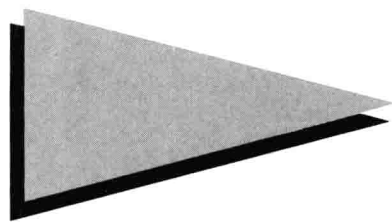


# BASIC BUSINESS MATH



**ROBERT L. DANSBY**



# **BASIC BUSINESS MATH**

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**DEDICATION**

This book is dedicated to my wife, Barbara; and to my son, Champ—for without them, no project would be meaningful.

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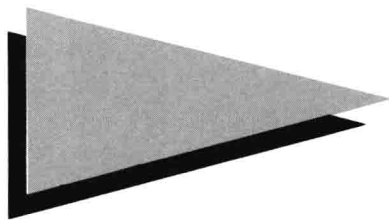
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# Preface

---

We live in a fast-moving, rapidly changing world. Skills in basic business mathematics are needed to enable you to begin your career and move up in that career. According to the latest research, the average professional person (bookkeeper, accountant, office worker, manager, etc.) will change positions at least six times during a working career. Many of these changes will take place because individuals will have the educational and occupational skills needed to keep moving up the success ladder.

*Basic Business Math* is designed to give you the basic math skills needed to enter the work force. It is a very user-friendly text that is aimed at the following objectives:

1. Thoroughly reviewing the fundamental operations of arithmetic: whole numbers (addition, subtraction, multiplication, and division), fractions, decimals, and percents
2. Developing the student's ability to apply the basic math skills to common business situations
3. Developing the student's ability to solve common business problems involving discounts, payroll, interest, markup, and banking
4. Developing the student's ability to use shortcuts and work mentally with speed and accuracy

*Basic Business Math* has been designed to allow you to work on an individual basis or receive instruction in the traditional classroom setting. It teaches by introducing concepts, supported by examples, and immediate feedback. Text matter and problems move from easy to more challenging.

Study your business math concepts well. You will be gaining skills that will benefit you throughout your entire working career as well as in your personal life.

## ACKNOWLEDGMENTS

I would like to express my sincere thanks to my many academic colleagues who offered many excellent suggestions and recommen-

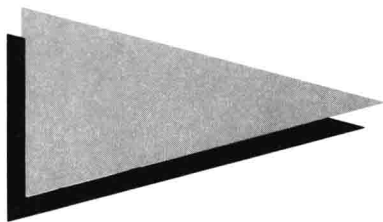
ditions during the review process of this book and its supplements. This project would not have been possible without their expert assistance. Their time, experience, and expertise are greatly appreciated.

|                       |  |
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Finally, I would like to recognize the significant contribution of my good friend and professional colleague, Dennis McCollum. Dennis read every page of the manuscript and checked every answer in the book. His professional help and moral support are immensely appreciated.



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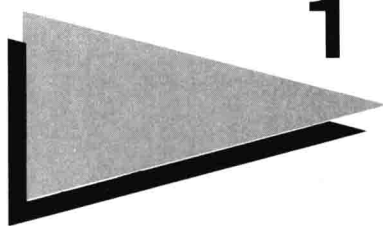
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# UNIT 1



## Reading and Writing Whole Numbers

A **whole number** is a number that we use for counting and numbering. We use these ten symbols, called **digits**, to represent whole numbers:

0, 1, 2, 3, 4, 5, 6, 7, 8, and 9

Using these ten digits, we can express any number, large or small. Numbers above the ten basic digits are formed by using combinations of the ten basic digits. The number “10,” for example, is formed by using a combination of the first two digits.

### THE PLACE VALUE SYSTEM

We can determine the value of each digit in a number by looking at its **place**, or its location, in the number. Thus, each digit in a number has a **place value**. To illustrate place value, let’s look at the figure, which shows the number “5” in three different *places*.

| Billions |      |      | Millions |      |      | Thousands |      |      | Hundreds |      |      |           |
|----------|------|------|----------|------|------|-----------|------|------|----------|------|------|-----------|
| Hundreds | Tens | Ones | Hundreds | Tens | Ones | Hundreds  | Tens | Ones | Hundreds | Tens | Ones |           |
|          |      |      |          |      |      |           |      |      |          |      | 5    | Example A |
|          |      |      |          |      |      |           |      |      |          | 5    | 0    | Example B |
|          |      |      |          |      |      |           |      | 5    | 0        | 0    |      | Example C |

The first 5 (Example A) is in the *ones* place; therefore, it has a value of 5 ones. The second 5

(Example B) is in the *tens* place. So, it has a value of 5 tens and no ones, and is written as 50. The third 5 (Example C) is in the *hundreds* place; so, it has a value of 5 hundreds, no tens, and no ones, and is written as 500. Notice that each place has a value that is worth ten times the value of the place to its right.

The place value system lets us write numbers in a very compact way. For example, the number 256 is actually:

| Billions |      |      | Millions |      |      | Thousands |      |      | Hundreds |      |      |
|----------|------|------|----------|------|------|-----------|------|------|----------|------|------|
| Hundreds | Tens | Ones | Hundreds | Tens | Ones | Hundreds  | Tens | Ones | Hundreds | Tens | Ones |
|          |      |      |          |      |      |           |      |      | 2        | 5    | 6    |

|       |              |   |
|-------|--------------|---|
| 200   | (2 hundreds) | ← |
| + 50  | (5 tens)     | ← |
| + 6   | (6 ones)     | ← |
| <hr/> |              |   |
| 256   |              |   |

The number “256” is read as “two hundred fifty-six” and is the sum of its place values.

### READING LARGER NUMBERS

Using the place value system makes it much easier to express and read large numbers. For example, let’s look at the figure, which shows the number 1,216,566 with its place values labeled.



| Billions |      |      | Millions |      |      | Thousands |      |      | Hundreds |      |      |
|----------|------|------|----------|------|------|-----------|------|------|----------|------|------|
| Hundreds | Tens | Ones | Hundreds | Tens | Ones | Hundreds  | Tens | Ones | Hundreds | Tens | Ones |
|          |      |      |          |      | 1    | 2         | 1    | 6    | 5        | 6    | 6    |

We read this number as **one million, two hundred sixteen thousand, five hundred sixty-six.**

To make the number easier to read, commas are used to separate the digits into groups of three. Each group of three digits (except the ones group) is read by saying the three-digit number followed by the name of the group it belongs to. Let's look at some other examples.

**EXAMPLE 1:** Read the number 12,318,412 out loud.

**Solution:**

| Billions |      |      | Millions |      |      | Thousands |      |      | Hundreds |      |      |
|----------|------|------|----------|------|------|-----------|------|------|----------|------|------|
| Hundreds | Tens | Ones | Hundreds | Tens | Ones | Hundreds  | Tens | Ones | Hundreds | Tens | Ones |
|          |      |      | 1        | 2    | 3    | 1         | 8    | 4    | 1        | 2    |      |

**twelve million, three hundred eighteen thousand, four hundred twelve**

**EXAMPLE 2:** Read the number 10,615,258,016 out loud.

**Solution:**

| Billions |      |      | Millions |      |      | Thousands |      |      | Hundreds |      |      |
|----------|------|------|----------|------|------|-----------|------|------|----------|------|------|
| Hundreds | Tens | Ones | Hundreds | Tens | Ones | Hundreds  | Tens | Ones | Hundreds | Tens | Ones |
| 1        | 0    | 6    | 1        | 5    | 2    | 5         | 8    | 0    | 1        | 6    |      |

**ten billion, six hundred fifteen million, two hundred fifty-eight thousand, sixteen**

**EXAMPLE 3:** Read the number 210,344,865,008 out loud.

**Solution:**

| Billions |      |      | Millions |      |      | Thousands |      |      | Hundreds |      |      |
|----------|------|------|----------|------|------|-----------|------|------|----------|------|------|
| Hundreds | Tens | Ones | Hundreds | Tens | Ones | Hundreds  | Tens | Ones | Hundreds | Tens | Ones |
| 2        | 1    | 0    | 3        | 4    | 4    | 8         | 6    | 5    | 0        | 0    | 8    |

**two hundred ten billion, three hundred forty-four million, eight hundred sixty-five thousand, eight**

In reading the number in the last example, notice that zeros are not read. This is because a zero means "no value." Thus, the number 500 means: no ones, no tens, and five hundreds. In the same way, the number 3,008 means: eight ones, no tens, no hundreds, and three thousands.

Also notice that we did not use the word "and" when reading any of the whole numbers in our examples. To take another example, the number "375" is read as "three hundred seventy-five," *not* as "three hundred and seventy-five." You only use "and" to show that a whole number also has a partial unit; we will talk about this in a later unit.

## EXPRESSING WHOLE NUMBERS AS DOLLARS

To express a number in dollars, you write the dollar sign to the left of the number. Thus, "fifty dollars" is written as \$50. To give another example, "four thousand, five hundred forty dollars" is written as \$4,540.

# UNIT 1 Exercises

Write the place value of the underlined digit.

- |                  |                         |
|------------------|-------------------------|
| 1. <u>5</u> 66   | 6. <u>2</u> 3,498       |
| 2. <u>2</u> 87   | 7. <u>4</u> 4,593       |
| 3. <u>8</u> 92   | 8. <u>1</u> 25,986      |
| 4. <u>1</u> ,975 | 9. <u>3</u> 45,687      |
| 5. <u>4</u> ,587 | 10. 15,67 <u>7</u> ,890 |

**ANSWERS**

1. \_\_\_\_\_
2. \_\_\_\_\_
3. \_\_\_\_\_
4. \_\_\_\_\_
5. \_\_\_\_\_
6. \_\_\_\_\_
7. \_\_\_\_\_
8. \_\_\_\_\_
9. \_\_\_\_\_
10. \_\_\_\_\_

Write these numbers.

|     | Billions |      |      | Millions |      |      | Thousands |      |      | Hundreds |      |      |
|-----|----------|------|------|----------|------|------|-----------|------|------|----------|------|------|
|     | Hundreds | Tens | Ones | Hundreds | Tens | Ones | Hundreds  | Tens | Ones | Hundreds | Tens | Ones |
| 11. |          |      |      |          |      |      | 2         | 2    | 8    | 1        | 5    |      |
| 12. |          |      |      | 3        | 8    | 0    | 1         | 6    | 7    | 7        | 2    |      |
| 13. |          |      | 5    | 6        | 7    | 9    | 4         | 3    | 8    | 2        | 9    | 9    |
| 14. | 5        | 4    | 5    | 8        | 9    | 6    | 3         | 7    | 5    | 0        | 0    | 0    |
| 15. |          |      |      | 1        | 0    | 0    | 3         | 1    | 8    | 0        | 1    | 7    |
| 16. |          |      |      |          |      |      | 9         | 9    | 0    | 0        | 0    | 0    |

Write these numbers in words.

17. 76 \_\_\_\_\_
18. 235 \_\_\_\_\_
19. 2,398 \_\_\_\_\_
20. 12,398 \_\_\_\_\_

21. 123,498 \_\_\_\_\_

22. 1,284,598 \_\_\_\_\_

\*23. 34,598,165 \_\_\_\_\_

\*24. 125,385,387 \_\_\_\_\_

\*25. 33,325,385,398 \_\_\_\_\_

Write these numbers in digits.

26. seventy-five

27. forty-eight

28. Two hundred ninety-nine

29. Eight hundred four

30. Fifteen thousand, three hundred three

31. One hundred two thousand, thirty-nine

32. Six million, four hundred two thousand

**ANSWERS**

26. \_\_\_\_\_

27. \_\_\_\_\_

28. \_\_\_\_\_

29. \_\_\_\_\_

30. \_\_\_\_\_

31. \_\_\_\_\_

32. \_\_\_\_\_



# UNIT 2

## Rounding Off Whole Numbers

Astronomers tell us that the sun is 93,000,000 miles from earth. Does this mean that the distance has been exactly measured and the sun is precisely 93,000,000 miles away? Or does it mean that, by using mathematical formulas, astronomers have calculated that the sun is around 93,000,000 miles away and this figure is rounded to even millions to make it easier to work with and to remember?

Actually, the sun is *around* 93,000,000 miles from earth, not *exactly* 93,000,000 miles. There are many times when numbers are rounded to make them easier to use. For example, the population of New York City is often said to be 8,000,000 people. At a given time, however, the actual population could be a little over 8,000,000 or a little under 8,000,000. What if it were, say, 8,124,512? This number would be hard to remember. So, it is simply rounded to an even 8,000,000.

To “round off” a number means to use an approximate value instead of the exact value. To round off a number, follow these steps:

Step 1: Locate the place that you want to round the number to.

Step 2: Look at the digit to the immediate *right* of the digit you want to round:

If the digit to the right of the place being rounded is 5 (or more), add 1 to the place being rounded.

If the digit to the right of the place being rounded is less than 5, do not change the digit in the place being rounded.

Step 3: Drop all digits after the place being rounded and replace them with zeros.

**EXAMPLE 1:** Round 485 to the nearest ten

**Solution:**

Step 1: 485

Locate the tens place.

Step 2: 485

Look at the digit to the right of the tens place. Since this digit is 5, the digit in the tens place, 8, is increased by 1:  $8 + 1 = 9$ .

↓  
495

Step 3: 495

Change the digit after the tens place to zero.

↓  
490

**Rounded answer = 490**

**EXAMPLE 2:** Round 77,242 to the nearest thousand

**Solution:**

Step 1: 77,241

Locate the thousands place.

Step 2: 77,241

The digit to the right of the thousands place is 2, which is less than 5; do not change the digit in the thousands place.

Step 3: 77,241

Change all digits after the rounding place to zero.

↓↓↓  
77,000

**Rounded answer = 77,000**

It is important to remember that **when rounding, you only look at two digits: the place being rounded and the place to its right; do not look at any other digit.**

Now, before we start the exercises, let's look at a few more examples.

**EXAMPLES:**

$$788 \text{ rounded to the nearest ten} = 790$$

$$7,455 \text{ rounded to the nearest hundred} = 7,500$$

$$12,898 \text{ rounded to the nearest thousand} = 13,000$$

$$255,790 \text{ rounded to the nearest ten-thousand} = 260,000$$

$$397,800 \text{ rounded to the nearest hundred-thousand} = 400,000$$

$$1,897,476 \text{ rounded to the nearest million} = 2,000,000$$



## ▶ UNIT 2 Exercises

Round these numbers to the nearest ten.

### ANSWERS

- |          |            |
|----------|------------|
| 1. 75    | 6. 9,593   |
| 2. 874   | 7. 12,356  |
| 3. 999   | 8. 15,837  |
| 4. 899   | 9. 25,925  |
| 5. 3,456 | 10. 33,121 |

1. \_\_\_\_\_
2. \_\_\_\_\_
3. \_\_\_\_\_
4. \_\_\_\_\_
5. \_\_\_\_\_
6. \_\_\_\_\_
7. \_\_\_\_\_
8. \_\_\_\_\_
9. \_\_\_\_\_

Round these numbers to the nearest hundred.

- |           |            |
|-----------|------------|
| 11. 678   | 16. 4,610  |
| 12. 234   | 17. 12,875 |
| 13. 1,565 | 18. 17,008 |
| 14. 1,843 | 19. 21,081 |
| 15. 2,877 | 20. 34,571 |

10. \_\_\_\_\_
11. \_\_\_\_\_
12. \_\_\_\_\_
13. \_\_\_\_\_
14. \_\_\_\_\_
15. \_\_\_\_\_
16. \_\_\_\_\_
17. \_\_\_\_\_
18. \_\_\_\_\_
19. \_\_\_\_\_

Round these numbers to the nearest thousand.

- |           |            |
|-----------|------------|
| 21. 1,898 | 26. 21,967 |
| 22. 2,458 | 27. 45,854 |
| 23. 7,916 | 28. 67,858 |
| 24. 5,718 | 29. 91,546 |
| 25. 9,469 | 30. 77,999 |

20. \_\_\_\_\_
21. \_\_\_\_\_
22. \_\_\_\_\_
23. \_\_\_\_\_
24. \_\_\_\_\_
25. \_\_\_\_\_
26. \_\_\_\_\_
27. \_\_\_\_\_
28. \_\_\_\_\_
29. \_\_\_\_\_
30. \_\_\_\_\_

Round these numbers to the nearest ten-thousand.

31. 34,598

36. 18,387

32. 56,987

37. 48,698

33. 47,698

38. 187,487

34. 59,308

39. 287,376

35. 59,287

40. 155,985

Round these numbers to the nearest hundred-thousand.

41. 128,765

46. 705,982

42. 768,876

47. 3,409,876

43. 345,986

48. 4,986,487

44. 234,765

49. 7,856,387

45. 998,475

50. 8,265,973

Round these numbers to the nearest million.

51. 3,598,587

56. 12,398,459

52. 4,598,219

57. 24,998,765

53. 8,498,986

58. 56,985,876

54. 3,999,876

59. 55,267,985

55. 7,987,376

60. 79,999,000

**ANSWERS**

- 31. \_\_\_\_\_
- 32. \_\_\_\_\_
- 33. \_\_\_\_\_
- 34. \_\_\_\_\_
- 35. \_\_\_\_\_
- 36. \_\_\_\_\_
- 37. \_\_\_\_\_
- 38. \_\_\_\_\_
- 39. \_\_\_\_\_
- 40. \_\_\_\_\_
- 41. \_\_\_\_\_
- 42. \_\_\_\_\_
- 43. \_\_\_\_\_
- 44. \_\_\_\_\_
- 45. \_\_\_\_\_
- 46. \_\_\_\_\_
- 47. \_\_\_\_\_
- 48. \_\_\_\_\_
- 49. \_\_\_\_\_
- 50. \_\_\_\_\_
- 51. \_\_\_\_\_
- 52. \_\_\_\_\_
- 53. \_\_\_\_\_
- 54. \_\_\_\_\_
- 55. \_\_\_\_\_
- 56. \_\_\_\_\_
- 57. \_\_\_\_\_
- 58. \_\_\_\_\_
- 59. \_\_\_\_\_
- 60. \_\_\_\_\_



## ▶ UNIT 2 Applications

1. Algood Company had these sales figures for the year:

| Territory    | Sales       |
|--------------|-------------|
| North        | \$2,988,964 |
| South        | 3,499,437   |
| East         | 3,288,388   |
| West         | 4,988,876   |
| East Central | 2,388,984   |

### ANSWERS

1. \_\_\_\_\_  
 \_\_\_\_\_  
 \_\_\_\_\_  
 \_\_\_\_\_  
 \_\_\_\_\_

Round each figure to the nearest thousand dollars.

2. Below are this month's sales for Lakeside Grocery. Round each amount to the nearest ten-thousand dollars.

2. \_\_\_\_\_  
 \_\_\_\_\_  
 \_\_\_\_\_  
 \_\_\_\_\_  
 \_\_\_\_\_

Grocery: \$78,988

Meat: \$54,987

Produce: \$32,876

Dairy: \$18,769

Hardware: \$12,344

3. Round the cost of these clothing items to the nearest ten dollars.

Leather coats: \$99

Suede coats: \$88

Belts: \$12

Dress shoes: \$65

Top coats: \$95

4. Zen Corporation had these profit figures for the last five years.  
Round each figure to the nearest million dollars.

19X1 . . . . . \$2,488,987

19X2 . . . . . \$6,487,184

19X3 . . . . . \$7,765,548

19X4 . . . . . \$7,687,175

19X5 . . . . . \$7,123,465

5. Round 12,467,886 to the nearest:

a. ten

b. hundred

c. thousand

d. ten-thousand

e. hundred-thousand

f. million

4. \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_
5. a. \_\_\_\_\_  
b. \_\_\_\_\_  
c. \_\_\_\_\_  
d. \_\_\_\_\_  
e. \_\_\_\_\_  
f. \_\_\_\_\_

