



BURTON S. KALISKI

**INSTRUCTOR'S MANUAL
WITH TESTS
FOR
BUSINESS
MATHEMATICS**

THIRD EDITION

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INTRODUCTION

I like to think of myself as a relaxed teacher of relaxed students. To make this image a reality, I keep the level of my classroom teaching as informal and colloquial as possible. I have tried to imbue *BUSINESS MATHEMATICS*, Third Edition, with this same informality and accessibility—successfully, I think—creating, in the process, a textbook you and your students should find comfortable to use, and easy to teach and learn. The format is simple to follow, and the text features vivid, explicit explanations, punctuated by real-life examples—all designed to help your students become competent in using and applying basic arithmetic procedures to everyday business problems. As a result, your students should be able to learn a great deal by means of self-instruction, leaving you free to concentrate on explaining, interpreting, and applying the basic concepts and underlying principles.

This Instructor's Manual with Tests makes suggestions which should help you use *BUSINESS MATHEMATICS* more effectively in your classes. It also places at your disposal examination questions to test your students and answer keys to check their work. Since my teaching procedures are a reflection of the classroom problems I have faced and the procedures I have used, you will want to adapt these suggestions to your own classes and teaching conditions. I would be interested to hear about your experiences in using *BUSINESS MATHEMATICS*—and to participate in a mutual exchange of ideas whose twin goals will be to help us become more effective as we teach and to help our students become more successful as they learn.

SPECIAL FEATURES OF THE TEXTBOOK

BUSINESS MATHEMATICS consists of 14 chapters that are grouped into six units and two appendices. Before discussing individual chapters, let's look at the book as a whole and consider some recommendations for its use.

After each concept or technique is presented, a sample problem immediately follows, showing a step-by-step solution. Problem sets titled *Test Your Ability (TYA)* frequently occur throughout each chapter, giving students opportunities to practice their new skills before going on to a new subject. All an-

swers to *TYA* problems are given in the back of the textbook. (Don't let your students forget this fact.)

When a student has completed a reading assignment and the related *TYA* problems in a chapter, assign problems from Group A in the *Exercises* at the end of the chapter. Group A items are matched to *TYA* items, but are presented in random sequence. Designed for the more advanced student, Group B problems require greater ability and slightly more difficult mathematical calculations. Answers to both sets of *Exercises* are given in this manual. Workbook problems are of the same level of difficulty as Group A; they are paired one to one with the *TYA* problems so that they may be used alternatively. (The Workbook is discussed on page 99 of this manual.)

Since much of the difficulty of doing simple arithmetic is due to poor reading habits, encourage your students to answer the *Check Your Reading* questions at the end of each chapter, covering the nonarithmetic aspects of the chapter: terminology, concepts, and mental reference to tables. Answers to all *Check Your Reading* questions are given in this manual.

Before an examination, the *Unit Self-Test* that appears at the end of each unit can serve as a good refresher of the major concepts covered. A key follows each *Unit Self-Test*.

Finally, because the student should understand business terminology, each unit includes a list of *Terms You Should Know*. A complete glossary of these terms and a comprehensive index are located at the back of the book; encourage your students to use the Index and the Glossary to help them obtain a better grasp of the subject matter.

TABLES AND ILLUSTRATIONS

Many kinds of business calculations are accomplished advantageously through the aid of tables. In *BUSINESS MATHEMATICS*, the student will become familiar with tables and learn their use. The tax tables are those of 1981. Other tables, such as the interest tables, sales tax table, and insurance tables, have been constructed to be representative of current ones. You may wish to present problems based on actual tables obtained from local firms and government offices. More will be said about this in the discussion of individual chapters.

Business forms are illustrated in as realistic a form as possible under the limitations of textbook production. Examples are the invoice form (Chapter 3), the payroll register (Chapter 5), and the promissory note (Chapter 8). The forms of the accounting statement are shown in Chapter 14.

SUGGESTED TIME SCHEDULE

Three suggested time schedules are presented here, two for a one-semester course and one for a two-semester course. Each includes time for testing. Tests can be given after completing the chapter or unit. Test (quiz) questions for each chapter are presented on pages 31–61 of this manual.

One-Semester Course (3 hours weekly)

Hours	Chapter
3	1
3	2
3	3
4	4
4	5
6	6
3	7
5	8
4	9
3	10
3	11
<u>4</u>	12
45	

One-Semester Course (4 hours weekly)

Hours	Chapter
3	1
4	2
3	3
4	4
4	5
6	6
3	7
5	8
4	9
3	10
6	11
6	12
3	13
3	14
<u>3</u>	App. B
60	

Two-Semester Course (3 hours weekly)

First Semester

Hours	Chapter
5	1
4	2
4	3
4	4
6	5
7	6
7	7
<u>8</u>	8
45	

Second Semester

Hours	Chapter
8	9
8	10
8	11
7	12
5	13
5	14
<u>4</u>	App. B
45	

The suggested times should be modified according to the ability of your class. You may wish, for example, to devote far more time to Chapters 1 and 2 if you are teaching students with limited or weak arithmetic skills. In that case, you will use your own judgment as to which chapters to include and how much time to devote to each.

AN IDEAL LESSON

I have found the following procedure to be an effective way of handling a lesson.

Warmup (5 minutes)

Begin with a warmup drill. If you are presenting a new topic, place five to ten short but relevant problems on the board. If the lesson deals with FICA tax, for example, the class may be asked to multiply $.0665 \times \$100$ or $.0665 \times \$200$.

If you are handling a review lesson, assign two or three textbook or workbook problems, keeping in mind that the purpose of the warmup drill is to acclimate the student's mind for the work to follow.

Development (20 minutes)

Introduce a new topic in your own words and give examples. Try to relate it to other topics, while encouraging class discussion whenever possible. For the FICA tax lesson, talk about the history of the tax, its purposes, and the predicted future rates. Then introduce the calculation of the tax. Show calculation by manual arithmetic. (If an individual earns \$200 weekly, what is the tax? The answer is on the board from the warmup.) Then show how to use a tax table to obtain the answer, and discuss the limit on taxable earnings. Compare this to other taxes, referring to text Tables 5.1 and 5.2.

Application (20 minutes)

Provide your students with practice in class by assigning them problems from the textbook or the workbook, or make up your own. In choosing problems, seek variety in calculation and thought. Take time to circulate around the room, lending assistance where needed and determining which areas need further

discussion. Be sure that all the assigned problems are checked, either individually or with the group, before the close of the class period.

Summary (5 minutes)

Summarize the lesson's important concepts. If possible, show a summary problem. Stress the procedures that have been learned during the lesson. Concerning the FICA tax, for example, stress the importance of checking whether the individual is at the taxable limit before calculating the tax.

PRETEST ON ARITHMETIC FUNDAMENTALS

The following pretest can be given to determine the weaknesses that need intensive coverage in Chapter 1. Standardized tests are also available and can be used instead. (Consult *Tests in Print*, by Oscar Buros, a standard library reference book.) A time limit of 30 minutes is best.

PRETEST ON ARITHMETIC FUNDAMENTALS

1. Add: (3)

$$\begin{array}{r} 4.73 \\ 37.04 \\ 5.982 \\ \hline 283.6051 \end{array}$$

2. Add: (3)

$$2.61 + 3.054 + 26.19 + 406.3872$$

3. Subtract: (3)

$$\begin{array}{r} 677.25 \\ - 54.1837 \\ \hline \end{array}$$

4. Subtract: (3)

$$463.02 - 27.1821$$

5. Multiply: (3)

$$\begin{array}{r} 38.54 \\ \times .037 \\ \hline \end{array}$$

6. Multiply: (3)

$$55.77 \times .064$$

7. Divide: (3)

$$.46 \overline{)1.9366}$$

8. Divide: (3)

$$3.4675 \text{ by } .73$$

9. Add; reduce to lowest terms: (4)

$$\frac{3}{8} + \frac{4}{5} + \frac{9}{10}$$

10. Subtract; reduce to lowest terms: (4)

$$\frac{7}{9} - \frac{3}{5}$$

11. Multiply; reduce to lowest terms: (4)

$$\frac{7}{8} \times \frac{3}{7}$$

12. Divide; reduce to lowest terms: (4)

$$\frac{6}{7} \div \frac{2}{3}$$

13. Add; reduce to lowest terms: (5)

$$6\frac{1}{3} + 7\frac{2}{5} + 9\frac{1}{9}$$

14. Subtract; reduce to lowest terms: (5)

$$5\frac{5}{8} - 2\frac{7}{10}$$

15. Multiply; reduce to lowest terms: (5)

$$7 \times 6\frac{1}{5}$$

16. Multiply; reduce to lowest terms: (5)

$$5\frac{5}{9} \times 5\frac{1}{4}$$

17. Divide; reduce to lowest terms: (5)

$$8 \div 3\frac{1}{5}$$

18. Divide; reduce to lowest terms: (5)

$$4\frac{1}{5} \div 2\frac{1}{3}$$

19. Convert to fraction form: (6)

(a) 20% (b) $66\frac{2}{3}\%$ (c) $5\frac{1}{2}\%$

20. Convert to decimal form: (6)

(a) 30% (b) 5% (c) 120%

21. Convert to decimal form: (6)

(a) $\frac{3}{4}$ (b) $\frac{5}{8}$ (c) $\frac{4}{5}$

22. Convert to percent form: (6)

(a) .24 (b) .03 (c) 2.90

23. Round 5,831.749 to the nearest: (6)

(a) tenth (b) hundredth (c) hundred
(d) unit (e) thousand (f) ten

Key to the Pretest:

1. 331.3571
2. 438.2412
3. 623.0663
4. 435.8379
5. 1.42598
6. 3.56928
7. 4.21
8. 4.75
9. $2\frac{3}{40}$
10. $\frac{8}{45}$
11. $\frac{3}{8}$
12. $1\frac{2}{7}$
13. $22\frac{38}{45}$
14. $2\frac{37}{40}$
15. $43\frac{2}{5}$
16. $29\frac{1}{6}$
17. $2\frac{1}{2}$
18. $1\frac{4}{5}$
19. (a) $\frac{1}{5}$
(b) $\frac{2}{3}$
(c) $\frac{11}{200}$
20. (a) .30
(b) .05
(c) 1.20
21. (a) .75
(b) .625
(c) .80
22. (a) 24%
(b) 3%
(c) 290%
23. (a) 5,831.7
(b) 5,831.75
(c) 5,800
(d) 5,832
(e) 6,000
(f) 5,830

COMMENTS ON INDIVIDUAL CHAPTERS

A general comment is made below about each chapter, followed by a series of numbered comments about individual areas or problems in the chapter that should be stressed or interpreted.

UNIT 1

Begin the course with the necessary material from Unit 1. After completing this unit, you can either go directly to Unit 2, which considers the trading process in business (its major profit-making function), or to Unit 3, dealing with operating expenses. Some teachers prefer to use Unit 3 after Unit 1 because much of the material is related to what the student already knows: payroll and insurance. However, following the exact order of the text does take the student through the parts of the income statement in sequence.

Chapter 1 THE BASIC SKILLS

Chapter 1 reviews the fundamental processes of addition, subtraction, multiplication, and division, as well as working with fractions, decimals, and percents. One business application—the bank reconciliation—is included. The amount of time to be devoted to this area will depend on the initial level of your class. Spend as much time on Chapter 1 as you feel is needed, keeping in mind that an inability to use the basic skills will handicap the student in the later chapters. You may wish to include Appendix A (dealing with calculators) in your coverage of the fundamentals.

1. Give the arithmetic pretest provided, or any other pretest, to determine which areas to emphasize in Chapter 1.
2. The rules for rounding stated in Chapter 1 are used throughout the text except in computing fire insurance rates (Chapter 6, to the nearest dollar) and compound interest on savings accounts (Chapter 9—cents are dropped before computing).

3. Provide mental multiplication drills, multiplying by 100, 1,000, 10,000, and other multiples of 10. Do the same with mental division by 10, etc.
4. Emphasize the need for rounding shown in Sample Problem 1 as basic to setting up a problem, especially in division, as shown in Sample Problem 6.
5. Check with local banks for variations in determining service charges on checking accounts.
6. Encourage a logical approach to solving bank reconciliation problems. Why is an item added? Why is it on the check-book side?
7. The following problem is an excellent example of a "Group B" type of simulated bank reconciliation problem and should be of interest to your sharper students.

The checkbook records of Andrew Stern show the following for February, 1982:

Balance, 2/1/82	\$2,473.06
Deposits, 2/2	306.19
2/14	295.08
2/21	311.25
2/28	501.14

Checks written:

Date	Number	Amount	Date	Number	Amount
2/3	139	\$ 68.16	2/15	151	\$ 72.50
2/3	140	9.57	2/15	152	203.40
2/3	141	10.99	2/15	153	86.35
2/4	142	205.00	2/17	154	59.00
2/5	143	6.10	2/17	155	3.50
2/6	144	19.25	2/18	156	104.75
2/6	145	30.00	2/19	157	90.00
2/6	146	5.11	2/21	158	6.15
2/8	147	52.18	2/23	159	4.85
2/12	148	6.80	2/23	160	12.60
2/13	149	66.63	2/28	161	87.70
2/15	150	11.55	2/28	162	25.10
Balance, 2/28/82		\$2,639.48			

On the bank reconciliation statement prepared last month, Stern showed a late deposit of \$275.12 made on January 31, and added it to the bank balance. He also showed as outstanding checks No. 107, for \$25.19; No. 137, for \$102.21; and No.

138, for \$46.18. All of these were subtracted from the bank balance. The bank statement received on March 3 shows a balance as of February 28 of \$2,560.98.

The statement from the bank lists the following deposits in Stern's account: \$275.12, \$306.19, \$295.08, and \$311.25. The canceled checks returned by the bank, arranged in numerical order, are as follows:

Number	Amount	Number	Amount	Number	Amount
107	\$ 25.19	145	\$30.00	154	\$ 59.00
138	46.18	146	5.11	155	3.50
139	68.16	148	6.80	156	104.75
140	9.57	149	36.63	157	90.00
141	10.99	150	11.55	158	6.15
142	205.00	151	72.50	159	4.85
143	6.10	153	86.35	160	12.60
144	19.25				

The bank deducted a service charge of \$2.95 from Stern's account. Stern's bank also deducted a \$75.00 check deposited by Stern on February 2, but returned by the bank on which it was drawn. The check was marked "Insufficient Funds." It "bounced."

Prepare a bank reconciliation statement for Stern as of February 28, 1982.

Solution:

Checkbook balance	\$2,639.48	Bank statement balance	\$2,560.98
Less: Service charge \$ 2.95		Add: Late deposit	501.14
Returned check 75.00	77.95		\$3,062.12
	\$2,561.53	Less: Outstanding checks:	
Add: Error on check 149	30.00	#137 \$102.21	
		147 52.18	
		152 203.40	
		161 87.70	
		162 25.10	
			470.59
Adjusted balance	\$2,591.53	Available balance	\$2,591.53

- Stress the need for the conversion of numbers from one form to another. Why, for example, multiply by $.33\frac{1}{3}$ when you can use the fraction $\frac{1}{3}$ instead?
- Point out the advantages of Table 1.2 in converting fractions, decimals, and percents. Many students overlook this table's qualities.
- Chapter 1 has only one set of end-of-chapter problems since the entire chapter is basic.

11. Your students may come to you with a “new math” background. They have learned that addition and multiplication are binary operations with certain properties. These properties may be simply stated as follows:

- (a) *The commutative property of addition:* The order in which numbers are added does not matter:

$$x + y = y + x$$

$$3 + 4 = 4 + 3$$

- (b) *The associative property of addition:* In the addition of x , y , and z , any one may be added to the sum of the other two.

$$(x + y) + z = x + (y + z)$$

$$(2 + 3) + 4 = 2 + (3 + 4)$$

To add 6, 7, and 3, you can say

$$6 + (7 + 3) = 6 + 10 = 16$$

using the grouping of 10 to speed your addition, rather than saying

$$6 + 7 = 13; 13 + 3 = 16$$

- (c) *The commutative property of multiplication:* Either number in a multiplication can be written first.

$$x \times y = y \times x$$

$$4 \times 3 = 3 \times 4$$

- (d) *The associative property of multiplication:* The product of three numbers is one of the numbers times the product of the other two.

$$(x \times y)z = x(y \times z)$$

$$(2 \times 3)4 = 2(3 \times 4)$$

This may simplify work with fractions. For example, to find the product of $3 \times 4 \times \frac{1}{4}$, use $3(4 \times \frac{1}{4}) = 3 \times 1 = 3$.

Some other useful principles are:

- (e) Given the two numbers b and c and an unknown number a such that

$$a \times b = c,$$

$$\text{then } a = \frac{c}{b}$$

$$\text{If } 3 \times 4 = 12, \text{ then } 3 = \frac{12}{4}.$$

$$\text{Or: if } 6 \times y = 42, \text{ then } y = \frac{42}{6} = 7.$$

- (f) *The equal fractions principle:* If two fractions are equal, the cross products of the numerators and denominators are equal.

That is,

$$\text{if } \frac{a}{b} = \frac{c}{d}, \text{ then } a \times d = b \times c$$

For example, to solve for n , when $\frac{n}{10} = \frac{2}{5}$,

the procedure is:

$$(1) \quad n \times 5 = 10 \times 2 \quad (\text{equal fractions principle})$$

$$(2) \quad n \times 5 = 20 \quad (\text{multiply})$$

$$(3) \quad n = \frac{20}{5} \quad (\text{if } a \times b = c, \text{ then } a = \frac{c}{b})$$

$$(4) \quad n = 4 \quad (\text{divide})$$

The principles shown above are extremely useful in solving base, rate, and percentage problems. Application to B, R, and P will be found in the discussion of Chapter 2.

Chapter 2 BASE, RATE, AND PERCENTAGE

Chapter 2 presents methods and formulas for determining base, rate, or percentage. The procedures are so common in later chapters that it is essential to learn them well at the beginning of the course.