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PREFACE

Business Mathematics, 14e, written by Gary Clendenen and Stanley A. Salzman, has been carefully revised to provide a complete course in those mathematical topics needed for success in modern business. More than enough topics are included for a full semester course. For shorter courses, the wide range of topics permits the selection of those chapters and sections which best fit individual instructor and class needs. Each section approximates the material covered in one classroom hour of instruction. This does vary, depending on the difficulty of the material and the ability of the student.

At the beginning of the course, it is usually beneficial to demonstrate to students the many features of the textbook and to share the benefits of using these features to the maximum advantage. The discussion should include the learning objectives at the beginning of each section. Be sure to point out the CASE IN POINT section openers, the learning aids labeled Quick TIP, the *QUICK START* exercises at the beginning of each exercise set, and the *Quick Review*, *Case Study*, *Case in Point Summary Exercise*, and *Test* that conclude each chapter. The answers for odd-numbered exercises, the *Case Study*, *Case in Point Summary Exercise*, and all chapter tests are provided in the back of the text. Instructors may choose to make the solutions to all exercises available to students. Students should also be reminded that there is a complete glossary of key terms at the back of the textbook.

The chapter sequence is designed to be as flexible as possible. Chapters 1-3 present basic prerequisite material, allowing for a great deal of flexibility in course planning. The number of chapters covered and the specific chapters used in a course vary according to time available (quarter or semester) and ability of students. Most business mathematics courses include the material in Chapters 1-13, as well as Chapter 16. Instructors can choose other topics depending on interests and time constraints.

The teaching suggestions for each chapter are derived from the successful experiences of instructors who have taught business mathematics for many years. They are offered to give suggestions and ideas to help the instructor work more efficiently and achieve greater success in the classroom. Suggestions and comments are included for each chapter, with a recommended exercise assignment for each section.

TO THE INSTRUCTOR

This introductory section may be used the first day of class. Each student should be made aware of the importance of the material of this course as he/she begins and progresses in a career. Many students can benefit from the suggestions of how to become successful in this business mathematics course. The Business Mathematics Pretest included in this manual may be used for class testing to measure overall abilities of each student. During the first class meeting, students may be assigned the Business Mathematics Pretest found in the textbook. The pretest could be reviewed in the second class meeting and the results used to determine whether or not to cover Chapter 1.

The Instructor's Resource Manual provides several tools for instructors using *Business Mathematics, 14e*, by Gary Clendenen and Stanley A. Salzman.

- Teaching suggestions, including suggested assignments, are provided to assist instructors with course planning.
- A business mathematics pretest is supplied to assist faculty with student placement.
- Four open-response and two multiple-choice test forms are provided for each chapter. All test forms for a particular chapter are designed to be of equal difficulty.
- Two open-response forms of a final examination are provided.
- For the instructor's convenience, necessary tables needed to complete the exams are included.

TEACHING SUGGESTIONS
CHAPTERS 1-16

Chapter 1 | Whole Numbers and Decimals

Prerequisite: None

Chapter Contents

- 1.1 Whole Numbers
- 1.2 Application Problems
- 1.3 Decimal Numbers
- 1.4 Addition and Subtraction of Decimals
- 1.5 Multiplication and Division of Decimals

This chapter is a review for students. While the material is basic, many of the students have not worked with mathematics for several years. The most important review is in rounding numbers, reading and solving application problems, and practicing multiplication and division with decimals. The word problems presented in Section 1.2 and throughout the text are an excellent way to encourage students to understand real-life business applications. While some instructors skip this chapter completely, others require students to work all problems in the chapter without the use of a calculator. Some instructors do not allow the use of a calculator in the first two or three chapters. In this chapter, as in all the others, students may work additional odd-numbered exercises for extra practice and then check the answers in the back of the book.

Suggested Assignments

- Section 1.1, Exercises 8-12 even, 16-54 even, 70-84 even
- Section 1.2, Exercises 4-20 even
- Section 1.3, Exercises 16-66 even
- Section 1.4, Exercises 12-14 even, 18-32 even
- Section 1.5, Exercises 4-22 even, 26-36 even
- Case Study
- Case in Point Summary Exercise
- Chapter 1 Test

Chapter 2 | Fractions

Prerequisite: None

Chapter Contents

- 2.1 Fractions
- 2.2 Addition and Subtraction of Fractions
- 2.3 Addition and Subtraction of Mixed Numbers
- 2.4 Multiplication and Division of Fractions
- 2.5 Converting Decimals to Fractions and Fractions to Decimals

Many students have difficulty working with fractions, as they do not use them every day. However, fractions are used in the food service industry, construction trades, real estate, accounting, and in many other fields. Special attention should be given to finding the lowest common denominator, borrowing when subtracting mixed numbers, reducing fractions when multiplying and dividing, and converting fractions to decimals. Class time spent reviewing fractions, along with assigned exercises, adds to students' confidence and ability, and pays great dividends in regard to performance in later chapters.

Suggested Assignments

- Section 2.1, Exercises 4-24 even, 30-38 even
- Section 2.2, Exercises 12-16 even, 22-40 even, 44-60 even
- Section 2.3, Exercises 4-16 even, 22-26 even
- Section 2.4, Exercises 4-28 even, 38-50 even
- Section 2.5, Exercises 4-24 even, 28-42 even
- Case Study
- Case in Point Summary Exercise
- Chapter 2 Test

Chapter 3 | Percents

Prerequisite: Whole Numbers and Decimals (Chapter 1)
Fractions (Chapter 2)

Chapter Contents

- 3.1 Writing Decimals and Fractions as Percents
- 3.2 Finding Part
- 3.3 Finding Base
- 3.4 Finding Rate
- 3.5 Increase and Decrease Problems

Students need a thorough understanding of this chapter in order to do well in this course. Percents are commonly used in business and many other fields, so this is an important chapter for students to master. Classroom explanation of these sections can be accelerated to two sections per day to allow extra time to assign and discuss the supplementary exercises in Sections 3.3 and 3.4. While the individual sections are designed to give practice in solving a single type of problem, the supplementary exercises combine the various types of percent problems and challenge the student to determine the type of problem and how to solve it. Emphasis should be put on how to determine the missing element in a percent problem, for this is usually the most difficult part in working with percent. Careful explanation of how to identify the missing element in a percent problem results in greater success in solving the increase and decrease problems in Section 3.5.

Suggested Assignments

- Section 3.1, Exercises 4-56 even
- Section 3.2, Exercises 4-14 even, 18-42 even
- Section 3.3, Exercises 4-22 even, 26-36 even,
Supplementary Application Exercises 2-14 even
- Section 3.4, Exercises 4-18 even, 22-30 even,
Supplementary Application Exercises 2-30 even
- Section 3.5, Exercises 2-8 even, 14-34 even
- Case Study
- Case in Point Summary Exercise
- Chapter 3 Test

Chapter 4 | **Equations and Formulas**

Prerequisite: None

Chapter Contents

- 4.1 Solving Equations
- 4.2 Applications of Equations
- 4.3 Business Formulas
- 4.4 Ratio and Proportion

The material in this chapter allows faculty to review some algebra. Instructors wanting even more algebra coverage may utilize Appendix D, Exponents and the Order of Operations. This chapter provides students practical applications of equation solving to business situations. The concepts of ratio and proportion are explained and illustrated with business applications. Emphasis should be given to the techniques of solving equations and proportions and then to the practical uses of these skills.

Suggested Assignments

- Section 4.1, Exercises 4-24 even
- Section 4.2, Exercises 4-50 even
- Section 4.3, Exercises 4-54 even
- Section 4.4, Exercises 4-50 even, 56-72 even
- Case Study
- Case in Point Summary Exercise
- Chapter 4 Test

Chapter 5 | **Bank Services**

Prerequisite: Whole Numbers and Decimals (Chapter 1)

Chapter Contents

- 5.1 Banking, Checking Accounts, and Check Registers
- 5.2 Checking Services and Credit-Card Transactions
- 5.3 Bank Statement Reconciliation

An introduction to banking services should include the importance and nature of banking, types of checking accounts and banking terminology, and recent changes in the availability of banking services, particularly electronic banking. Discussion should also include interest-paying checking accounts, other types of withdrawal accounts, electronic funds transfer (EFT), and automated teller machines (ATMs). Reference to banking forms will enhance student understanding and success.

Suggested Assignments

- Section 5.1, Exercises 4-10 even, 16-22 even
- Section 5.2, Exercises 6-20 all, 24
- Section 5.3, Exercises 4-6 even, 12-14 even
- Case Study
- Case in Point Summary Exercise
- Chapter 5 Test

Prerequisite: Percents (Chapter 3)

Chapter Contents

- 6.1 Gross Earnings: Wages and Salaries
- 6.2 Gross Earnings: Piecework and Commissions
- 6.3 Social Security, Medicare, and Other Taxes
- 6.4 Income Tax Withholding

A general discussion of average personal income, average family income, and the amount of income students feel would be necessary to meet their needs is a good way to introduce this topic. As a follow-up, consider an income amount and convert it to annual, monthly, weekly, and hourly salary. The importance of checking the accuracy of periodic paychecks regarding hours worked, overtime, and deductions may also be stressed. The FICA and Medicare rates and cutoff points will be introduced. Be sure to stress the importance of using only current tables. The importance of understanding defined terms should be stressed. This chapter contains data on average income by level of education and career that students will find very interesting.

Suggested Assignments

- Section 6.1, Exercises 2-24 even, 30-48 even
- Section 6.2, Exercises 2-8 even, 12-30 even
- Section 6.3, Exercises 4-28 even
- Section 6.4, Exercises 4-30 even, 36-46 even
- Case Study
- Case in Point Summary Exercise
- Chapter 6 Test

Chapter 7 | Mathematics of Buying

Prerequisite: Percents (Chapter 3)

Chapter Contents

- 7.1 Invoices and Trade Discounts
- 7.2 Series Discounts and Single Discount Equivalents
- 7.3 Cash Discounts: Ordinary Dating Methods
- 7.4 Cash Discounts: Other Dating Methods

Use of sample invoices can provide understanding into what an invoice does and how it works. The advantage of calculator use to solve series discounts can be easily demonstrated. Surprisingly, many students do not know how many days are in each month of the year. This knowledge and the ability to work with percent are important in solving cash discounts. Local businesses will often supply actual invoices, which may be shared with the class to demonstrate the application of this material. Vocabulary is important, so emphasis should be given to the new terms used in the chapter.

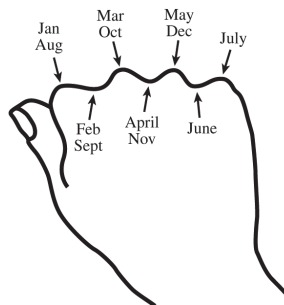
The number of days in each month can be recalled with a poem or using the knuckle method.

Poem Method

Thirty days hath September, April, June, and November. All the rest have thirty-one, except February which has 28 and on leap year 29.

Knuckle Method

31 days
Jan., Mar.,
May, July,
Aug., Oct., Dec.



30 days
April, June,
Sept., Nov.

All of the knuckle months have 31 days (they're higher), and all of the valley months have 30 days (they're lower), except February, which has 28 days.

Suggested Assignments

- Section 7.1, Exercises 8-14 all, 18-30 even, 38-58 even, 64-74 even
- Section 7.2, Exercises 4-8 even, 12-24 even
- Section 7.3, Exercises 4-12 even, 16-22 even
- Section 7.4, Exercises 2-14 even, 18-30 even
- Case Study
- Case in Point Summary Exercise
- Chapter 7 Test

Chapter 8 | **Mathematics of Selling**

Prerequisite: Percents (Chapter 3)

Chapter Contents

- 8.1 Markup on Cost
- 8.2 Markup on Selling Price
- 8.3 Markdown
- 8.4 Turnover and Valuation of Inventory

Knowledge of percent is the only prerequisite to working with markup. The approach to solving markup problems used in the text is appreciated by students and helps distinguish between the two types of markup problems.

The text's diagram approach to understanding and solving markdown problems is very helpful. Emphasis should be given to understanding the terminology used throughout the section. This material is especially important for students interested in retail merchandising and accounting. The importance of inventory records and inventory control will become very apparent to those students interested in management careers.

Suggested Assignments

- Section 8.1, Exercises 4-14 even, 18-26 even
- Section 8.2, Exercises 4-16 even, 20-24 even, Supplementary Application Exercises 2-16 even
- Section 8.3, Exercises 4-12 even, 16-22 even
- Section 8.4, Exercises 4-14 even, 18-24 even
- Case Study
- Case in Point Summary Exercise
- Chapter 8 Test

Chapter 9 | Simple Interest

Prerequisite: Percents (Chapter 3)

Chapter Contents

- 9.1 Basics of Simple Interest
- 9.2 Finding Principal, Rate, and Time
- 9.3 Simple Discount Notes
- 9.4 Discounting a Note Before Maturity

It should be emphasized that simple interest is the basis for calculating the many variations of interest in the area of finance. Students should understand that interest rates are expressed on an annual basis unless otherwise stated. The broad application of the $I = PRT$ formula should be demonstrated. It is vital that students are familiar with the formulas used to solve for principal, rate, and time. Emphasize that a 360-day year (ordinary interest) is used unless stated otherwise. Students should understand that in the field of finance, it is important to determine the method being used to calculate interest.

Suggested Assignments

- Section 9.1, Exercises 2-36 even
- Section 9.2, Exercises 4-36 even
- Section 9.3, Exercises 2-30 even
- Section 9.4, Exercises 2-24 even,
Supplementary Application Exercises 4-20 even
- Case Study
- Case in Point Summary Exercise
- Chapter 9 Test

Chapter 10 | Compound Interest and Inflation

Prerequisite: Simple Interest (Chapter 9)

Chapter Contents

- 10.1 Compound Interest
- 10.2 Interest-Bearing Bank Accounts and Inflation
- 10.3 Present Value and Future Value

Compound interest is a fundamental concept that students need to understand. The topics discussed in this chapter are the foundation for understanding investments, return on investment, inflation, annuities, sinking funds, amortization, and home loans, among other topics. Students learn to use the compound interest tables and experience compounding for various periods of time, including daily compounding. It is important for students to observe that the return on an investment depends on the frequency with which interest is compounded, the number of compounding periods, and the interest rate per compounding period.

Present value and future value are also introduced. Students should understand the time value of money. You may want to ask them whether they would rather have \$1000 today or \$1000 in 20 years, even if the payment in 20 years is guaranteed by the United States government. Many will choose \$1000 today. Ask them why they made that choice.

Suggested Assignments

- Section 10.1, Exercises 2-28 even
- Section 10.2, Exercises 4-10 even, 14-26 even
- Section 10.3, Exercises 4-14 even
- Case Study
- Case in Point Summary Exercise
- Chapter 10 Test

Chapter 11 | Annuities, Stocks, and Bonds

Prerequisite: Simple Interest (Chapter 9)

Chapter Contents

- 11.1 Annuities and Retirement Accounts
- 11.2 Present Value of an Ordinary Annuity
- 11.3 Sinking Funds (Finding Annuity Payments)
- 11.4 Stocks and Mutual Funds
- 11.5 Bonds

An understanding of the topics of this chapter is extremely important to the long-term financial health of the students. Many students believe that it is impossible for working people to accumulate several hundred thousand or a million dollars. They simply do not understand the benefits of regular investment and compound interest over time. The section on annuities includes a discussion of Individual Retirement Accounts (IRAs) to help students understand the value of regular investment.

The time value of money is emphasized by a discussion of the present value of an annuity or sinking funds. Sinking funds are commonly used to accumulate funds to pay off debt.

Stocks, mutual funds, and bonds are common investment vehicles. Most financial planners recommend including stocks and bonds or mutual funds composed of stocks and bonds in any long-term investment portfolio. This recommendation is made because the returns on stocks have generally been far superior to that of simple saving accounts.

Suggested Assignments

- Section 11.1, Exercises 4-12 even, 16-20 even
- Section 11.2, Exercises 4-6 even, 10-18 even
- Section 11.3, Exercises 4-8 even, 12-26 even,
Supplementary Application Exercises 2-12 even
- Section 11.4, Exercises 4-24 even, 28-44 even
- Section 11.5, Exercises 2-6 all, 8-12 even, 16-20 even
- Case Study
- Case in Point Summary Exercise
- Chapter 11 Test

Chapter 12 | Business and Consumer Loans

Prerequisite: Simple Interest (Chapter 9)

Chapter Contents

- 12.1 Open-End Credit and Charge Cards
- 12.2 Installment Loans
- 12.3 Early Payoffs of Loans
- 12.4 Personal Property Loans
- 12.5 Real Estate Loans

The topics of this chapter are always interesting to students, many of whom are borrowing to attend college. Time permitting, the entire chapter may be used, or specific sections may be selected according to time and individual class interest. This is an excellent opportunity to discuss state laws or interest rates on types of loans offered by banks and credit unions. Personal property loans are of special interest to students. Student debt has become a particularly troublesome issue. Discussion concerning types of loans available, interest rates charged, and qualifying for a loan may be of interest.

Suggested Assignments

- Section 12.1, Exercises 2-6 even, 12-20 even
- Section 12.2, Exercises 4-16 even, 22-32 even
- Section 12.3, Exercises 2-12 even, 16-26 even
- Section 12.4, Exercises 4-14 even, 18-24 even
- Section 12.5, Exercises 4-6 even, 12-18 even
- Case Study
- Case in Point Summary Exercise
- Chapter 12 Test

Chapter 13 | Taxes and Insurance

Prerequisite: Percents (Chapter 3)

Chapter Contents

- 13.1 Property Tax
- 13.2 Personal Income Tax
- 13.3 Fire Insurance
- 13.4 Motor-Vehicle Insurance
- 13.5 Life Insurance

Younger students may not be aware of many of the topics discussed in this chapter, but will likely find them interesting. Occasionally there are some local tax issues relevant to this topic that may be discussed in class. A discussion of sales tax may be appropriate. The coverage of income tax is merely introductory but gives students excellent guidance in working with income tax returns.

Understanding terminology and the use of tables are two key goals. Students should become aware of current and future insurance needs. Also, the types of insurance coverage available and the various insurance options are essential knowledge for the business person.

Suggested Assignments

- Section 13.1, Exercises 4-16 even, 20-32 even
- Section 13.2, Exercises 4-24 even, 28-34 even
- Section 13.3, Exercises 4-20 even, 24-32 even
- Section 13.4, Exercises 4-6 even, 10-18 even
- Section 13.5, Exercises 4-10 even, 14-20 even
- Case Study
- Case in Point Summary Exercise
- Chapter 13 Test

Chapter 14 | Depreciation

Prerequisite: Percents (Chapter 3)

Chapter Contents

- 14.1 Straight-Line Method
- 14.2 Declining-Balance Method
- 14.3 Sum-of-the-Years'-Digits Method
- 14.4 Units-of-Production Method
- 14.5 Modified Accelerated Cost Recovery System

Depreciation is an accounting concept by which the cost of an item is deducted over time. Depreciation can be used if the useful life of the item is longer than one year. The Modified Accelerated Cost Recovery System (MACRS) should be given only a proportionate share of class time. MACRS is easiest for students to comprehend after the vocabulary used in straight-line, declining-balance, and sum-of-the-years'-digits depreciation methods has been covered. It should be emphasized that many states do not allow MACRS in preparing state income tax returns. The instructor should point out that the laws affecting depreciation change from time to time and that the taxpayer must be aware of these changes and their effects.

Suggested Assignments

- Section 14.1, Exercises 4-30 even, 34-36 even
- Section 14.2, Exercises 4-30 even, 34-38 even
- Section 14.3, Exercises 4-26 even, 30-34 even,
Supplementary Application Exercises 2-18 even
- Section 14.4, Exercises 2-16 even, 20
- Section 14.5, Exercises 4-30 even, 34-38 even
- Case Study
- Case in Point Summary Exercise
- Chapter 14 Test

Chapter 15 | Financial Statements and Ratios

Prerequisite: Percents (Chapter 3)

Chapter Contents

- 15.1 The Income Statement
- 15.2 Analyzing the Income Statement
- 15.3 The Balance Sheet
- 15.4 Analyzing the Balance Sheet

This chapter introduces the student to the important financial tools of the income statement and the balance sheet using actual figures from a large, publicly held corporation. Emphasis should be given to the fact that the income statement, balance sheet, and financial ratios are key tools used to make management decisions. This material introduces key concepts and may help prepare students for a course in accounting.

Suggested Assignments

- Section 15.1, Exercises 2, 3, 6
- Section 15.2, Exercises 2-6 all, 9-12 all
- Section 15.3, Exercise 1, 2
- Section 15.4, Exercises 1, 2, 4-12 even
- Case Study
- Case in Point Summary Exercise
- Chapter 15 Test

Chapter 16 | Budgeting and Business Statistics

Prerequisite: Percents (Chapter 3)

Chapter Contents

- 16.1 Planning and Budgeting
- 16.2 Frequency Distributions and Graphs
- 16.3 Mean, Median, and Mode

This chapter begins with a section on planning and budgeting, which is important for every family and every manager. It then focuses on helping students read, build, and understand graph and charts. The instructor may supplement with additional graphs and charts if desired. Supplementary material related to graphing is found in Appendix E, Graphing Equations. Section 16.3 introduces basic concepts used for statistical analysis.

Suggested Assignments

- Section 16.1, Exercises 1-4 all
- Section 16.2, Exercises 2-54 even
- Section 16.3, Exercises 4-8 even, 14-34 even
- Case Study
- Case in Point Summary Exercise
- Chapter 16 Test

Appendix A | The Metric System

This material introduces students to the metric system and the uses of the system. The goal is to familiarize students with the units of the metric system. A review of units of the English system is presented. Students are taught to convert from one system to another.

Suggested Assignment Appendix A, 2-52 even

Appendix B | Basic Calculators

This material introduces students to the use of a basic calculator for solving financial applications. Models differ, so it is important for each student to review the instructions that accompany the calculator before attempting to solve problems.

Suggested Assignment Appendix B, 2-42 even

Appendix C | Financial Calculators

This material introduces students to the use of the financial calculator to solve problems related to the time value of money. Problems involving compound interest, present value, future value, annuities, sinking funds, etc. can be solved using these inexpensive calculators. Models differ, so it is important for each student to review the instructions that accompany the calculator before attempting to solve problems.

Suggested Assignment Appendix C, 2-20 even

Appendix D | Exponents and the Order of Operations

This material provides a review of exponents and multiplication and division of expressions involving exponents. The Order of Operations is outlined. Several application problems are included to provide additional practice. This appendix can be used effectively as a review, or exercises may be assigned for students who will benefit from additional practice.

Suggested Assignment Appendix D, 2-44 even

Appendix E | Graphing Equations

This material covers the basics of graphing linear and nonlinear equations, with an emphasis on identifying dependent and independent variables, and creating graphs that provide visual clarity of information. This appendix provides a review for students who have had limited exposure to such graphing techniques.

Suggested Assignment Appendix E, 2-20 even

