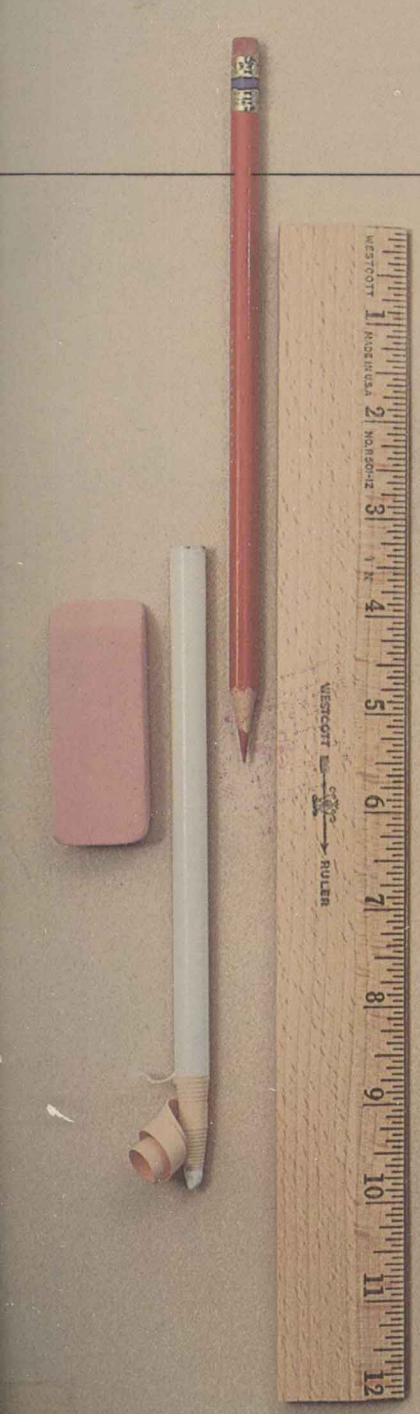
Jeffrey Slater

Practical Business Math Procedures

Scrapbook



Daily Percentage Leaders Of NYSE-Listed Issues

The following list shows the New York Stock Exchange-listed stocks and warrants that sell for more than $1 that have gone up the most and down the most based on the percent of change regardless of volume for Thursday. Rights are excluded. Net and percentage changes are the difference between the previous closing price and yesterday's last price.

UPS

Name	Sales(hds)	High	Low	Last	Chg	Pct.
1 Tonka Corp	63	13⅞	12½	13¾	+ 1½	Up 12.2
2 RollinsEnv	21	5	5	5¼	+ ¼	Up 9.4
3 InexcoOil	435	10¼	9⅛	10¼	+ ⅞	Up 9.3
4 PureAtlnt	2196	30¼	27⅝	30	+ 2½	Up 9.1
5 GIANPac	2092	8	7½	8	+ ⅝	Up 8.5
6 SFN Cos	68	20½	19½	20½	+ 1½	Up 7.9
7 AlmadnNE	135	8⅞	8½	8¾	+ ⅝	Up 7.6
8 IndlNt 2.75pf	1	16¼	16¼	16¼	+ 1¼	Up 7.4
9 Holly Sup	183	34½	32½	34¼	+ 2⅜	Up 7.3
10 Transcn Inc	43	3¼	3¼	3¼	+ ⅛	Up 7.1

DOWNS

1 Pengonl	2926	3¼	2¾	2¾	- ⅜	Off 16.8
2 Vendo Co	292	6¼	5¼	5¼	- ⅞	Off 9.4
3 E&L wtO	46	2¾	2¼	2¾	- ⅛	Off 9.1
4 Cook Unit	182	4¼	3¾	3¾	- ⅛	Off 8.1
5 GCA Corp s	1929	14	12½	13	- 1¼	Off 8.8
6 Measurex	254	14	13	13	- 1¼	Off 8.8
7 Nat Stand	125	9¾	8	9	- ¾	Off 8.6
8 Banquet B	252	4¾	4¼	4¾	- ⅜	Off 8.3
9 LTV Cp pfI	3	11½	11	11	- 1	Off 8.3
10 HandyHar	34	14⅛	13⅛	13⅛	- 1	Off 7.1

Average 15% Rate Boost On Some Car Insurance Cleared by New Jersey

By a Wall Street Journal Staff Reporter

TRENTON—New Jersey Insurance Commissioner Joseph F. Murphy approved automobile-insurance rate increases averaging 15% for owners of one million cars.

The rate increases may help ease tension between the state's auto insurance industry and state regulators. Since 1978, eight automobile insurers have stopped doing business in the state, complaining of inadequate rates. Last February, a controversial insurance commissioner, James Sheeran, was succeeded by Mr. Murphy.

The increase in auto rates doesn't affect owners of 1.4 million cars in New Jersey's assigned-risk plan, which currently covers about 40% of the state's drivers. The increase is expected to generate $78 million in additional premiums.

In addition, the insurance department granted an average auto-rate increase of 18.5% to Prudential Property and Casualty Co., a unit of Prudential Insurance Co. of America. The Prudential unit recently curtailed writing new auto business in New Jersey and some other states because of losses.

Ti-Caro Profit Fell 26% On 3.7% Sales Decrease In Fiscal Third Quarter

By a Wall Street Journal Staff Reporter

GASTONIA, N.C.—Ti-Caro Inc. said earnings in the fiscal third quarter, ended July 3, dropped 26% to $3.5 million, or 63 cents a share, from $4.7 million, or 86 cents a share, a year earlier. Sales decreased 3.7% to $67.2 million from $69.8 million.

The maker of yarns and sewing threads said nine-month earnings dropped 22% to $10 million, or $1.83 a share, from $13 million, or $2.37 a share. Sales were off 2.4%, slipping to $196.2 million from $201 million.

"Comparing the best year in the company's history, 1981, with a recession-plagued year, 1982, is like comparing apples with oranges," said James H. Martin Jr., president and chief executive officer. He noted that keen competition and rising costs resulted in soft prices and narrow profit margins for the company.

"Our fourth quarter, which ends Oct. 2, holds little promise of improvement," said Mr. Martin. "The income tax cut and the increase in Social Security benefits put several billion dollars into the hands of consumers. But it is too early to tell how much of this will be spent and how much will be saved or used to reduce debt."

He added, "Cash flow remains strong enough to permit us to continue our capital expenditure program. We also are looking into a broader participation in the export market, and we are optimistic about the growth potential in this area."

Salomon Brothers Loses Big Bid by 30 Seconds

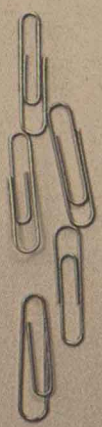
By a Wall Street Journal Staff Reporter

NEW YORK—What a difference a half minute makes.

A group led by Salomon Brothers Inc. submitted the best bid for $200 million of revenue bonds auctioned by the California Department of Water Resources. But the bid was about 30 seconds late and the bonds instead were awarded to the runner-up team led by Merrill Lynch White Weld Capital Markets Group.

A spokesman for Salomon Brothers said the company simply couldn't get the calculations done in time to meet the deadline. "The computer run took longer than expected," he explained, adding: "Those things happen." The Salomon bid would have produced an effective interest cost of 12.29% on the California bonds, compared with 12.81% on the bid submitted by Merrill Lynch.

The big, double-A-rated issue sold briskly after it was reoffered by the Merrill group at yields ranging from 9% in 1985 to 12.78% in 2002. By some estimates, less than $2.5 million of the issue remained in underwriters' hands late yesterday.



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Practical Business Math Procedures

Dedicated to my family

Shelley
Rusty
Abby

—With love

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Note to students

Structure of *Practical Business Math Procedures:* The student support system

Chapters

21 chapters, broken up into 60 learning units

Objectives and vocabulary are presented at the beginning of each chapter. Page references are provided.

Mini quizzes

Self quizzes at the end of each unit, with solutions within each chapter

Your professor has a complete *backup set* of the mini (self) quizzes if additional practice is desired.

Problems

Complete sets of both drill and word problems at the end of each chapter

Appendix 5 at the end of the text has solutions to even-numbered problems.

Business math scrapbook

A special page following the problems in each chapter provides the student with real-world projects showing business math in action

Most of these articles and news items have come from *The Wall Street Journal,* and others are from leading corporations.

Summary practice tests

Sample tests that review each chapter

Your professor has the solutions for all summary practice tests.

In the Appendixes, be sure to look at:

Business math organizer

Outlines of each chapter with key points and formulas along with worked-out examples

Metric system

A simple introduction to understanding the metric system

Basic business statistics and graphical presentations

Basic calculations of mean, median, mode, etc., plus examples of graphs

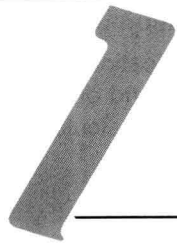
Glossary

An alphabetical list of all key terms used in the text

Solutions to even-numbered problems

Answers to drill and word problems

Contents



Review of basic computational skills

With total doubt
I have an electric calculator
With which I can swiftly add,
And this should save me a
lot of time
But doesn't, which makes me
sad.
You see, every time when
I've added up
A column of figures long
I add them again, the old-
fashioned way,
In case the machine is wrong.
Richard Armour

On completion of this chapter you should be able to:

LU 1: The decision-making process

1. Explain the role of business math in the decision-making process. (2)
2. Convert written numbers into verbal form. (3)
3. Write numbers from verbal form. (3)
4. Identify digits to be rounded. (4)
5. Round whole numbers to indicated position (tens, hundreds, thousands, and so on.) (4)

LU 2: Whole numbers—Addition and subtraction

1. Develop speed and accuracy. (5)
2. Add columns by grouping of tens. (5)
3. Prove addition and subtraction computations. (6–7)
4. Estimate addition and subtraction computations. (6–7)

5. Compare and contrast "common sense" with the process of estimating. (6)
6. Complete horizontal addition and subtraction. (6–7)

LU 3: Whole numbers—Multiplication and division

1. Explain the relationship of multiplication to addition. (8)
2. Estimate and prove multiplication and division calculations. (8–11)
3. Complete multiplication and division calculations by shortcut methods (zero, 25, 50). (9–11)
4. Complete short division. (10)
5. Complete long division. (10–11)

Vocabulary preview and drill

Here are the key terms that will be found in the chapter. If you feel *on completion of the chapter* that you know the term, place a $\surd$ within the parentheses following the term. If you are not absolutely certain of the definition, look it up and place the page number where it can be found in the text. At the bottom of the page are page references to the terms. There is also a complete glossary at the end of the text.

1. Addend ( )
2. Difference ( )
3. Digit ( )
4. Dividend ( )
5. Divisor ( )
6. Minuend ( )
7. Multiplicand ( )
8. Multiplier ( )
9. Place value ( )
10. Product ( )
11. Quotient ( )
12. Rounding whole numbers ( )
13. Subtrahend ( )
14. Sum ( )
15. Whole number ( )

LEARNING UNIT 1: THE DECISION-MAKING PROCESS

The bottom line

Bill: Let's be honest, do I really need to take this business math course? I know how to add and subtract. I don't want to waste my time.

Sue: [Former business math student] Business math is more than knowing basic math skills. This course will help you in your everyday life, be it for personal or business reasons.

Bill: Stop with the theory—show me the bottom line.

Sue: Practical business math procedures will aid you in making key decisions. For example, in your personal life the course will help you analyze:

1. If you are getting the most for the buck at the supermarket.
2. If you are minimizing energy costs.
3. If you really understand your home, car, and life insurance policies.
4. How the APR (annual percentage rate) is calculated when financing a new car.
5. The cost of not taking advantage of discounts.
6. How to plan for the future, should you invest in stocks, bonds, real estate, and the like, along with tax implications.

Page references:

1. **5**
2. **7**
3. **4**
4. **10**
5. **10**
6. **7**
7. **8**
8. **8**
9. **3**
10. **8**
11. **10**
12. **4**
13. **7**
14. **5**
15. **3**

Bill: Let's say I get a job as a manager in a retail business. What possibly could this course offer me?

Sue: Remember, Bill, nothing is cast in concrete (except your opinion) but here goes. The following are some areas which the business math course addresses:

1. Calculating markups, and markdowns.
2. Is inventory moving like it should?
3. Is payroll too high as a percent of sales?
4. What is the percent of advertising expenses to sales?
5. Is the floor space being utilized to maximize profit and minimize expenses?
6. Are trade as well as cash discounts from suppliers being taken?
7. Is there enough business insurance?
8. Are we complying with the Truth in Lending Act?
9. What is the required inventory level?
10. Handling credit cards and revolving charge cards.
11. Reading and interpreting financial reports.
12. Being aware of tax consequences.
13. Setting budgets and monitoring performance.
14. Keeping assets as liquid as possible while attempting to maximize your return.

Keep in mind these are only some of the topics you may be studying. To be good at these applications don't forget how important are the basic math fundamentals.

Bill: OK, I'll give it a shot.

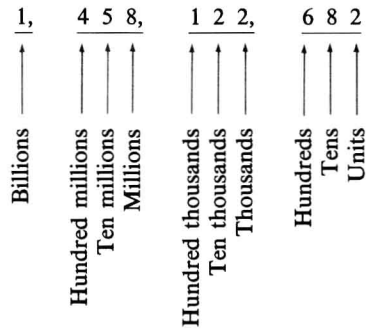
Bill attended the following lecture.

The writing of numbers

The key to this course is not taking anything for granted. For example, let's look at the number 1,425. Using our decimal number system, 1,425 is in actuality:

$$1{,}425 = (1 \times 1{,}000) + (4 \times 100) + (2 \times 10) + (5 \times 1)$$

This is true because our number system has positions of units, tens, hundreds, thousands, and so on. Let's look at how the number one billion, four hundred fifty-eight million, one hundred twenty-two thousand, six hundred eighty-two is written.



Note how each number is positioned (the commas help separate from right to left every three digits). When we read (or write in verbal) this number we do not use the word *and.* This is used for the decimal point presented later in the course. Also, any numbers written between twenty-one to ninety-nine are hyphenated. For example, the number 4,959 in verbal is written as four thousand, nine hundred fifty-nine.

As we work with numbers and try to estimate results, the process of *rounding* can be a great tool to verify actual calculations. Let's look at the rounding-off process, keeping in mind this process of rounding tries to *approximate* the actual answer.

Rounding off whole numbers

Example. Let's round off 46,725 to the nearest thousand.

The rule.

> **Steps:**
> 1. Identify the digit to be rounded.
> 2. If digit to right of place identified in Step (1) is 5 or more, increase identified digit by one. (If not, identified digit is not changed.)
> 3. Change all of the digits to the right of the identified digit to zero.

Step 1. 46,725 — Identified digit—6

Step 2. 7 is 5 or more; thus 6, the identified digit (Step 1), is now rounded to a 7.

47,725

Step 3. 47,000 — Change the 725 to zeros, since these are the digits to the right of the number rounded off.

Thus 46,725 rounds to 47,000 to the nearest thousand.[1]

Example. Let's look at 8,245 rounded to the nearest thousand.

8,245

Step 1. Identified digit—8

Step 2. Digit to right of 8 is *not* 5 or more; thus identified digit is *not* changed. We only change if digit to right is five or more.

Step 3. 8,000 — Change the 245 to zeros.

In this case we are rounding *all the way.* This means, of course, that we have only one non-zero digit left. By rounding all the way our estimate is not as exact. For example, 4,895 rounded all the way is 5,000. Remember, rounding to a specific digit depends on what degree of accuracy you seek in your estimate.

The Wall Street Journal

"Sure, I can explain the 'D' in Math: the batteries in my calculator went dead."

LU 1 mini quiz: The decision-making process

At the end of each unit you will get a chance to check your progress. If you are having difficulties, these mini quizzes will help identify your area of weakness. It is suggested you work out these problems on scrap paper and check your answers with the solutions for each mini quiz.

[1] If rounded to nearest ten, 46,725 would be 46,730.
If rounded to nearest hundred, 46,725 would be 46,700.

Write in verbal form the following numbers:

1. 8,254

2. 18,558

3. 225,116,082

4. 5,000,001

Round off as indicated:

	Nearest ten	*Nearest hundred*	*Nearest thousand*
5.	32	**8.** 372	**11.** 8,950
6.	81	**9.** 435	**12.** 9,100
7.	89	**10.** 786	**13.** 8,498

(Solution to mini quiz on page 13.)

LEARNING UNIT 2: WHOLE NUMBERS—ADDITION AND SUBTRACTION

In today's fast-moving business world there is a need for speed and accuracy in the adding and subtracting of numbers. Too often these "easy calculations" can cause hours of frustration while locating errors.

Addition

A quick method of adding is by group or groups of 10s. This method is used by many accountants.

Groups of 10s:	2_8	8_2	3_7	7_3	5_5	4_6	6_4	1_9	9_1
Various combinations:	1	2	2	5	3	4	3	2	
	1	7	3	4	3	4	2	2	
	8	1	5	1	4	2	5	6	

Example.

8 → 10 (with 2)
7 → 10 (with 3)
3 → 10 (with 4)
3

Addend (numbers added) 30 Total (sum)

Example.

6 → 9 (with 3)
8 → 10 (with 2)
9 → 14 (with 5)
6 → 10 (with 4)
43

19
33
43

The Wall Street Journal

"What big financial deal? . . . They're figuring out how many calories they had for lunch!"

This is not an exact science, but the key is to speed up the adding process. Don't forget, adding is done *top to bottom.* Note how the grouping of 10s takes place.

Let's quickly look at the adding process and how it is proved.

Add and prove:

Example.

Carrying
(1)

```
 2 21
 1,524
 3,681
 2,952
 8,132
 6,544
------
22,833
```

Proof:
(2)

```
 1,524
 3,681
 2,952
 8,132
 6,544
------
    13
    22
    26
    20
------
22,833
```

Insight: Another method when adding long columns is to divide the columns into two parts, obtain a subtotal for each part, and add subtotals for the grand total.

The calculation (1) Add top to bottom, with carrying of numbers, and prove by adding bottom to top. Don't forget to line up digits carefully and add units, tens, hundreds, and so on.

The proof (2) Add each column as one separate total, then combine.

Using rounding all the way to estimate addition Remember, common sense is your best tool. For example, we estimate the following by rounding all the way and then do the actual calculation to see how close we are. (Keep in mind, rounding all the way gives us only an estimate of what the total should be.) It is the estimating that verifies that we are in the ball park.

Example.

```
 1,524 ------------> 2,000
 3,681               4,000
 2,952               3,000
 8,132               8,000
 6,544               7,000
                    ------
                    24,000
```

Rounding all the way
1 non-zero digit.

Actual calculation:
22,833

Horizontal addition

A payroll clerk may have to add numbers horizontally as well as vertically to verify payrolls. The key is to be sure that the total of the columns equals the total of the rows. The use of this adding eliminates the need to rewrite the numbers vertically, and this saves time and recopying errors.

Example.

$$\begin{array}{rrrr} 10+ & 40+ & 70= & 120 \\ 20+ & 50+ & 80= & 150 \\ \underline{30}+ & \underline{60}+ & \underline{90}= & \underline{180} \\ 60 & 150 & 240 & 450 \end{array}$$

(Note: $60 + 150 + 240 = 450$ and $120 + 150 + 180 = 450$.)

As in typing, practice will indeed increase your speed and accuracy. Now let's look briefly at subtraction, which is the reverse of addition.

Subtraction

Example.

$8,\overset{8\,(11)}{\not{9}}16$ ← Minuend (the larger number)	Proof:	3,251
3,251 ← Subtrahend		+ 5,665
5,665 ← Difference		8,916

(Borrowing 10, 10 + 1 = 11)

Starting right to left, note that the 5 of the subtrahend cannot be subtracted from 1. Thus the 9 becomes an 8 and 10 is added to the 1 to become 11. Proving subtraction requires adding the difference (5,665) to the subtrahend (3,251) to arrive at the minuend (8,916). Once again, rounding and estimating could be utilized. Later we will see how important subtraction is in keeping your checkbook in balance (Chapter 4).

Horizontal subtraction

As we have seen in horizontal addition, the same procedure could be used in horizontal subtraction.

Example.

150 − 20 = 130
120 − 10 = 110
80 − 10 = 70
75 − 35 = 40
425   75   350

Now the total of the first column, 425, less the total of the second column, 75, does indeed equal the sum of the individual differences, 350.

Now let's check your progress.

LU 2 mini quiz: Whole numbers—Addition and subtraction

Add by grouping of 10s:

1.
9
1
7
3
6
7

Add and prove by totalling each separate column:

2.
1,424
1,382
9,999
1,854

Add, as well as estimate, answer by rounding all the way:

3.
1,095
2,854
3,791
2,888

Subtract and prove:

4.
$$\begin{array}{r} 7{,}915 \\ -2{,}956 \\ \hline \end{array}$$

Complete:

5.
$$\begin{array}{rl} 150 - 30 = & \_\_\_\_\_ \\ 180 - 40 = & \_\_\_\_\_ \\ 2{,}555 - 18 = & \_\_\_\_\_ \\ 122 - 15 = & \_\_\_\_\_ \\ \hline \quad = & \_\_\_\_\_ \end{array}$$

(Solution to mini quiz on p. 13.)

LEARNING UNIT 3: WHOLE NUMBERS—MULTIPLICATION AND DIVISION

Multiplication—Shortcut to addition

A shortcut to addition is multiplication. For example:

$$9 \times 7 = 63 \text{ or } 7+7+7+7+7+7+7+7+7 = 63$$

The Wall Street Journal

"Dad, what was nine times seven in your day?"

In the example (below), note the positioning of 2075. This is the result of 415 really being multiplied by 50 (the 5 is in the tens position).

Example.

415 ← Top number (multiplicand)
52 ← Bottom number (multiplier)

830	$2 \times 415 = 830$
2075 (product)	$50 \times 415 = 20{,}750$
21,580	21,580

(Note same result whichever way it is done.)

Estimating and proving

The multiplication process can be proved by reversing the multiplicand and multiplier and then multiplied. Let's estimate 52×415 by rounding all the way. Remember, if we didn't round all the way, our estimate would have been closer.

Example.

52 →	50
× 415 →	× 400
260	20,000
52	
208	
21,580	

If we are using a calculator, this quick estimate aids us in verifying the calculator's answer.[2] Our "commonsense estimate" tells us our answer is near 20,000—not 2,000 or 200,000.

[2] The use of the calculator is shown on the inside cover of your text. Check with your instructor for specific guidelines on the role of the calculator in your class.