SOLUTIONS MANUAL

NINTH EDITION

COLLEGE MATHEMATICS

CHERYL CLEAVES • MARGIE HOBBS

Selected Solutions

Solutions are included for:

Even-Numbered Chapter Review Exercises
All Concepts Analysis Exercises
Even-Numbered Practice Test Exercises
Even-Numbered Cumulative Practice Test Exercises

Other solutions are included in the
Student Solutions Manual

Odd-Numbered Chapter Review Exercises
Odd-Numbered Practice Test Exercises
Odd-Numbered Cumulative Practice Test Exercises

Chapter One

Review of Basic Concepts
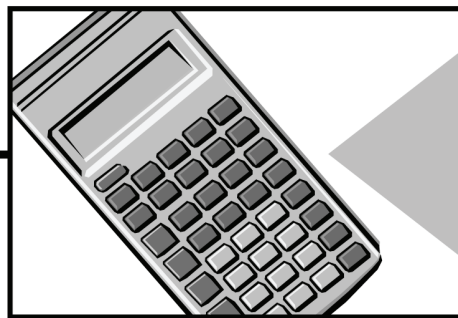
▶CHAPTER 1 REVIEW EXERCISES

2. (a) $\dfrac{75}{1,000} = 0.075$

Since the denominator is 1,000, the last digit of the numerator is in the thousandths place.

(b) $\dfrac{21}{10} = 2.1$

Since the denominator is 10, the last digit of the numerator is in the tenths place.

(c) $\dfrac{652}{100,000} = 0.00652$

Since the denominator is 100,000, the last digit of the numerator is in the hundred-thousandths place.

4. (a) ⑨8̲ The rounded answer is 100. (b) ⑨4̲ The rounded answer is 90.
(c) 2⑤,7̲86 The rounded answer is 26,000. (d) 0.0⑦3̲6 The rounded answer is 0.07.
(e) ⑦ 9̲3 The rounded answer is 8. (f) ①.8̲76 The rounded answer is 2.

6. smaller: 0.83   0.825
        ↑   ↑

Compare each place value, left to right, until two digits in the same place value are different, and compare those digits.

0.83 > ⟨0.825⟩   0.825 is smaller.

8. larger: 4.831   4.820
        ↑   ↑
       ⟨4.831⟩ > 4.820
       4.831 is larger.

10. smaller: 1.023   1.03
          ↑   ↑
        1.023 < 1.03
The 1.023 in. part is smaller and has been machined more.

12.   (a) $6.2 + 32.7 + 46.82 + 0.29 + 4.237$

<div style="margin-left:3em">
2 2 1
6.200
32.700
46.820
0.290
+   4.237
—————
90.247
</div>

(b) $86.3 + 9.2 + 70.02 + 3 + 2.7$

The decimal point in a whole number is at the end.

<div style="margin-left:3em">
1 2 1
86.30
9.20
70.02
3.00
+   2.70
—————
171.22
</div>

14.

Estimate	Exact
1	2 1 1
60	57.32
70	74.26
+ 200	+ 174.85
330	$ 306.43

16.   (a)

Estimate	Exact
12,300	12,346.87
− 4,500	− 4,468.63
7,800	7,878.24

(b)

Estimate	Exact
3,500	3,495
− 3,100	− 3,090
400	405

(c)

Estimate	Exact
6,800	6,767
− 500	− 478
6,300	6,289

(d)

Estimate	Exact
300	293.86
− 100	− 148.00
200	145.86

18.

<div style="margin-left:3em">
          0 9 9 9 10
75   100.00
+ 25   −   12.75
————   —————
100   87.25
</div>

The family cleared $87.25 on the two
items sold.

20. $A = E - B$
$A = 4.86 \text{ in.} - 1.972 \text{ in.}$
$A = 2.888 \text{ in.}$

22. $C = D - E$
$C = 3.7 \text{ in.} - 1.6 \text{ in.}$
$C = 2.1 \text{ in.}$

24. $6(3)(2)(4) = 18(2)(4) = 36(4) = 144$

$$\begin{array}{r} \overset{1}{18} \\ \times\ 2 \\ \hline 36 \end{array} \qquad \begin{array}{r} \overset{2}{36} \\ \times\ 4 \\ \hline 144 \end{array}$$

26.

$$\begin{array}{r} \overset{1}{} \\ +\overset{2}{} \\ +\overset{2}{} \\ 236 \\ \times\ 244 \\ \hline \overset{11}{9}44 \\ 944 \\ 472 \\ \hline 57,584 \end{array}$$

28.

$$\begin{array}{r} \overset{2}{} \\ \overset{2\,6}{} \\ 327 \\ \times\ \ 39 \\ \hline \overset{1}{2}\ 943 \\ 9\ 81 \\ \hline 12,753 \end{array}$$

The bookstore received \$12,753 for the books.

30.

$$\begin{array}{r} \overset{1}{} \\ \$\ \ 112 \\ \times\ \ 105 \\ \hline 560 \\ 11\ 2 \\ \hline \$11,760 \end{array}$$

The dealer took in \$11,760 on the sale.

32.

Estimate	Exact
30	\$ 33.25
× 40	× 37
1200	232 75
	997 5
	\$1,230.25

The sound system installer was paid \$1,230.25.

34.

Estimate	Exact	Check	
$A = l \times w$	$A = l \times w$	234.6	123.2
$= 200 \times 100$	$= 234.6 \times 123.2$	× 123.2	× 234.6
$= 20,000$	$= 28,902.72$	469 2	73 92
		7038	492 8
		4 692	3 696
		23 46	24 64
		28,902.72	28,902.72

The area of the field is 28,903 ft^2.

36. $178.6 \times 0.28 \times 5$

$$\begin{array}{r} \overset{1\,1\,1}{} \\ \overset{6\,6\,4}{} \\ 178.6 \\ \times\ 0.2\,8 \\ \hline \overset{11\ \ 1}{14}\ 28\ 8 \\ 35\ 72 \\ \hline 50.00\ 8 \end{array} \qquad \begin{array}{r} 50.008 \\ \times\ \ \ \ 5 \\ \hline 250.040\ \ \text{or } 250.04 \end{array}$$

The employee earns \$250.04.

38. $29.25 \div 0.36$

$$
\begin{array}{r}
81R9 \\
0.36\overline{)29.25} \\
\underline{288} \\
45 \\
\underline{36} \\
9
\end{array}
$$

40. $364.8 \div 6$

$$
\begin{array}{r}
60.8 \\
6\overline{)364.8} \\
\underline{36} \\
4 \\
\underline{0} \\
48 \\
\underline{48} \\
0
\end{array}
$$

42. $10{,}160 \div 20$

$$
\begin{array}{r}
508 \\
20\overline{)10{,}160} \\
\underline{100} \\
16 \\
\underline{0} \\
160 \\
\underline{160} \\
0
\end{array}
$$

44. $56 \div 7 = 8$
The band will have 8 members in each row.

46.   average, nearest cent (hundredth)

$$
\begin{array}{r}
{}^{2\ 2\ 3\ 2} \\
\$ \quad 74.98 \\
23.72 \\
51.27 \\
125.36 \\
+ \quad 85.93 \\
\hline
\$ \quad 361.26
\end{array}
$$

$$
\begin{array}{r}
72.252 \quad \approx \$72.25 \\
5\overline{)361.260} \\
\underline{35} \\
11 \\
\underline{10} \\
1\,2 \\
\underline{1\,0} \\
26 \\
\underline{25} \\
12 \\
\underline{10}
\end{array}
$$

48.   (a)   base $\rightarrow 5^{6} \leftarrow$ exponent
$5^{6} = 5 \times 5 \times 5 \times 5 \times 5 \times 5 = 15{,}625$

(b)   base $\rightarrow 1.2^{2} \leftarrow$ exponent
$1.2^{2} = 1.2 \times 1.2 = 1.44$

(c)   base $\rightarrow 10^{6} \leftarrow$ exponent
$10^{6} = 1{,}000{,}000$

50.   (a) $\sqrt{2{,}500} = 50$ since $50 \times 50 = 2{,}500$

(b) $\sqrt{1.44} = 1.2$ since $1.2 \times 1.2 = 1.44$

(c) $\sqrt{289} = 17$ since $17 \times 17 = 289$

(d) $\sqrt{81} = 9$ since $9 \times 9 = 81$

calculator options: $\boxed{\sqrt{\ }}$ $\boxed{81}$ $\boxed{=}$

52.   (a) $3 \times 100 = 300$ (b) $75 \times 10{,}000 = 750{,}000$ (c) $2.2 \times 1{,}000 = 2{,}200$
(d) $5 \times 100 = 500$ (e) $40.6 \times 10 = 406$

54.
$$
\begin{array}{ll}
2 + 3 \cdot 3 \div 3 = & \text{Multiply.} \\
2 + 9 \div 3 = & \text{Divide.} \\
2 + 3 = & \text{Add.} \\
5 &
\end{array}
$$

56.
$$
\begin{array}{ll}
18 \div 6 - 3 = & \text{Divide.} \\
3 - 3 = & \text{Subtract.} \\
0 &
\end{array}
$$

58.

$82 + 4 \div 2 \times 5 =$ Divide and multiply from left to right.

$82 + 2 \times 5 =$ Multiply.

$82 + 10 =$ Add.

92

60.

$15 - 6 \cdot 2 + 3 =$ Multiply.

$15 - 12 + 3 =$ Add and subtract from left to right.

$3 + 3 =$ Add.

6

62.

$24 \div 4 - 18 \div 6 =$ Divide from left to right.

$6 - 3 =$ Subtract.

3

64.

$26 + 8 \div 2 - 3 \cdot 3 =$ Divide and multiply from left to right.

$26 + 4 - 9 =$ Add and subtract from left to right.

$30 - 9 =$ Subtract.

21

66.

$\sqrt{12.25} \cdot (4 - 2) + 8 =$ Do operations within parentheses first.

$\sqrt{12.25} \cdot 2 + 8 =$ Evaluate square root.

$3.5 \cdot 2 + 8 =$ Multiply.

$7 + 8 =$ Add.

15

68.

$2^4 \div 2 - \sqrt{10 - 1} =$ Do operation in grouping (square root).

$2^4 \div 2 - \sqrt{9} =$ Evaluate exponentiation and square root from left to right.

$16 \div 2 - 3 =$ Divide.

$8 - 3 =$ Subtract.

5

70.

$4 + \dfrac{8.6}{2}(2) =$ Divide.

$4 + 4.3(2) =$ Multiply.

$4 + 8.6 =$ Add.
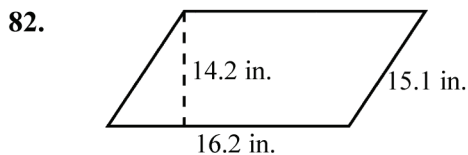
12.6

72. $8^2 - (3 - 1.5)(5.2) =$ Do operation inside parentheses.

$8^2 - 1.5(5.2) =$ Evaluate exponentiation.

$64 - 1.5(5.2) =$ Multiply.

$64 - 7.8 =$ Subtract.

56.2

74. $5.13 \div (6.2 - 4.3) + 8.6 =$ Simplify grouping.

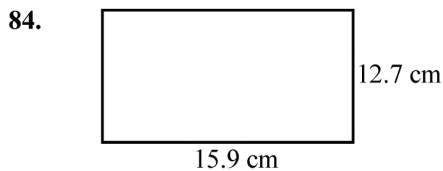$5.13 \div 1.9 + 8.6 =$ Divide.

$2.7 + 8.6 =$ Add.

11.3

76. $7,460,174,000 \div 194,582 = \$38,339.48669; \$38,339$ (rounded)

78. $(42 + 68 + 72 + 96) \div 4 =$ **80.** $(78 + 72 + 86 + 88 + 90 + 85 + 82) \div 7 =$

$278 \div 4 =$ $581 \div 7 =$

69.5 $83°$
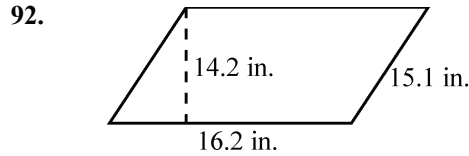
or 70 (rounded)

82.

$P = 2(b + s)$
$P = 2(16.2 + 15.1)$
$P = 2(31.3)$
$P = 62.6$ in.

84.

$P = 2(l + w)$
$P = 2(15.9 + 12.7)$
$P = 2(28.6)$
$P = 57.2$ cm

86.

$P = 4s$
$P = 4(2.5)$
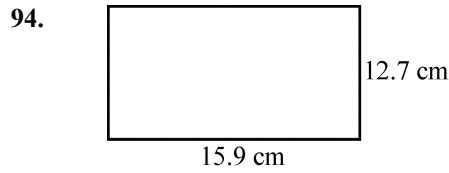$P = 10$ ft

88.

$P = 4s$
$P = 4(6)$
$P = 24$ in.
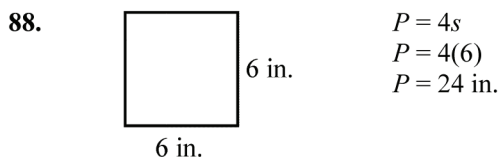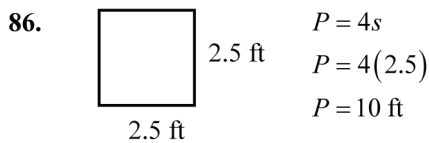
90. $P = 4s$

$P = 4(15.5 \text{ ft})$

$P = 62 \text{ ft}$
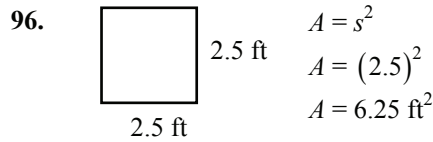$62 - 4 = 58$ ft of fencing

92.

$A = bh$
$A = 16.2(14.2)$
$A = 230.04 \text{ in}^2$

14.2 in.   15.1 in.

16.2 in.

94.

$A = lw$
$A = 15.9(12.7)$
$A = 201.93 \text{ cm}^2$

12.7 cm

15.9 cm

96.

2.5 ft

2.5 ft

$A = s^2$
$A = (2.5)^2$
$A = 6.25 \text{ ft}^2$

98. $A = lw$
$A = 25(8)$
$A = 200 \text{ ft}^2$
$A_{2 \text{ walls}} = 2(200) = 400 \text{ ft}^2$

100.

$A_{\text{doorway}} = lw$
$\qquad = 7(6)$
$\qquad = 42 \text{ ft}^2$
$A_{\text{front}} = lw$
$\qquad = 20(12)$
$\qquad = 240 \text{ ft}^2$
$A_{\text{brick}} = 240 - 42 = 198 \text{ ft}^2$
$\dfrac{198 \text{ ft}^2}{1}\left(\dfrac{6 \text{ bricks}}{1 \text{ ft}^2}\right) = 1{,}188 \text{ bricks}$

Chapter 1 Concepts Analysis

1. $1.2 + n = 1.7$
$\qquad n = 1.7 - 1.2$
$\qquad n = 0.5$

2. $5 \times n = 4.5$
$\qquad n = 4.5 \div 5$
$\qquad n = 0.9$

3. $\sqrt{n} = 6$
$\qquad n = 6^2$
$\qquad n = 36$

4. $7 - (3 - 1) \neq (7 - 3) - 1$
$\qquad 7 - 2 \neq 4 - 1$
$\qquad 5 \neq 3$
Answers may vary

5. $6 \div 12 \neq 12 \div 6$
$\qquad \dfrac{1}{2} \neq 2$
Answers may vary

6.   1. Perform operations within parentheses (or other grouping symbols) beginning with the innermost set of parentheses.
2. Evaluate exponential operations and find square roots in order from left to right.
3. Multiply and divide in order from left to right.
4. Add and subtract in order from left to right.

7. $2.5 + 4.9 =$ $\overset{1}{2.5}$ $5 + 9 = 14$
                 $+\ 4.9$ Write 4 in the tenths column and
                  7.4 carry the 1 to the units column.
                      $1 + 2 + 4 = 7$

8.   The order of operations states that multiplication must be done <u>before</u> addition. $2 + 5(4) =$
                                                                              $2 + 20 =$
                                                                              22

9. $\sqrt{9} = 81$ Wrong because $9^2 = 81$.
                      Find $?^2 = 9$ to get $\sqrt{9}$.
                      On some calculators: $\boxed{\sqrt{}}$ 9 $\boxed{=}$
    $\sqrt{9} = 3$ Correct

10.   Addition requires the decimals to be in a vertical line, so similar place values are added, just as with whole numbers.

11.   No, perfect squares have an even number of decimal places.

12.   Yes, the number of decimal places in a perfect cube is a multiple of three, and 8 is a perfect cube.

13.   No, any decimal multiplied times itself will have twice as many decimal places.
    $(0.1^2 = 0.01, 0.11^2 = 0.0121, 0.111^2 = 0.012321,$ etc.)

Chapter 1 Practice Test

2.   nearest hundredth $4.0①8$
                              $4.0\ 2$ (rounded up
                              since 8 is five or more)

4.   nearest cent $\$4.\,8③4$
     (hundredths) $\$4.83$ (rounded
                       down since 4 is
                       less than 5)

6. $\$\overset{511\ \overset{12}{4}\overset{}{2}12}{61{,}532}$
     $-\ \underline{47{,}245}$
       $\$14{,}287$

8.
```
        2,133.33
   12 ) 25,600.00
        24
        ──
         1 6
         1 2
         ──
           40
           36
           ──
            40
            36
            ──
             4 0
             3 6
             ───
              40
              36
              ──
               4
```

10. $46 \times 10^3 = 46{,}000$

12.

$$5^3 - (3 + 2) \times \sqrt{9} =$$ Do operation within parentheses first.

$$5^3 - 5 \times \sqrt{9} =$$ Evaluate exponentiation and square root from left to right.

$$125 - 5 \times 3 =$$ Multiply.

$$125 - 15 =$$ Subtract.

$$110$$

14.

Estimate:	Exact:
$\overset{1}{3}00$	$335
$\times\ 5\overset{}{0}$	$\times\ \ \ 45$
$\$\ 15{,}000$	$\overset{1}{1\ 675}$
	$13\ 40$
	$\$15{,}075$

The total cost is $15,075.

16.

$$\overset{1}{17}$$
$$\underline{\times\ \ 2}$$
$$34$$

The professor should give 34 points to the student.

18.

$$\begin{array}{r} 1.11 \\ 25\overline{)\ 27.75} \\ \underline{25} \\ 27 \\ \underline{25} \\ 25 \\ \underline{25} \\ 0 \end{array}$$

20. $52.38 \div 10{,}000 = 0052.38 = 0.005238$

22.   Estimate, nearest whole number

3.85	4
$+\ 7.46$	$+\ 7$
	11

24.

1.485	1.485
$-\ 0.010$	$+\ 0.010$
1.475	1.495

The limit dimensions of the part are 1.475 in. to 1.495 in.

26.

$$\overset{5\ \ 3}{7.96}$$
$$\underline{\times\ \ \ \ 16}$$
$$\overset{1\ 1}{47\ 76}$$
$$\underline{79\ 6}$$
$$127.36$$

The length of steel required is 127.36 ft.

28. $l = 18.5$ ft
$w = 2.5$ ft
$P = 2l + 2w$
$P = 2(18.5\text{ ft}) + 2(2.5\text{ ft})$
$P = 37\text{ ft} + 5\text{ ft}$
$P = 42\text{ ft}$
$A = lw$
$A = 18.5\text{ ft}(2.5\text{ ft})$
$A = 46.25\text{ ft}^2$