

Contemporary Mathematics for Business and Consumers
8th edition Brechner Solutions Manual

SKU: 9781305585447-SOLUTIONS

EXAMPLE 2**ROUNDING WHOLE NUMBERS**

Round the following numbers to the indicated place.

- | | |
|-------------------------------|---------------------------------|
| a. 1,867 to tens | b. 760 to hundreds |
| c. 129,338 to thousands | d. 293,847 to hundred thousands |
| e. 97,078,838,576 to billions | f. 85,600,061 all the way |

SOLUTION STRATEGY

Following the steps on page 4, locate the place to be rounded, use the digit to the right of that place to determine whether to round up or leave it as is, and change all digits to the right of the place being rounded to zeros.

	Place Indicated	Rounded Number
a. 1,867 to tens	1,8 <u>6</u> 7	1,870
b. 760 to hundreds	<u>7</u> 60	800
c. 129,338 to thousands	129, <u>3</u> 38	129,000
d. 293,847 to hundred thousands	<u>2</u> 93,847	300,000
e. 97,078,838,576 to billions	97, <u>0</u> 78,838,576	97,000,000,000
f. 85,600,061 all the way	<u>8</u> 5,600,061	90,000,000

TRY IT EXERCISE 2

Round the following numbers to the indicated place.

- | | | |
|-----------------------|-------------------------------|----------------------------------|
| a. 51,667 to hundreds | b. 23,441 to tens | c. 175,445,980 to ten thousands |
| d. 59,561 all the way | e. 14,657,000,138 to billions | f. 8,009,070,436 to ten millions |

CHECK YOUR ANSWERS WITH THE SOLUTIONS ON PAGE 24.

CLASSROOM ACTIVITY

For practice, have students round the numbers in the chart “Pricey Diplomas” to various places.

CLASSROOM ACTIVITY

Ask students to think of situations in which rounding or estimating would be useful. Typical responses might include

- totaling a check in a restaurant
- deciding how much food and beverages to buy for a party
- planning the purchase of materials for a construction project

REVIEW EXERCISES**1****SECTION I**

Read and write the following whole numbers in numerical and word form.

Number	Numerical Form	Word Form
1. 22938	22,938	Twenty-two thousand, nine hundred thirty-eight
2. 1573	1,573	One thousand, five hundred seventy-three
3. 184	184	One hundred eighty-four
4. 984773	984,773	Nine hundred eighty-four thousand, seven hundred seventy-three
5. 2433590	2,433,590	Two million, four hundred thirty-three thousand, five hundred ninety
6. 49081472	49,081,472	Forty-nine million, eighty-one thousand, four hundred seventy-two




Write the following whole numbers in numerical form.

- | | |
|--|-------------------------|
| 7. One hundred eighty-three thousand, six hundred twenty-two | <u>183,622</u> |
| 8. Seven million, sixty-one thousand, ten | <u>7,061,010</u> |
| 9. According to Globo's G1 website, expenses in preparation for the 2014 World Cup in Brazil reached forty billion dollars. Write this number in numerical form. | <u>\$40,000,000,000</u> |


Match the following numbers in word form with the numbers in numerical form.

- | | |
|--|------------|
| 10. One hundred two thousand, four hundred seventy <u>b</u> | a. 12,743 |
| 11. One hundred twelve thousand, seven hundred forty-three <u>d</u> | b. 102,470 |
| 12. Twelve thousand, seven hundred forty-three <u>a</u> | c. 11,270 |
| 13. Eleven thousand, two hundred seventy <u>c</u> | d. 112,743 |
| 14. According to NCR Corporation, retailers in America generate 228,700,000 pounds of paper receipts per year. Write this number in word form. | |
| <u>Two hundred twenty-eight million, seven hundred thousand pounds</u> | |


Round the following numbers to the indicated place.

- | | |
|---|----------------------|
| 15. 1,757 to tens | <u>1,760</u> |
| 16. 32,475 to thousands | <u>32,000</u> |
| 17. 812,461 to hundreds | <u>812,500</u> |
| 18. 559,443 to ten thousands | <u>560,000</u> |
| 19. 25,812,922 to millions | <u>26,000,000</u> |
| 20. 45,699 all the way | <u>50,000</u> |
| 21. 1,325,669,226 to hundred millions | <u>1,300,000,000</u> |
| 22. 23,755 all the way | <u>20,000</u> |
| 23. According to the American Wind Energy Association, Texas has the highest operating wind capacity, 8,797 megawatts. Iowa is second with 3,053 megawatts capacity. | |
| a. Write each of these numbers in word form. | |
| <u>Texas: eight thousand, seven hundred ninety-seven megawatts</u> | |
| <u>Iowa: three thousand, fifty-three megawatts</u> | |
| b. Round each of these numbers to the nearest hundred. | |
| <u>Texas: 8,800 megawatts</u> | |
| <u>Iowa: 3,100 megawatts</u> | |
| 24. According to the <i>Financial Times</i> , in a recent recession, outstanding consumer credit in the United States fell to \$2,460,000,000,000—the seventh straight monthly decline. Most of the drop came as a result of consumers paying down revolving debt such as credit cards. | |
| a. Write this number in word form. | |
| <u>Two trillion, four hundred sixty billion dollars</u> | |
| b. Round this number to the nearest hundred billion. | |
| <u>\$2,500,000,000,000</u> | |

BUSINESS DECISION: UP OR DOWN?

25. You are responsible for writing a monthly stockholders' report about your company. Your boss has given you the flexibility to round the numbers to tens, hundreds, thousands, and so on, or not at all, depending on which is most beneficial for the company's image. For each of the following monthly figures, make a rounding choice and explain your reasoning.

- | | |
|--|----------------------------------|
| a. 74,469—number of items manufactured | <u>100s; 74,500 Items</u> |
| b. \$244,833—your department's net sales for the month | <u>1,000s; \$245,000 Sales</u> |
| c. 5,648—defective items manufactured | <u>100s; 5,600 Defects</u> |
| d. \$649,341—total company profit | <u>10,000s; \$650,000 Profit</u> |
| e. 149 new customers | <u>10s; 150 New customers</u> |



TEACHING TIP

Answers may vary. This is a good time to discuss how far numbers should be rounded in various situations.

ADDITION AND SUBTRACTION OF WHOLE NUMBERS

1

SECTION II

Addition and subtraction are the most basic mathematical operations. They are used in almost all business calculations. In business, amounts of things or dollars are often combined or added to determine the total. Likewise, subtraction is frequently used to determine an amount of something after it has been reduced in quantity.

ADDING WHOLE NUMBERS AND VERIFYING YOUR ANSWERS

Addition is the mathematical process of computing sets of numbers to find their sum, or total. The numbers being added are known as **addends**, and the result or answer of the addition is known as the **sum**, **total**, or **amount**. The “+” symbol represents addition and is called the **plus sign**.

$$\begin{array}{r}
 1,932 \text{ addend} \\
 2,928 \text{ addend} \\
 + 6,857 \text{ addend} \\
 \hline
 11,717 \text{ total}
 \end{array}$$



STEPS FOR ADDING WHOLE NUMBERS

- STEP 1.** Write the whole numbers in columns so that you line up the place values—units, tens, hundreds, thousands, and so on.
- STEP 2.** Add the digits in each column, starting on the right with the units column.
- STEP 3.** When the total in a column is greater than nine, write the units digit and carry the tens digit to the top of the next column to the left.

VERIFYING ADDITION

Generally, when adding the digits in each column, we add from top to bottom. An easy and commonly used method of verifying your addition is to add the numbers again, but this time from bottom to top. By adding the digits in the *reverse* order, you will reduce the chance of making the same error twice.

For illustrative purposes, addition verification will be rewritten in reverse. In actuality, you do not have to rewrite the numbers; just add them from bottom to top. As mentioned earlier, you will achieve speed and accuracy with practice.

1-3

addition The mathematical process of computing sets of numbers to find their sum, or total.

addends Any of a set of numbers being added in an addition problem. For example, 4 and 1 are the addends of the addition problem $4 + 1 = 5$.

sum, total, or amount The result or answer of an addition problem. The number 5 is the sum, or total, of $4 + 1 = 5$.

plus sign The symbol “+” representing addition.

Learning Tip

Once you become proficient at verifying addition, you can speed up your addition by recognizing and combining two numbers that add up to 10, such as $1 + 9$, $2 + 8$, $6 + 4$, and $5 + 5$. After you have mastered combining two numbers, try combining three numbers that add up to 10, such as $3 + 3 + 4$, $2 + 5 + 3$, and $4 + 4 + 2$.



Learning Tip

Because each place value increases by a factor of 10 as we move from right to left (units, tens, hundreds, etc.), when we borrow a digit, we can think of it as borrowing a 10.

COLLABORATIVE LEARNING ACTIVITY

Here's a challenge that may be appropriate for some students. In groups, have students formulate a strategy and complete this addition problem. Each letter represents a different digit.

$$\begin{array}{r} \text{NUT} \\ + \text{SUN} \\ \hline \text{NEAR} \end{array}$$

where $U = 3$ and $T = 4$

Solution

The strategy is to find the value of "N" first by deciding what its value as the first digit in "NEAR" must be.

$$\begin{array}{r} 134 \\ + 931 \\ \hline 1,065 \end{array}$$

SOLUTION STRATEGY

$$\begin{array}{r} 8 \\ 4,968 \\ - 192 \\ \hline 4,776 \end{array}$$

Verification:

$$\begin{array}{r} 1 \\ 4,776 \\ + 192 \\ \hline 4,968 \end{array}$$

Write the numbers in columns so that the place values are lined up. In this problem, they are already lined up.

Starting with the units column, subtract the digits.

Units column: $8 - 2 = 6$. Enter the 6 under the units column.

Tens column: $6 - 9$ can't be subtracted, so we must borrow a digit, 10, from the hundreds column of the minuend. This reduces the 9 to an 8 and gives us a 10 to add to the 6, making it 16.

Now we can subtract 9 from 16 to get 7. Enter the 7 under the tens column.

Hundreds column: $8 - 1 = 7$. Enter the 7 under the hundreds column.

Thousands column: This column has no subtrahend, so just bring down the 4 from the minuend to the answer line.

b. Subtraction

$$\begin{array}{r} 33 \\ 189,440 \\ - 1,347 \\ \hline 188,093 \end{array}$$

Verification

$$\begin{array}{r} 11 \\ 188,093 \\ + 1,347 \\ \hline 189,440 \end{array}$$

c. Subtraction

$$\begin{array}{r} 0 \\ 165 \\ - 71 \\ \hline 94 \end{array}$$

Verification

$$\begin{array}{r} 1 \\ 94 \\ + 71 \\ \hline 165 \end{array}$$

TRY IT EXERCISE 4

Subtract the following whole numbers and verify your answers.

a.
$$\begin{array}{r} 98,117 \\ - 7,682 \\ \hline \end{array}$$

b. $12,395 - 5,589$

c. Joe Montgomery has \$4,589 in his checking account. If he writes a check for \$344, how much will be left in the account?

CHECK YOUR ANSWERS WITH THE SOLUTIONS ON PAGE 24.

SECTION II

1

REVIEW EXERCISES



Add the following numbers.

1.
$$\begin{array}{r} 45 \\ 27 \\ + 19 \\ \hline 91 \end{array}$$

2.
$$\begin{array}{r} 548 \\ 229 \\ 4,600 \\ + 62,660 \\ \hline 68,037 \end{array}$$

3.
$$\begin{array}{r} 339 \\ 1,236 \\ 5,981 \\ 3,597 \\ + 8,790 \\ \hline 19,943 \end{array}$$

4.
$$\begin{array}{r} 2,359 \\ 8,511 \\ + 14,006 \\ \hline 24,876 \end{array}$$

5.
$$\begin{array}{r} 733 \\ 401 \\ 1,808 \\ 24,111 \\ + 10,595 \\ \hline 37,648 \end{array}$$

6. $2,339 + 118 + 3,650 + 8,770 + 81 + 6 = 14,964$

$$\begin{array}{r} 2,339 \\ 118 \\ 3,650 \\ 8,770 \\ 81 \\ + 6 \\ \hline 14,964 \end{array}$$



7. $12,554 + 22,606 + 11,460 + 20,005 + 4,303 = 70,928$

$$\begin{array}{r} 12,554 \\ 22,606 \\ 11,460 \\ 20,005 \\ + 4,303 \\ \hline 70,928 \end{array}$$

Estimate the following by rounding each number all the way; then add to find the exact answer.

		<u>Estimate</u>	<u>Rounded Estimate</u>	<u>Exact Answer</u>
8.	288	300	6,800	6,694
	512	500		
	3,950	4,000		
	<u>+ 1,944</u>	<u>+ 2,000</u>		
	6,694	6,800		
9.	27,712	30,000	35,400	33,361
	5,281	5,000		
	<u>+ 368</u>	<u>+ 400</u>		
	33,361	35,400		
10.	318,459	300,000	600,000	601,864
	<u>+ 283,405</u>	<u>+ 300,000</u>		
	601,864	600,000		



11. City traffic engineers in Canmore are doing an intersection traffic survey. On Tuesday, a counter placed at the intersection of Armstrong Place and Three Sisters Blvd. registered the following counts: morning, 2,594; afternoon, 2,478; and evening, 1,863.

a. Round each number to the nearest hundred and add to get an *estimate* of the traffic count for the day.

$$\begin{array}{r}
 2,600 \\
 2,500 \\
 + 1,900 \\
 \hline
 7,000 \text{ Vehicles}
 \end{array}$$

b. What was the *exact* amount of traffic for the day?

$$\begin{array}{r}
 2,594 \\
 2,478 \\
 + 1,863 \\
 \hline
 6,935 \text{ Vehicles}
 \end{array}$$

12. While shopping, Tyler Hammond purchases items for \$3, \$24, \$13, \$2, and \$175. How much did he spend?

$$\begin{array}{r}
 3 \\
 24 \\
 13 \\
 2 \\
 + 175 \\
 \hline
 \$217 \text{ Total spent}
 \end{array}$$

13. The following chart shows the April, May, and June sales figures by service categories for Pandora's Beauty Salon. Total each row to get the category totals. Total each column to get the monthly totals. Calculate the grand total for the three-month period.

Pandora's Beauty Salon					
Service Category	April	May	June		Category Totals
Cutting, Styling, Coloring	\$13,515	\$12,350	\$14,920		<u>\$40,785</u>
Manicure, Pedicure, Waxing	5,418	7,640	5,756		<u>18,814</u>
Facials and Makeup	4,251	6,125	6,740		<u>17,116</u>
Beauty Supplies	<u>8,690</u>	<u>7,254</u>	<u>10,346</u>		<u>26,290</u>
Monthly Totals	<u>\$31,874</u>	<u>\$33,369</u>	<u>\$37,762</u>	Grand Total	<u>\$103,005</u>



Service Sector According to the *CIA World Factbook*, service sector businesses such as beauty salons and dry cleaners account for 79.6% of the U.S. economy's gross domestic product. Other sectors include industrial at 19.2% and agriculture at 1.2%.

14. At Cherry Valley Farms, a farmer plants 350 acres of soybeans, 288 acres of corn, 590 acres of wheat, and 43 acres of assorted vegetables. In addition, the farm has 9 acres for grazing and 4 acres for the barnyard and farmhouse. What is the total acreage of the farm?

$$\begin{array}{r}
 350 \\
 288 \\
 590 \\
 43 \\
 9 \\
 + 4 \\
 \hline
 1,284 \text{ Total acres}
 \end{array}$$

15. Service Masters Carpet Cleaners pays its sales staff a salary of \$575 per month, plus commissions. Last month Alex Acosta earned commissions of \$129, \$216, \$126, \$353, and \$228. What was Alex's total income for the month?

$$\begin{array}{r}
 575 \\
 129 \\
 216 \\
 126 \\
 353 \\
 + 228 \\
 \hline
 \$1,627 \text{ Total income}
 \end{array}$$

Subtract the following numbers.



16. $\begin{array}{r} 354 \\ - 48 \\ \hline 306 \end{array}$	17. $\begin{array}{r} 5,596 \\ - 967 \\ \hline 4,629 \end{array}$	18. $\begin{array}{r} 95,490 \\ - 73,500 \\ \hline 21,990 \end{array}$	19. $\begin{array}{r} 339,002 \\ - 60,911 \\ \hline 278,091 \end{array}$	20. $\begin{array}{r} 2,000,077 \\ - 87,801 \\ \hline 1,912,276 \end{array}$
--	---	--	--	--

21. \$206 minus \$58

$$\begin{array}{r}
 206 \\
 - 58 \\
 \hline
 \$148
 \end{array}$$

22. 67,800 – 9,835

$$\begin{array}{r}
 67,800 \\
 - 9,835 \\
 \hline
 57,965
 \end{array}$$

23. \$127 less \$33

$$\begin{array}{r}
 127 \\
 - 33 \\
 \hline
 \$94
 \end{array}$$

24. Subtract 5,868 from 10,918

$$\begin{array}{r}
 10,918 \\
 - 5,868 \\
 \hline
 5,050
 \end{array}$$

25. Subtract 8,906,000 from 12,396,700

$$\begin{array}{r}
 12,396,700 \\
 - 8,906,000 \\
 \hline
 3,490,700
 \end{array}$$



26. The beginning inventory of the Designer Shoe Salon for August was 850 pairs of shoes. On the 9th, it received a shipment from the factory of 297 pairs. On the 23rd, another shipment of 188 pairs arrived. When inventory was taken at the end of the month, there were 754 pairs left. How many pairs of shoes were sold that month?

$\begin{array}{r} 850 \\ 297 \\ + 188 \\ \hline 1,335 \end{array}$	Beginning inventory Shipments received Total inventory	$\begin{array}{r} 1,335 \\ - 754 \\ \hline 581 \end{array}$	Total inventory Ending inventory Pairs sold
--	--	---	---

27. An electrician, Sparky Wilson, starts the day with 650 feet of wire on his truck. In the morning, he cuts off pieces 26, 78, 45, and 89 feet long. During lunch, he goes to an electrical supply warehouse and buys another 250 feet of wire. In the afternoon, he uses lengths of 75, 89, and 120 feet. How many feet of wire are still on the truck at the end of the day?

$\begin{array}{r} 26 \\ 78 \\ 45 \\ + 89 \\ \hline 238 \end{array}$	Morning feet used	$\begin{array}{r} 650 \\ - 238 \\ \hline 412 \end{array}$	Morning feet left	$\begin{array}{r} 412 \\ + 250 \\ \hline 662 \end{array}$	Afternoon start	$\begin{array}{r} 75 \\ 89 \\ + 120 \\ \hline 284 \end{array}$	Afternoon feet used	$\begin{array}{r} 662 \\ - 284 \\ \hline 378 \end{array}$	Feet left end of day
---	----------------------	---	----------------------	---	--------------------	--	------------------------	---	-------------------------

28. Use the U.S. Postal Service Mail Volume graph on the next page to answer the following questions.
a. How many pieces were delivered in 2005 and 2006 combined?

$$\begin{array}{r}
 212 \\
 + 213 \\
 \hline
 425 \text{ Billion}
 \end{array}$$



Dollars AND Sense

The American Association of Retired Persons offers financial advice targeted at those in their 20s and 30s at www.aarp.org/money. The site contains tips from financial experts as well as calculators to help you budget and determine ways to reduce debt.

- b. How many fewer pieces were delivered in 2009 than in 2007?

$$\begin{array}{r} 212 \\ - 180 \\ \hline 32 \text{ Billion} \end{array}$$

- c. Write the number of pieces of mail for 2008 in numerical form.

203,000,000,000

29. Eileen Townsend is planting her flower beds. She initially bought 72 bedding plants at Home Depot.

- a. If she plants 29 in the front bed, how many plants remain unplanted?

$$\begin{array}{r} 72 \\ - 29 \\ \hline 43 \text{ Plants} \end{array}$$

- b. Eileen's remaining flower beds have room for 65 bedding plants. How many more plants must she buy to fill up the flower beds?

$$\begin{array}{r} 65 \\ - 43 \\ \hline 22 \text{ Plants} \end{array}$$

- c. How many total plants did she buy?

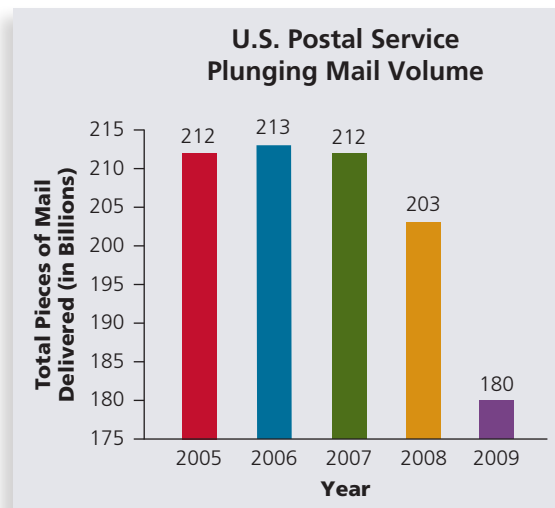
$$\begin{array}{r} 72 \\ + 22 \\ \hline 94 \text{ Plants} \end{array}$$

30. An Allied Vans Lines moving truck picks up loads of furniture weighing 5,500 pounds, 12,495 pounds, and 14,562 pounds. The truck weighs 11,480 pounds, and the driver weighs 188 pounds. If a bridge has a weight limit of 42,500 pounds, is the truck within the weight limit to cross the bridge?

$$\begin{array}{r} 5,500 \\ 12,495 \\ 14,562 \\ 11,480 \\ + 188 \\ \hline 44,225 \text{ Pounds} \\ \text{total weight} \end{array}$$

$$\begin{array}{r} - 44,225 \\ - 42,500 \\ \hline 1,725 \text{ Pounds over} \\ \text{weight limit} \end{array}$$

No, the truck is overweight.



Rapidly Decreasing Postal Volume This chart illustrates the dramatic decrease in U.S. postal mail volume as e-mail and other electronic transfers of information became more widely used.

Source: U.S. Postal Service



BUSINESS DECISION: PERSONAL BALANCE SHEET



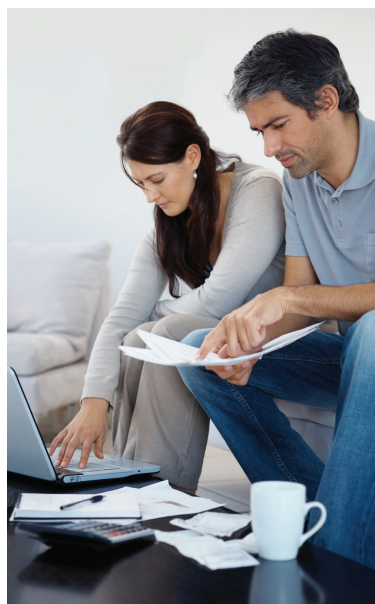
31. A *personal balance sheet* is the financial picture of how much “wealth” you have accumulated as of a certain date. It specifically lists your *assets* (i.e., what you own) and your *liabilities* (i.e., what you owe). Your current *net worth* is the difference between the assets and the liabilities.

$$\text{Net worth} = \text{Assets} - \text{Liabilities}$$

Tom and Carol Jackson have asked for your help in preparing a personal balance sheet. They have listed the following assets and liabilities: current value of home, \$144,000; audio/video equipment, \$1,340; automobiles, \$17,500; personal property, \$4,350; computer, \$3,700; mutual funds, \$26,700; 401(k) retirement plan, \$53,680; jewelry, \$4,800; certificates of deposit, \$19,300; stock investments, \$24,280; furniture and other household goods, \$8,600; balance on Wal-Mart and Sears charge accounts, \$4,868; automobile loan balance, \$8,840; home mortgage balance, \$106,770; Visa and MasterCard balances, \$4,211; savings account balance, \$3,700; Carol's night school tuition loan balance, \$2,750; checking account balance, \$1,385; signature loan balance, \$6,350.

Use the data provided and the personal balance sheet on page 14 to calculate the following for the Jacksons.

- | | | |
|----------------------|------------------|--|
| a. Total assets | <u>\$313,335</u> | d. Explain the importance of the personal balance sheet. How often should this information be updated? |
| b. Total liabilities | <u>\$133,789</u> | |
| c. Net worth | <u>\$179,546</u> | Monthly—or at least quarterly; answers will vary. |



© Yuri Shirokov/Shutterstock.com

Just as with corporate statements, **personal financial statements** are an important indicator of your financial position. The balance sheet, income statement, and cash flow statement are most commonly used. When compared over a period of time, they tell a story of where you have been and where you are going financially.

PERSONAL BALANCE SHEET			
ASSETS		LIABILITIES	
CURRENT ASSETS		CURRENT LIABILITIES	
Checking account	1,385	Store charge accounts	4,868
Savings account	3,700	Credit card accounts	4,211
Certificates of deposit	19,300	Other current debt	
Other		Total Current Liabilities	9,079
Total Current Assets	24,385	LONG-TERM LIABILITIES	
LONG-TERM ASSETS		Home mortgage	106,770
Investments		Automobile loan	8,840
Retirement plans	53,680	Education loan	2,750
Stocks	24,280	Other loan	6,350
Bonds		Other loan	
Mutual funds	26,700	Total Long-Term Liabilities	124,710
Other		TOTAL LIABILITIES	\$133,789
Personal		NET WORTH	
Home	144,000	Total Assets	313,335
Automobiles	17,500	Total Liabilities	– 133,789
Furniture	8,600	NET WORTH	\$179,546
Personal property	4,350		
Jewelry	4,800		
Other	1,340		
Other	3,700		
Total Long-Term Assets	288,950		
TOTAL ASSETS	\$313,335		

SECTION III

1

MULTIPLICATION AND DIVISION OF WHOLE NUMBERS

Multiplication and division are the next two mathematical procedures used with whole numbers. Both are found in business as often as addition and subtraction. In reality, most business problems involve a combination of procedures. For example, invoices, which are a detailed list of goods and services sold by a company, require multiplication of items by the price per item and then addition to reach a total. From the total, discounts are frequently subtracted or transportation charges are added.

1-5

MULTIPLYING WHOLE NUMBERS AND VERIFYING YOUR ANSWERS

multiplication The combination of two numbers in which the number of times one is represented is determined by the value of the other.

multiplicand In multiplication, the number being multiplied. For example, 5 is the multiplicand of $5 \times 4 = 20$.

Multiplication of whole numbers is actually a shortcut method for addition. Let's see how this works. If a clothing store buys 12 pairs of jeans at \$29 per pair, what is the total cost of the jeans? One way to solve this problem is to add $\$29 + \$29 + \dots$, 12 times. It's not hard to see how tedious this repeated addition becomes, especially with large numbers. By using multiplication, we get the answer in one step: $12 \times 29 = \$348$.

Multiplication is the combination of two whole numbers in which the number of times one is represented is determined by the value of the other. These two whole numbers are known as factors. The number being multiplied is the **multiplicand**, and the number by which

▶ TRY IT EXERCISE 6

Divide the following numbers and verify your answers.

a. $910 \div 35$

b. $1,503 \div 160$

c. $\begin{array}{r} 3,358 \\ 196 \end{array}$

d. $\begin{array}{r} 175 \\ 12 \end{array}$

- e. Delta Industries has 39 production line workers, each making the same amount of money. If last week's total payroll amounted to \$18,330, how much did each employee earn?

CHECK YOUR ANSWERS WITH THE SOLUTIONS ON PAGE 25.

REVIEW EXERCISES

1

SECTION III

Multiply the following numbers and verify your answers.

1. $\begin{array}{r} 589 \\ \times 19 \\ \hline 11,191 \end{array}$

2. $\begin{array}{r} 1,292 \\ \times 158 \\ \hline 204,136 \end{array}$

3. $\begin{array}{r} 327 \\ \times 900 \\ \hline 294,300 \end{array}$

4. $\begin{array}{r} 76,000 \\ \times 45 \\ \hline 3,420,000 \end{array}$

5. $\begin{array}{r} 56,969 \\ \times 1,000 \\ \hline 56,969,000 \end{array}$



6. Multiply \$6 by 1004.

$$\begin{array}{r} 1,004 \\ \times 6 \\ \hline \$6,024 \end{array}$$

- 7.
- 42×610

$$\begin{array}{r} 610 \\ \times 42 \\ \hline 25,620 \end{array}$$

8. What is 475 times 12?

$$\begin{array}{r} 475 \\ \times 12 \\ \hline 5,700 \end{array}$$

Estimate the following by rounding each number all the way; then multiply to get the exact answer.

	Estimate	Rounded Estimate	Exact Answer
9.	$\begin{array}{r} 202 \\ \times 490 \\ \hline 98,980 \end{array}$	$\begin{array}{r} 200 \\ \times 500 \\ \hline 100,000 \end{array}$	$\begin{array}{r} 100,000 \\ \hline 98,980 \end{array}$
10.	$\begin{array}{r} 515 \\ \times 180 \\ \hline 92,700 \end{array}$	$\begin{array}{r} 500 \\ \times 200 \\ \hline 100,000 \end{array}$	$\begin{array}{r} 100,000 \\ \hline 92,700 \end{array}$
11.	$\begin{array}{r} 17 \\ \times 11 \\ \hline 187 \end{array}$	$\begin{array}{r} 20 \\ \times 10 \\ \hline 200 \end{array}$	$\begin{array}{r} 200 \\ \hline 187 \end{array}$

12. Dazzling Designs made custom drapery for a client using 30 yards of material.

- a. At \$5 per yard, what is the cost of the material?

$$\begin{array}{r} 30 \\ \times 5 \\ \hline \$150 \end{array}$$

- b. If the company received 4 more orders of the same size, how much material will be needed to fill the orders?

$$\begin{array}{r} 30 \\ \times 4 \\ \hline 120 \text{ Yards} \end{array}$$





© Xavier Marchant/Shutterstock.com

13. The U.S. Department of Transportation has a rule designed to reduce passenger discomfort and inconvenience. It states that airlines must let passengers off domestic flights when they have waited three hours without taking off. Airlines that don't comply can be fined up to \$27,500 per passenger.

If a Premium Airlines 767 aircraft with 254 passengers on board was fined the maximum penalty for waiting four hours on the tarmac at JFK before takeoff last Tuesday, what was the amount of the fine?

$$27,500 \times 254 = \underline{\underline{\$6,985,000}}$$

14. There are 34 stairs from bottom to top in each of five stairways in the football bleachers at Waycross Stadium. If each track team member is to run four complete sets up and down each stairway, how many stairs will be covered in a workout?

$$34 \times 5 \times 4 \times 2 = \underline{\underline{1,360 \text{ Stairs}}}$$



15. To earn extra money while attending college, you work as a cashier in a restaurant.
- Find the total bill for the following food order: three sirloin steak dinners at \$12 each; two baked chicken specials at \$7 each; four steak burger platters at \$5 each; two extra salads at \$2 each; six drinks at \$1 each; and tax of \$7.

Steaks	$3 \times 12 = 36$
Chicken	$2 \times 7 = 14$
Burgers	$4 \times 5 = 20$
Salads	$2 \times 2 = 4$
Drinks	$6 \times 1 = 6$
Tax	$+ 7$
	<u>\$87</u> Total

- How much change will you give back if the check is paid with a \$100 bill?

$$\begin{array}{r} 100 \\ - 87 \\ \hline \$13 \text{ Change} \end{array}$$

16. Bob Powers, a consulting electrical engineer, is offered two different jobs. Abbott Industries has a project that pays \$52 per hour and will take 35 hours to complete. Micro Systems has a project that pays \$44 per hour and will take 45 hours to complete. Which offer has a greater gross income and by how much?

$$\text{Abbott Industries: } \$52 \times 35 \text{ hours} = \$1,820$$

$$\text{Micro Systems: } \$44 \times 45 \text{ hours} = \$1,980$$

$$1,980 - 1,820 = \$160$$

The Micro Systems project has the greater income by \$160.



Divide the following numbers.

17. $4,500 \div 35$

$$\begin{array}{r} 128 \text{ R } 20 \\ 35 \overline{)4500} \\ \underline{35} \\ 100 \\ \underline{70} \\ 300 \\ \underline{280} \\ 20 \end{array}$$

18. $74,770 \div 5,700$

$$\begin{array}{r} 13 \text{ R } 670 \\ 5700 \overline{)74770} \\ \underline{5700} \\ 17770 \\ \underline{17100} \\ 670 \end{array}$$

19. $\frac{6,000}{25}$

$$\begin{array}{r} 240 \\ 25 \overline{)6000} \\ \underline{50} \\ 100 \\ \underline{100} \\ 00 \end{array}$$

20. $\frac{2,365}{43}$

$$\begin{array}{r} 55 \\ 43 \overline{)2365} \\ \underline{43} \\ 215 \\ \underline{215} \\ 0 \end{array}$$

Estimate the following by rounding each number to hundreds; then divide to get the exact answer.

	Estimate	Rounded Estimate	Exact Answer
21. $890 \div 295$	$\frac{900}{300}$	$\frac{3}{1}$	$3 \text{ R } 5$
22. $1,499 \div 580$	$\frac{1,500}{600}$	$\frac{2 \text{ R } 300}{1}$	$\frac{2 \text{ R } 339}{1}$
23. $68,246 \div 112$	$\frac{68,200}{100}$	$\frac{682}{1}$	$\frac{609 \text{ R } 38}{1}$



24. Tip-Top Roofing has 50,640 square feet of roofing material on hand. If the average roof requires 8,440 square feet of material, how many roofs can be installed?

$$\frac{50,640}{8,440} = 6 \text{ Roofs}$$

25. A calculator uses eight circuit boards, each containing 450 parts. A company has 421,215 parts in stock.

- a. How many calculators can it manufacture?

$$\begin{array}{r} 450 \\ \times 8 \\ \hline 3,600 \end{array} \text{ Parts per calculator}$$

$$\frac{421,215}{3,600} = 117 \text{ R } 15$$

177 Calculators

- b. How many parts will be left over?

15 Parts left

26. Eric Shotwell borrows \$24,600 from the Mercantile Bank and Trust Co. The interest charge amounts to \$8,664. What equal monthly payments must Eric make in order to pay back the loan, with interest, in 36 months?

$$\begin{array}{r} 24,600 \\ + 8,664 \\ \hline \$33,264 \end{array} \text{ Total payback}$$

$$\frac{33,264}{36} = \$924 \text{ Per month}$$

27. A 16-person college basketball team is going to a tournament in Boston. As the team manager, you are trying to find the best price for hotel rooms. The Windsor Hotel is quoting a price of \$108 for 2 people in a room and \$10 for each extra person. The Royale Hotel is quoting a price of \$94 for 2 people in a room and \$15 for each extra person. If the maximum number of people allowed in a room is 4, which hotel would be more economical?

$$\text{Rooms needed: } \frac{16}{4} = 4 \text{ Rooms}$$

Windsor Hotel: \$108 room rate + 2 extra people @ \$10 each = \$128 Per room

$$4 \text{ rooms} \times \$128 \text{ per room} = \$512$$

Royale Hotel: \$94 room rate + 2 extra people @ \$15 each = \$124 Per room

$$4 \text{ rooms} \times \$124 \text{ per room} = \$496$$

The Royale Hotel is more economical.

28. You have just purchased a 65-acre ranch for a price of \$780 per acre. In addition, the house was valued at \$125,000 and the equipment amounted to \$22,300.

- a. What was the total price of your purchase?

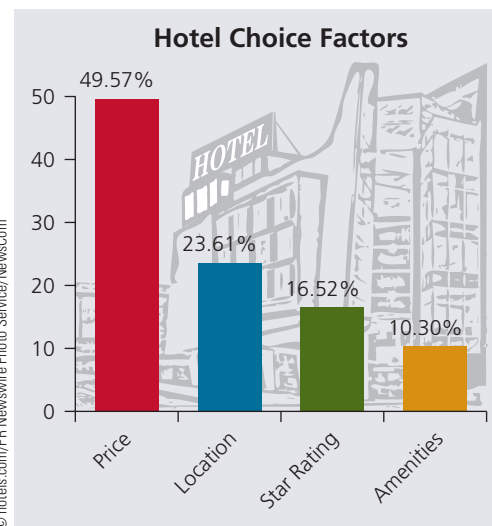
$$\begin{array}{r} 65 \times 780 = 50,700 \text{ Land} \\ 125,000 \text{ House} \\ 22,300 \text{ Equipment} \\ \hline \$198,000 \text{ Total price} \end{array}$$

- b. Since the owner was anxious to sell, he offered to finance the ranch for you with a no-interest mortgage loan. What would your monthly payments be to pay off the loan in 10 years?

$$\frac{198,000}{120} = \$1,650 \text{ Monthly payment}$$

- c. Besides the mortgage payment, you are required to make monthly property tax and insurance payments. If property tax is \$3,000 per year and insurance is \$2,400 per year, how much would these items add to your monthly expenses for the ranch?

$$\frac{3,000 + 2,400}{12} = \$450 \text{ Additional expense}$$



Hotels.com Survey When selecting a hotel, what do you consider most important?



29. As the IT manager for FastNet Enterprises, you have maintained records of the average prices you've paid for PCs over the years, and you are reviewing your records over a particularly interesting period in your company's history. In 2005, you purchased 12 laptop computers and 15 desktop computers for your office staff. Using the graph Average PC Prices, answer the following:

- a. What was the total amount of the purchase for these computers in 2005?

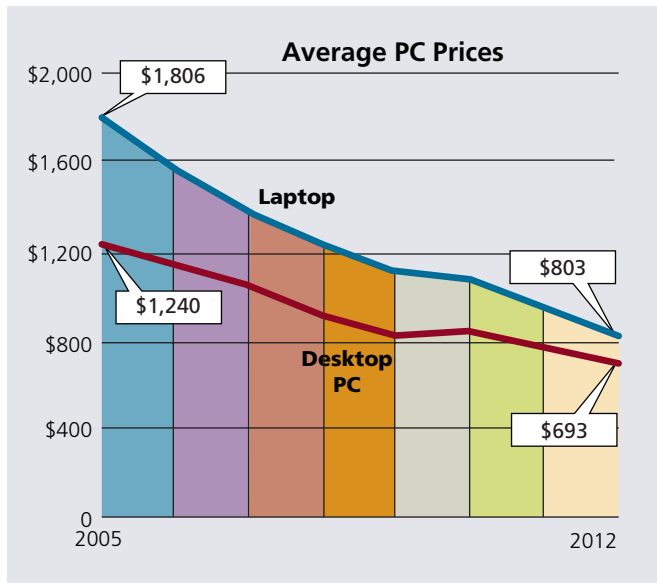
$$\begin{array}{r} 12 \times 1,806 = 21,672 \\ 15 \times 1,240 = 18,600 \\ \hline \$40,272 \end{array}$$

- b. In 2012, you replaced all of the computers with new ones. What was the total amount of the purchase for these computers?

$$\begin{array}{r} 12 \times 803 = 9,636 \\ 15 \times 693 = 10,395 \\ \hline \$20,031 \end{array}$$

- c. In total, how much did you save in 2012 over 2005 because of falling computer prices?

$$\begin{array}{r} 40,272 \\ - 20,031 \\ \hline \$20,241 \end{array}$$



BUSINESS DECISION: ESTIMATING A TILE JOB

30. You are the owner of Decorama Flooring. Todd and Claudia have asked you to give them an estimate for tiling four rooms of their house. The living room is 15 feet $\times$ 23 feet, the dining room is 12 feet $\times$ 18 feet, the kitchen is 9 feet $\times$ 11 feet, and the study is 10 feet $\times$ 12 feet.

- a. How many square feet of tile are required for each room? (Multiply the length by the width.)

Living Room	Dining Room	Kitchen	Study
23	18	11	12
$\times 15$	$\times 12$	$\times 9$	$\times 10$
<u>345 sq ft</u>	<u>216 sq ft</u>	<u>99 sq ft</u>	<u>120 sq ft</u>

- b. What is the total number of square feet to be tiled?

$$\begin{array}{r} 345 \\ 216 \\ 99 \\ + 120 \\ \hline 780 \text{ Total sq ft} \end{array}$$

- c. If the tile for the kitchen and study costs \$4 per square foot and the tile for the living and dining rooms costs \$3 per square foot, what is the total cost of the tile?

99 Kitchen	345 Living room	876
+ 120 Study	+ 216 Dining room	+1,683
219 sq ft	561 sq ft	\$2,559 Total cost of tile
$\times 4$ Price	$\times 3$ Price	
\$876	\$1,683	

- d. If your company charges \$2 per square foot for installation, what is the total cost of the tile job?

$$\begin{array}{r} 780 \text{ sq ft} \\ \times 2 \text{ Price} \\ \hline \$1,560 \text{ Installation charge} \end{array} \quad \begin{array}{r} 1,560 \\ + 2,559 \\ \hline \$4,119 \text{ Total cost of job} \end{array}$$

- e. If Todd and Claudia have saved \$4,500 for the tile job, by how much are they over or under the amount needed?

$$\begin{array}{r} 4,500 \text{ Saved} \\ - 4,119 \text{ Cost} \\ \hline \$381 \text{ Over amount needed} \end{array}$$