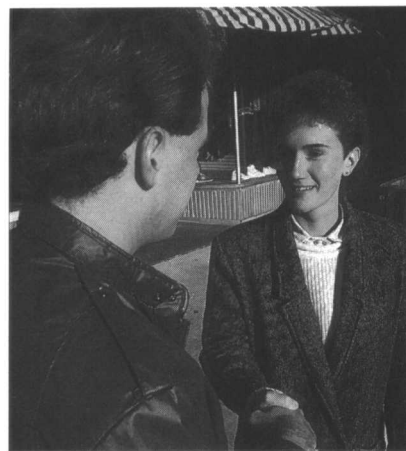
# Suggested Classroom Time for This Chapter

hours: 1 2 3 4 5

# Perceived Student Difficulty with Topical Material

easy moderate difficult

# 1 Working with Whole Numbers



## Sport-A-Merica

Kerry Finn and Hal Balmer are forming Sport-A-Merica, Inc., a retail sports center, specializing in equipment for sports-minded people of all ages. Kerry and Hal will form their business into a corporation and will begin in a small building located on the main street of the downtown area. The store is near city parking, other retail stores, and many city office buildings.

Kerry was first inspired to participate in athletics by her brother Rob. She followed his footsteps in track and cross-country in high school and went on to college on an athletic scholarship for cross-country. Kerry surpassed Rob's performances and competed in many long-distance races after college. She was a top finisher in the New York and Boston marathons and in other regional races, and became known in her hometown as the athlete with the greatest amount of drive and stamina.

Kerry first met Hal at a 10-kilometer race. Hal had been active in sports in school; he was now a representative of a sportswear firm. Kerry bought a piece of clothing from him. While writing up the sale, they discovered they had attended the same college, although at different times. Hal earned a degree in business and had been in marketing and retail for several years, with most of his experience in sports clothing and athletic shoes.

Following further conversations, Kerry and Hal decided to start their own business in retail sporting goods. Kerry had \$50,000 in prize money

from some of the races she won. Hal had saved \$38,000 from his commissions. They bought a small building for \$26,000, purchased merchandise for \$41,000, and started their business. Kerry acts as president and makes all the critical decisions—with Hal's advice, of course. She is responsible for sales and public relations. Hal deals with the day-to-day operations of the business. He hires the staff, prices the merchandise, and makes most of the buying decisions. And there are so many decisions to make! With Kerry, Hal, and one sales clerk, Sport-A-Merica is open for business! Kerry and Hal know it will take a great deal of determination to make the business successful.

Kerry and Hal both recognize the importance of good records and the analysis of those records—selling expenses, travel expenses, sales for the month, cost of sales, taxes due, depreciation expenses, checkbook balancing—the list goes on. They realize they need to be on top of the records, as do any employees they may hire. Hal must complete his expense report for the week of October 10, for example. He has the receipts for his meals, travel, and lodging. He expects his reimbursement to be nearly \$600. He is also concerned about the check he needs to write to Cindi White for \$64. Is there enough money in the checking account? Correct calculations are essential to profits, customer satisfaction, and the success of Sport-A-Merica, Inc.

## Objectives

After mastering the material in this chapter, you will be able to:

1. Read and write whole numbers. p. 2
2. Round off whole numbers. p. 4
3. Perform the four fundamental arithmetic operations (addition, subtraction, multiplication, and division) of whole numbers with more accuracy and speed. p. 5
4. Work word problems using the four fundamental arithmetic operations. p. 6
5. Understand and use the following terms:  
Place Values  
Addend  
Sum  
Difference  
Minuend  
Subtrahend  
Borrowing  
Multiplicand  
Multiplier  
Product  
Dividend  
Divisor  
Quotient  
Remainder



This chapter is concerned with improving your skill in the four fundamental arithmetic operations. These fundamentals will be the building blocks for a better understanding of material to be presented later in the text.

## Reading and Writing Whole Numbers

*place value*

Business communications often include numerical information that must be read. To be able to read and write numbers, you must be able to use place values. Each digit in a number, because of its position, has a place value. Once mastered, these **place values** will aid you in reading numbers. The following illustration gives a number with all of its place values labeled.

### Objective 1

Billion			Million			Thousand					
Hundred	Ten	One	Hundred	Ten	One	Hundred	Ten	One	Hundreds	Tens	Ones or Units
5	0	7	9	1	4	6	2	3	8	6	5
											Decimal Point

Notice that the number has a comma between each **group** of three digits to the left of the decimal place. The commas, therefore, break the number into thousands, millions, etc., so that it can be easily read.

The digit in the ten billions place is 0.

The digit in the hundred thousands place is 6.

The digit in the tens place is 6.

The digit in the hundred millions place is 9.

The digit in the ones or units place is 5.

#### Exercise A

In the number 562,704,831

- The digit in the hundreds place is 8.
- The digit in the millions place is 2.
- The digit in the tens place is 3.
- The digit in the ten thousands place is 0.
- The digit in the units place is 1.

#### Exercise B

In the number 814,036,725

- The digit in the thousands place is 6.
- The digit in the **hundred thousands** place is 0.
- The digit in the **tens** place is 2.
- The digit in the **hundreds** place is 7.
- The digit in the **ten thousands** place is 3.

(Check your progress by turning to the answers at the back of the book.)

With your knowledge of place values, you can read and write numbers using the word description. In the preceding illustration, each group of three digits to the left of the decimal point has a name (i.e., thousands, millions, billions, etc.). To read a number, first read the digit in the leftmost group followed by that group name and continue with this process until all of the digits are read.

The ability to read numbers will enable you to communicate with others more successfully. It will also improve your image as a competent student, employee, or manager.

**Example 1**

*Note that no "ands" are used while reading whole numbers.*

The number 46,002 is read: 46 thousand, 2 *or* forty-six thousand, two. Notice that there are no "ands" used in reading the number.

**Example 2**

The number 693,924,806 is read: Six hundred ninety-three million, nine hundred twenty-four thousand, eight hundred six.

Read the following numbers to yourself.

123,066,231	960,012
7,839,850	3,140
7,016	90,008

When reading numbers that are in dollars, simply add the word "dollars" after the last digit is read.

**Example 3**

The amount \$33,108 is read: 33 thousand, 108 dollars *or* thirty-three thousand, one hundred eight dollars.

Read the following dollar amounts to yourself.

\$3,509	\$7,750,000
\$3,602	\$19,436,502,500
\$987,503	\$51,437

*How many times will you receive or provide monetary values over the phone? This is an important skill!*

Now that you are able to read whole numbers it will be easier for you to write numbers with words. This knowledge will be useful when writing checks. The check form has a place for the amount to be written with words as well as with numbers.

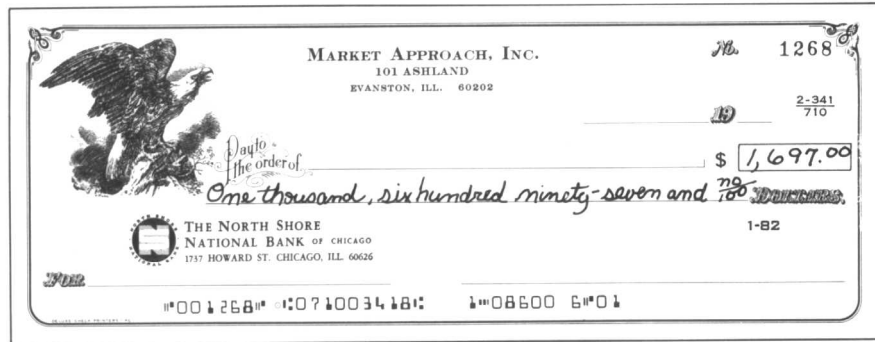
When writing the number, a *comma* is placed between each written portion corresponding to each group of numbers (i.e., thousands, millions, etc.). Values twenty-one through ninety-nine are *hyphenated*.

**Exercise C**

Write in the dollar amounts in the following checks using the value in the upper right corner of each check. Follow the procedure shown in example 4, check number 1268.

**Example 4**

Bankers will use the value written in words if it differs from the value written in numbers on the check. Write carefully and accurately!



MARKET APPROACH, INC.  
101 ASHLAND  
EVANSTON, ILL. 60202

No. 1268

2-341  
710

Pay to the order of \$ 1,697.00

One thousand, six hundred ninety-seven and  $\frac{70}{100}$  DOLLARS

THE NORTH SHORE  
NATIONAL BANK OF CHICAGO  
1737 HOWARD ST. CHICAGO, ILL. 60626

1-82

⑈001268⑈ ⑆071003418⑆ ⑈08600 6⑈0⑆



MARKET APPROACH, INC.  
101 ASHLAND  
EVANSTON, ILL. 60202

No. 1269

2-341  
710

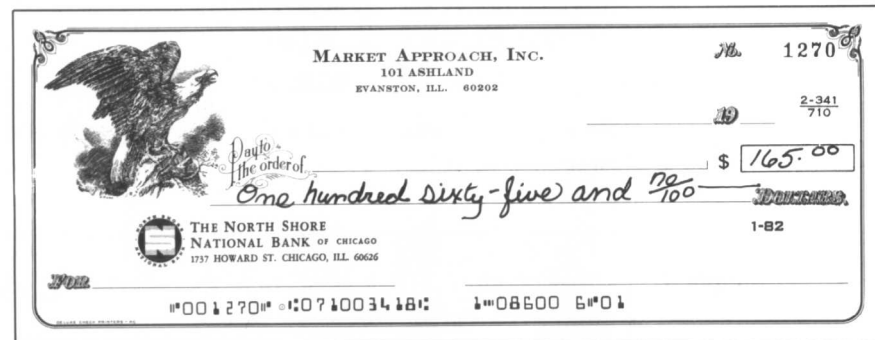
Pay to the order of \$ 5,843.00

Five thousand, eight hundred forty-three and  $\frac{70}{100}$  DOLLARS

THE NORTH SHORE  
NATIONAL BANK OF CHICAGO  
1737 HOWARD ST. CHICAGO, ILL. 60626

1-82

⑈001269⑈ ⑆071003418⑆ ⑈08600 6⑈0⑆



MARKET APPROACH, INC.  
101 ASHLAND  
EVANSTON, ILL. 60202

No. 1270

2-341  
710

Pay to the order of \$ 165.00

One hundred sixty-five and  $\frac{70}{100}$  DOLLARS

THE NORTH SHORE  
NATIONAL BANK OF CHICAGO  
1737 HOWARD ST. CHICAGO, ILL. 60626

1-82

⑈001270⑈ ⑆071003418⑆ ⑈08600 6⑈0⑆

Courtesy of Market Approach, Inc., Evanston IL.

## Rounding Off

### Objective 2

Accuracy in arithmetic operations is essential and must be a goal of every business student. There are occasions, however, when the answer may need to be rounded off in order for it to be a more useful figure. The rounding off process does not eliminate the need for accurate arithmetic, but relies on accuracy in order that the answer may be correctly rounded off. Directions for rounding off usually ask you to round off to the nearest ten, hundred, etc. (See example 5.)

**Example 5**

"Round off your answer to the nearest ten thousand."

**Rounding Rules**

Rounding is used on financial statements, sales reports, and income tax returns (no cents).

If the instructions are to "round off to the nearest ten thousand," you must be concerned with the digit in the ten thousands place and the digit immediately to the right of it, that is, the thousands place. In the number 627,584, the digit 2 is in the ten thousands place. The 2 will be changed to a 3 if the digit immediately to the right of it is a 5 or larger. In this case the digit is a 7; therefore, the answer is 630,000. Notice that all of the digits to the right of the number are dropped and zeros substituted. When the digit immediately to the right is a 4 or smaller, the digit in question remains the same and the value of the digits to the right are changed to zeros.