Selected Solutions

Solutions are included for:

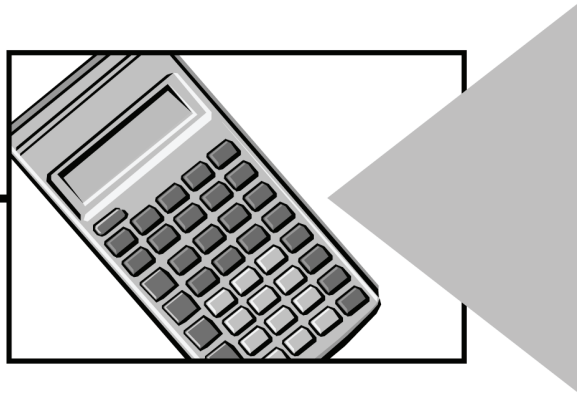
Even-Numbered Chapter Review Exercises
All Concepts Analysis Exercises
Even-Numbered Practice Test Exercises
Even-Numbered Cumulative Practice Test Exercises

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) ⑨8 The rounded answer is 100.
(b) ⑨4 The rounded answer is 90.
(c) 2⑤,786 The rounded answer is 26,000.
(d) 0.0⑦36 The rounded answer is 0.07.
(e) ⑦93 The rounded answer is 8.
(f) ①.876 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) $6.2 + 32.7 + 46.82 + 0.29 + 4.237$

$$\begin{array}{r} {\scriptstyle 2\,2\,1} \\ 6.200 \\ 32.700 \\ 46.820 \\ 0.290 \\ +\ 4.237 \\ \hline 90.247 \end{array}$$

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

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

$$\begin{array}{r} {\scriptstyle 1\,2\,1} \\ 86.30 \\ 9.20 \\ 70.02 \\ 3.00 \\ +\ 2.70 \\ \hline 171.22 \end{array}$$

14.

Estimate	Exact
$\begin{array}{r} {\scriptstyle 1} \\ 60 \\ 70 \\ +\ 200 \\ \hline 330 \end{array}$	$\begin{array}{r} {\scriptstyle 2\,1\,1} \\ 57.32 \\ 74.26 \\ +\ 174.85 \\ \hline \$\,306.43 \end{array}$

16. (a)

Estimate	Exact
$\begin{array}{r} 12{,}300 \\ -\ 4{,}500 \\ \hline 7{,}800 \end{array}$	$\begin{array}{r} 12{,}346.87 \\ -\ 4{,}468.63 \\ \hline 7{,}878.24 \end{array}$

(b)

Estimate	Exact
$\begin{array}{r} 3{,}500 \\ -\ 3{,}100 \\ \hline 400 \end{array}$	$\begin{array}{r} 3{,}495 \\ -\ 3{,}090 \\ \hline 405 \end{array}$

(c)

Estimate	Exact
$\begin{array}{r} 6{,}800 \\ -\ 500 \\ \hline 6{,}300 \end{array}$	$\begin{array}{r} 6{,}767 \\ -\ 478 \\ \hline 6{,}289 \end{array}$

(d)

Estimate	Exact
$\begin{array}{r} 300 \\ -\ 100 \\ \hline 200 \end{array}$	$\begin{array}{r} 293.86 \\ -\ 148.00 \\ \hline 145.86 \end{array}$

18.

$\begin{array}{r} 75 \\ +\ 25 \\ \hline 100 \end{array}$	$\begin{array}{r} {\scriptstyle 0\,9\,9\,9\,10} \\ 100.00 \\ -\ 12.75 \\ \hline 87.25 \end{array}$

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

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

26.

$$\begin{array}{r} {\scriptstyle 1}\\ \cancel{1}\cancel{2}\\ \cancel{1}\cancel{2}\\ 236\\ \times\ 244\\ \hline {\scriptstyle 11}944\\ 944\\ 472\\ \hline 57{,}584 \end{array}$$

28.

$$\begin{array}{r} {\scriptstyle 2}\\ {\scriptstyle 26}\\ 327\\ \times\ \ 39\\ \hline {\scriptstyle 1}\\ 2\ 943\\ 9\ 81\\ \hline 12{,}753 \end{array}$$

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

30.

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

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

32. Estimate

$$\begin{array}{r} 30\\ \times\ 40\\ \hline 1200 \end{array}$$

Exact

$$\begin{array}{r} \$\ 33.25\\ \times\ \ 37\\ \hline 232\ 75\\ 997\ 5\\ \hline \$1{,}230.25 \end{array}$$

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

34. Estimate

$$A = l \times w$$
$$= 200 \times 100$$
$$= 20{,}000$$

Exact

$$A = l \times w$$
$$= 234.6 \times 123.2$$
$$= 28{,}902.72$$

Check

$$\begin{array}{r} 234.6\\ \times\ 123.2\\ \hline 469\ 2\\ 7038\\ 4\ 692\\ 23\ 46\\ \hline 28{,}902.72 \end{array} \qquad \begin{array}{r} 123.2\\ \times\ 234.6\\ \hline 73\ 92\\ 492\ 8\\ 3\ 696\\ 24\ 64\\ \hline 28{,}902.72 \end{array}$$

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

36. $178.6 \times 0.28 \times 5$

$$\begin{array}{r} {\scriptstyle 1\,1\,1}\\ {\scriptstyle 6\,6\,4}\\ 178.6\\ \times\ 0.2\ 8\\ \hline {\scriptstyle 1\,1\ \ 1}\\ 14\ 28\ 8\\ 35\ 72\\ \hline 50.00\ 8 \end{array}$$

$$\begin{array}{r} 50.008\\ \times\ \ \ \ 5\\ \hline 250.040 \end{array} \text{ or } 250.04$$

The employee earns \$250.04.

38. $29.25 \div 0.36$

$$0.36\overline{)29.25}$$

$$\begin{array}{r} 81\text{R}9 \\ 288 \\ \hline 45 \\ 36 \\ \hline 9 \end{array}$$

40. $364.8 \div 6$

$$6\overline{)364.8}$$

$$\begin{array}{r} 60.8 \\ 36 \\ \hline 4 \\ 0 \\ \hline 48 \\ 48 \\ \hline 0 \end{array}$$

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

$$20\overline{)10{,}160}$$

$$\begin{array}{r} 508 \\ 100 \\ \hline 16 \\ 0 \\ \hline 160 \\ 160 \\ \hline 0 \end{array}$$

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

46. average, nearest cent (hundredth)

$$\begin{array}{rr} & {\scriptstyle 2\,2\,3\,2} \\ \$ & 74.98 \\ & 23.72 \\ & 51.27 \\ & 125.36 \\ + & 85.93 \\ \hline \$ & 361.26 \end{array}$$

$$5\overline{)361.260} \quad 72.252 \approx \$72.25$$

$$\begin{array}{r} 35 \\ \hline 11 \\ 10 \\ \hline 1\,2 \\ 1\,0 \\ \hline 26 \\ 25 \\ \hline 12 \\ 10 \\ \hline \end{array}$$

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: $\boxed{\sqrt{\ }}$ 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.
$2 + 3 \cdot 3 \div 3 =$ Multiply.
$2 + 9 \div 3 =$ Divide.
$2 + 3 =$ Add.
5

56.
$18 \div 6 - 3 =$ Divide.
$3 - 3 =$ Subtract.
0

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. $4 + \frac{8.6}{2}(2) =$ 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 ÷ 194,582 = $38,339.48669; $38,339 (rounded)

78.

$(42 + 68 + 72 + 96) \div 4 =$

$278 \div 4 =$

69.5

or 70 (rounded)

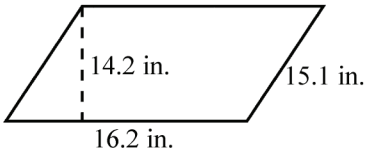
80.

$(78 + 72 + 86 + 88 + 90 + 85 + 82) \div 7 =$

$581 \div 7 =$

$83°$

82.

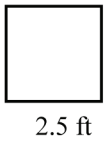


$P = 2(b + s)$
$P = 2(16.2 + 15.1)$
$P = 2(31.3)$
$P = 62.6$ in.

84.

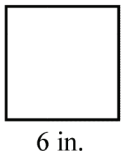
$P = 2(l + w)$
$P = 2(15.9 + 12.7)$
$P = 2(28.6)$
$P = 57.2$ cm

86.



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

88.



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

90.

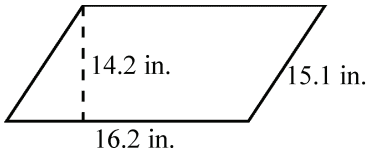
$P = 4s$

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

$P = 62$ ft

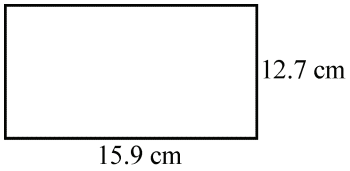
$62 - 4 = 58$ ft of fencing

92.



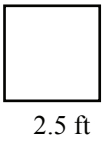
$A = bh$
$A = 16.2(14.2)$
$A = 230.04 \text{ in}^2$

94.



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

96.



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

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

100.
$$A_{\text{doorway}} = lw = 7(6) = 42 \text{ ft}^2$$
$$A_{\text{front}} = lw = 20(12) = 240 \text{ ft}^2$$
$$A_{\text{brick}} = 240 - 42 = 198 \text{ ft}^2$$
$$\frac{198 \cancel{\text{ft}^2}}{1}\left(\frac{6 \text{ bricks}}{1 \cancel{\text{ft}^2}}\right) = 1{,}188 \text{ bricks}$$

Chapter 1 Concepts Analysis

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

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

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

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

5. $6 \div 12 \neq 12 \div 6$
$\frac{1}{2} \neq 2$
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. $2.5 + 4.9 =$

$$\begin{array}{r} {\scriptstyle 1} \\ 2.5 \\ +\ 4.9 \\ \hline 7.4 \end{array}$$

$5 + 9 = 14$
Write 4 in the tenths column and carry the 1 to the units column.
$1 + 2 + 4 = 7$

8. The order of operations states that multiplication must be done before 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 (hundredths)
$4. 8③4
$4.83 (rounded down since 4 is less than 5)

6.

$$\begin{array}{r} {\scriptstyle 5\,11\ 4\,2\,{}^{12}12} \\ \$\,61{,}532 \\ -\ 47{,}245 \\ \hline \$\,14{,}287 \end{array}$$

8.

$$\begin{array}{r} \$2{,}133.33 \\ 12\overline{)25{,}600.00} \\ \underline{24} \\ 16 \\ \underline{12} \\ 40 \\ \underline{36} \\ 40 \\ \underline{36} \\ 40 \\ \underline{36} \\ 40 \\ \underline{36} \\ 4 \end{array}$$

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:

$$\begin{array}{r} 300 \\ \times\ 50 \\ \hline \$15{,}000 \end{array}$$

Exact:

$$\begin{array}{r} \$335 \\ \times\ \ 45 \\ \hline 1\,675 \\ 13\,40 \\ \hline \$15{,}075 \end{array}$$

The total cost is $15,075.

16.

$$\begin{array}{r} {\scriptstyle 1} \\ 17 \\ \times\ \ 2 \\ \hline 34 \end{array}$$

The professor should give 34 points to the student.

18.

$$25 \overline{)\ 27.75}\quad 1.11$$

$$\begin{array}{r} 25 \\ \hline 27 \\ 25 \\ \hline 25 \\ 25 \\ \hline 0 \end{array}$$

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

22. Estimate, nearest whole number

$$\begin{array}{rr} 3.85 & 4 \\ +\ 7.46 & +\ 7 \\ \hline & 11 \end{array}$$

24.

$$\begin{array}{rr} 1.485 & 1.485 \\ -\ 0.010 & +\ 0.010 \\ \hline 1.475 & 1.495 \end{array}$$

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

26.

$$\begin{array}{r} {\scriptstyle 5\ 3} \\ 7.96 \\ \times\ \ 16 \\ \hline {\scriptstyle 11} \\ 47\,76 \\ 79\,6 \\ \hline 127.36 \end{array}$$

The length of steel required is 127.36 ft.

28.

$l = 18.5$ ft

$w = 2.5$ ft

$P = 2l + 2w$

$P = 2(18.5 \text{ ft}) + 2(2.5 \text{ ft})$

$P = 37 \text{ ft} + 5 \text{ ft}$

$P = 42$ ft

$A = lw$

$A = 18.5 \text{ ft}(2.5 \text{ ft})$

$A = 46.25 \text{ ft}^2$