1. a.
```
      2 4
    5 3 6
  x   7 1
    5 3 6
  3 7 5 2
  3 8,0 5 6
```

b.
```
  $2 4.5 9
  x     7 0
  $1,7 2 1.3 0
```

c.
```
        2 0 6
    x   9 1 5
    1 0 3 0
      2 0 6
  1 8 5 4
  1 8 8,4 9 0
```

d.
```
      1 3 8 7
  4)5 5 4 8
    4
    1 5
    1 2
      3 4
      3 2
        2 8
        2 8
          0
```

e.
```
      8 5.6
  7)5 9 9.2
    5 6
    3 9
    3 5
      4 2
      4 2
        0
```

f.
```
      1 0 3 4
  8)8 2 7 2
    8
    0 2 7
      2 4
        3 2
        3 2
          0
```

2. Multiply the quotient by the divisor to check your division.

```
    1 3 2
    1 3 8 7
  x       4
    5 5 4 8
```

```
      3 4
      8 5.6
  x       7
    5 9 9.2
```

```
      2 3
    1 0 3 4
  x       8
    8 2 7 2
```

3. a. 6,048
   b. 34.95
   c. 109,841 R2

4. a. $37 \div 6 = 6$ R1; $6 \times 6 + 1 = 37$
   b. $54 \div 5 = 10$ R4; $5 \times 10 + 4 = 54$
   c. $61 \div 8 = 7$ R5; $8 \times 7 + 5 = 61$

5.

$2 \times 45 = 90$
$3 \times 45 = 135$
$4 \times 45 = 180$
$5 \times 45 = 225$
$6 \times 45 = 270$
$7 \times 45 = 315$
$8 \times 45 = 360$
$9 \times 45 = 405$
	a. `45)4005` quotient `89`
	`-3 6 0`
	`4 5`
	`- 4 5`
	`0`
		`34`
		`8 9`
		`× 4 5`
		`4 4 5`
		`+3 5 6 0`
		`4 0 0 5`

$2 \times 30 = 60$
$3 \times 30 = 60$
$4 \times 30 = 90$
$5 \times 30 = 120$
$6 \times 30 = 180$
$7 \times 30 = 210$
$8 \times 30 = 240$
$9 \times 30 = 270$
	b. `30)20220` quotient `674`
	`-1 8 0`
	`2 2 2`
	`-2 1 0`
	`1 2 0`
	`-1 2 0`
	`0`
		`2 1`
		`6 7 4`
		`× 3 0`
		`2 0 2 2 0`

$2 \times 75 = 150$
$3 \times 75 = 225$
$4 \times 75 = 300$
$5 \times 75 = 375$
	c. `75)19.875` quotient `0.265`
	`-1 5 0`
	`4 8 7`
	`-4 5 0`
	`3 7 5`
	`-3 7 5`
	`0`
		`34`
		`0.2 6 5`
		`× 7 5`
		`1 3 2 5`
		`+1 8 5 5 0`
		`1 9.8 7 5`

6

6. a. 1,813 R1; 48 × 1813 + 1 = 87,025
   b. 9,685 R10; 90 × 9685 + 10 = 871,660
   c. 658 R66; 82 × 685 + 66 = 54,022

7.

a. 2,960 R86	
2960 101)299046 -202 970 -909 614 -606 86	34 2960 × 101 2960 0 +296000 298960 + 86 299046
b. 29,546 R48 29546 123)3634206 -246 1174 1107 672 -615 570 -492 786 -738 48	29546 × 123 88638 590920 +2954600 3634158 + 48 3634206
c. 21,862 R300 21862 350)7652000 -700 652 -350 3020 -2800 2200 -2100 1000 -700 300	21862 × 350 0 1093100 +6558600 7651700 + 300 7652000

Rounding and Estimating, p. 27

1.

Number	410,987	699,893	12,781,284	3,259,949	1,495,397
...thousand	411,000	700,000	12,781,000	3,260,000	1,495,000
...ten thousand	410,000	700,000	12,780,000	3,260,000	1,500,000
...hundred thousand	400,000	700,000	12,800,000	3,300,000	1,500,000
...million	0	1,000,000	13,000,000	3,000,000	1,000,000

2.

Number	8,419,289,387	12,238,994,038	3,459,994,920	2,203,845,108
...ten million	8,420,000,000	12,240,000,000	3,460,000,000	2,200,000,000
...hundred million	8,400,000,000	12,200,000,000	3,500,000,000	2,200,000,000
...billion	8,000,000,000	12,000,000,000	3,000,000,000	2,000,000,000

3. a. $299,\underline{7}24 \approx \underline{300,000}$ b. $1,399,\underline{9}56 \approx \underline{1,400,000}$

c. $698,999,\underline{8}65 \approx \underline{699,000,000}$ d. $499,998,\underline{3}25 \approx \underline{500,000,000}$

4.

a. $2,384 \times 19,384$ Estimation: $2,000 \times 20,000 = 40,000,000$ Exact: $46,211,456$ Error of estimation: $6,211,456$	b. $345 \times 61,852$ Estimation: $300 \times 62,000 = 18,600,000$ Exact: $21,338,940$ Error of estimation: $2,738,940$
c. $124,012 - 16 \times 2,910$ Estimation: $124,000 - 10 \times 3,000 = 124,000 - 30,000 = 94,000$ or $124,000 - 15 \times 3,000 = 124,000 - 45,000 = 79,000$ Exact: $77,452$ Error of estimation: $16,548$ or $1,548$	d. $25,811 \div 487$ Estimation: $26,000 \div 500 = 52$ Exact: 53 Error of estimation: 1

5. $2 \times \$1.40 \times 20 = 56$. Janet spends approximately $56 a month for bus fare.

6. $7 \times \$1.00 + 3 \times \$11.50 = \$7 + \$34.50 = \$41.50$

7. The total monthly savings are $2,417. You can solve this in many different ways. For example:

Right now, the salaries are a total of $3 \times \$1,552 + 2 \times \$1,267 = \$4,656 + \$2,534 = \$7,190$.
When those are cut by 1/10, the savings are $719.
When the other operating costs, $8,490, are cut by 2/10, the savings are $849 + \$849 = \$1,698$.
In total, the savings are $1,698 + \$719 = \$2,417$.

Lessons in Problem Solving, p. 30

1. One small carpet costs $\$55.50 \div 5 \times 2 = \$22.20$. Two of them cost $44.40.
   $50 - \$44.40 = \$5.60$ His change was $5.60.

2. The smaller ones hold $0.75 \text{ L} \div 10 \times 7 = 0.525 \text{ L}$.
   Four large containers would hold $4 \times 0.75 = 3$ liters.
   Five small containers would hold $5 \times 0.525 = 2.625$ liters.
   In total, they hold $3 \text{ L} + 2.625 \text{ L} = 5.625 \text{ L}$. So, yes, five liters of soup will fit into four large and five small containers.

3. Converting the 25 kg and 15 kg into grams: $25,000 \text{ g} \div 20 = 1,250 \text{ g}$ or 1.25 kg. One bag of bolts weighs 1.25 kg.
   $15,000 \text{ g} \div 20 = 750 \text{ g}$ or 0.75 kg. One bag of nuts weighs 0.75 kg.
   $1.25 \text{ kg} + 0.75 \text{ kg} = 2 \text{ kg}$. Together the nuts and bolts weigh 2 kg.

Chapter 2: Expressions and Equations

Terminology for the Four Operations, p. 39

1.

numbers	sum	difference	product	quotient
a. 50 and 2	52	48	100	25
b. 5 and 3	8	2	15	5/3 or 1 2/3

2.

numbers/letters	sum	difference	product	quotient
a. x and 6	$x + 6$	$x - 6$	$6x$	$\dfrac{x}{6}$
b. z and w	$z + w$	$z - w$	wz	$\dfrac{z}{w}$

Notice that when variables are multiplied, they are written in alphabetical order. That is why the product of z and w is best written as wz; however zw is acceptable since this has not been taught at this point. See page 55 in the text.

3.

a. the product of 5 and T — $5 - T$ 29 — e. the difference of T and 5

b. the quotient of 5 and T — $T - 5$ $\dfrac{T}{5}$ — f. the sum of T and 5

c. the product of 6 and 5 — 30   5T — g. the sum of 5, 15, and 9

d. the quotient of T and 5 — $5 \div T$ $T + 5$ — h. the difference of 5 and T

4.

Statement	Equation
a. The quotient is 5, the divisor is 8, the dividend is 40.	$40 \div 8 = 5$
b. The subtrahend is 30, the difference is 15, and the minuend is 45.	$45 - 30 = 15$
c. The factors are 5, 6, and 8, and the product is 240.	$5 \cdot 6 \cdot 8 = 240$
d. The addends are 7, 8, and 85, and the sum is 100.	$7 + 8 + 85 = 100$

5. a. Answers will vary. Please check the student's work.
Examples: $5 \cdot 6 \cdot 0 = 0$ or $0 \cdot 2 \cdot 250 = 0$ or $65 \cdot 0 \cdot 12 = 0$
Any numbers can be used as long as at least one of the three factors is zero.

b. Answers will vary. For example: $120 \div 40 = 3$ or $120 \div 120 = 1$ or $120 \div 9 = 13$ R3.
The divisor will need to be more than 8 (because $120 \div 8 = 15$).

c. Answers will vary. For example: $2 + 2 + 2 + 2 = 8$; $1 + 2 + 3 + 2 = 8$; $1 + 1 + 1 + 1 = 4$; $0 + 0 + 0 + 8 = 8$

6. Subtract the difference from the minuend and you will find the subtrahend.

a. $56 - 37 = 19$ b. $4,203 - 3650 = 553$

7. Divide the dividend by the quotient, and you will find the divisor..

a. $\dfrac{56}{8} = 7$ b. $\dfrac{535}{107} = 5$

8. Divide the product solved by the known factor and you will find the missing factor.

a. $12 \cdot 8 = 96$ b. $7 \cdot 418 = 2,926$

Terminology for the Four Operations, cont.

9. a. $7y$ b. $S + 7$ c. $\dfrac{5s}{8}$ d. $x - 9$

   e. $190 + r$ f. $8d$ g. $9 - x$ h. $n - 14$

10. a. $\dfrac{2x - 1}{3}$ b. $(5 + x)^3$ c. $5(x + 2)$ d. $8(4 + x + 2)$

   e. $2(10 - s)$ f. $\dfrac{y}{y + 4}$ g. $\dfrac{x + 4}{x^2}$

11. a. $7s + 6$ b. $4s - 9$ c. $\dfrac{5 + x}{5 - x}$ d. $(6 - x)^2$

   e. $(5 - m)^2$ f. $\dfrac{w^2}{w - 1}$ g. $100 - p^2$ h. $7 - x$

   i. $x^2 + 100$

Puzzle corner:
a. 7, 8, 9. The next higher cube after 504 is $8^3 = 512$, so 8 is the middle number. The others are one higher and one lower: $7 \cdot 8 \cdot 9 = 504$.
b. The sum 621 divided by 3 gives the "average" number 207, so the others are one less and one more: 206, 207, 208.

The Order of Operations, p. 43

1. a. $100 - (50 - 50) = 100$ b. $200 \div (10 + 10) + 5 = 15$ c. $(50 + 50) \cdot 4 - 10 = 390$

2.

a. $\dfrac{64}{8} \cdot 4 = 32$	b. $\dfrac{64}{8 \cdot 4} \cdot 2 = 4$	c. $4 \cdot \dfrac{8}{4} \cdot 2 = 16$
d. $\dfrac{64}{8 \cdot 4} = 2$	e. $\dfrac{64}{8} \cdot 4 \cdot 2 = 64$	f. $\dfrac{4 \cdot 8}{4 \cdot 2} = 4$

3.

a. $150 + 2 \cdot 10 = 170$	b. $5^2 \cdot 2^3 = 200$	c. $3^2 \cdot (150 + 900) \div 3 = 3{,}150$
d. $\dfrac{12 + 9}{4 + 1} = 4\ 1/5$	e. $\dfrac{5^2}{3^2} = 2\ 7/9$	f. $\dfrac{2^3}{8} + 10^3 = 1001$
g. $(6 + 6)^2 \cdot (15 - 5)^2 = 14{,}400$	h. $40 + 80 \div 2 \cdot 4 - 15 = 185$	i. $\dfrac{7^2}{7} \cdot 7 = 49$

4. a. $20{,}000 - 7 \cdot 500 = 16{,}500$
   b. $6 \cdot 70 + 5 \cdot 120 = 1{,}020$

5. a. $2^7 + 5^3 = 128 + 125 = 253$
   b. $5 \cdot 100^3 - 2 \cdot 10^5 = 5{,}000{,}000 - 200{,}000 = 4{,}800{,}000$

6. a. $(3.2 + 5.3) \cdot 2 = 17$ or $2 \cdot (3.2 + 5.3) = 17$ b. $(190 - 50) \div 5 = 28$

   c. $100 - (40 - 5) = 65$ d. $(2 \cdot 5)^3 = 1{,}000$

   e. $\dfrac{5}{3^3} = 5/27$ f. $2(10 - 4) + 3(5 + 8) = 51$

   g. $\dfrac{61 - 30}{5^2} = 31/25 = 1\ 6/25$ h. $6^2 - 7 = 29$

7. a. $5 \cdot 10¢ + 15 \cdot 1¢ + 2 \cdot 25¢ + 7 \cdot 50¢ = 465¢$
   b. $(64 - 15) \cdot 2 = 98$. Henry has 98 marbles.
   c. $5 \cdot 20 - 9 \cdot 2 = 82$. The colored area is 82 square units.
   d. $5 \cdot 5 - 2 \cdot 2 = 21$. The colored area is 21 square units.

Chapter 3: Decimals

Place Value with Decimals, p. 93

1.

0.00006	6 parts per thousand	$\dfrac{6}{100000}$	$\dfrac{15}{100000}$
0.0015	15 hundred-thousandths		$\dfrac{15}{1000}$
0.000006	15 ten-thousandths	$\dfrac{6}{1000}$	
0.00015	6 hundred-thousandths		$\dfrac{15}{10000}$
0.006	15 parts per million		
0.000015	15 thousandths	$\dfrac{6}{1000000}$	$\dfrac{15}{1000000}$
0.015	6 millionths		

2.
a. 0.003   b. 3.4
c. 1.001934   d. 0.0034
e. 0.000907   f. 0.00837
g. 0.52   h. 0.00008
i. 3.017   j. 0.000091
k. 1.056   l. 2.028319
m. 0.0291   n. 4.000005

3. a. 9/100   b. 5/1000   c. 45/1000
d. 371/100,000   e. 2381/100,000   f. 30,078/10,000
g. 29,302/10,000   h. 2,003,814/1,000,000 i. 53,925,012/10,000,000
j. 31/10,000,000   k. 3,294,819/1,000,000 l. 4,500,032/100,000

4. a. $2.67 = 2 \times 1 + 6 \times \dfrac{1}{10} + 7 \times \dfrac{1}{100}$

b. $0.594 = 5 \times \dfrac{1}{10} + 9 \times \dfrac{1}{100} + 4 \times \dfrac{1}{1,000}$

c. $45.6 = 4 \times 10 + 5 \times 1 + 6 \times \dfrac{1}{10}$

d. $0.004923 = 4 \times \dfrac{1}{1,000} + 9 \times \dfrac{1}{10,000} + 2 \times \dfrac{1}{100,000} + 3 \times \dfrac{1}{1,000,000}$

e. $0.00000506 = 5 \times \dfrac{1}{1,000,000} + 6 \times \dfrac{1}{100,000,000}$

5. a. 65.286   b. 5.055009
c. 700.07103   d. 0.010304
e. 6.5903   f. 2.02101

Comparing Decimals p. 95

1. a. 0.067 > 0.0098   b. 0.0005 < 0.005   c. 1.828 > 1.0828
   d. 2.504040 < 2.505404   e. 8.00014 < 8.004   f. 0.91701 > 0.917005

Comparing Decimals, cont.

2.

a. 0.05 0.009 <u>0.1</u>	b. 1.04 <u>1.2013</u> 1.1	c. <u>0.905</u> 0.86948 0.9
d. <u>0.0004</u> 0.0000337	e. 9.082 <u>9.1</u> 9.09	f. <u>0.288391</u> 0.284857

3. a. 0.0087 > 0.0009   b. 1.005830 > 1.002301   c. 1.270038 < 1.270110

   d. 0.0000020 > 0.0000004   e. 0.000026 > 0.000010   f. 0.450 > 0.300

4. a. 0
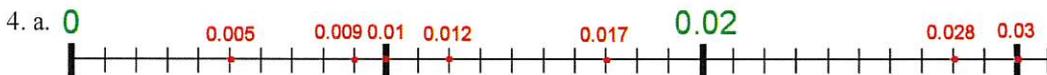
Note: The student is expected to *reason* what the midpoints would be, based on the visual number line, and is not required to *calculate* them. The calculations below are included as enrichment to show how it *could* be done and how it gives exactly the same results.

b. The midpoint of 0 and 0.01 is exactly (0 + 0.01) / 2 = <u>0.005</u>
c. The midpoint of 0.01 and 0.02 is exactly (0.01 + 0.02) / 2 = <u>0.015</u>
d. The midpoint of 0 and 0.001 is exactly (0 + 0.001) / 2 = <u>0.0005</u>
e. The midpoint of 0.001 and 0.002 is exactly (0.001 + 0.002) / 2 = <u>0.0015</u>

5.

a. 0.0491 < 0.2930 < 0.3100	b. 1.043 < 1.304 < 1.340
c. 3.00028 < 3.00890 < 3.00980	d. 0.000003 < 0.000020 < 0.000023
e. 1.0980 < 1.0987 < 1.1070	f. 0.0400 < 0.0450 < 0.0456

6. a. 0.400 + 0.008 = 0.408
   b. 0.20 + 0.07 = 0.27
   c. 4.001 + 0.007 = 4.008
   d. 0.005 + 0.060 = 0.065

7.

Number	0.4	0.35	0.027	1.297	5.99	0.606
+ 0.1	0.5	0.45	0.127	1.397	6.09	0.706
+ 0.01	0.41	0.36	0.037	1.307	6	0.616
+ 0.001	0.401	0.351	0.028	1.298	5.991	0.607

Add and Subtract Decimals, p. 97

1.

a.

O		t	h	th	t-th
0	.	0	0	2	

1 tenth more: 0.002 + 0.100 = <u>0.102</u>
1 thousandth less: 0.002 − 0.001 = <u>0.001</u>
1 ten-thousandth more: 0.0020 + 0.0001 = <u>0.0021</u>

b.

O		t	h	th	t-th	h-th
0	.	8	5			

2 hundredths less: 0.85 − 0.02 = <u>0.83</u>
2 ten-thousandths more: 0.8500 + 0.0002 = <u>0.8502</u>
2 hundred-thousandths more: 0.85000 + 0.00002 = <u>0.85002</u>

2.

a. 0.2 + 0.8 = <u>1.0</u>	d. 0.03 + 0.06 = <u>0.09</u>	g. 0.090 + 0.007 = <u>0.097</u>
b. 0.20 + 0.08 = <u>0.28</u>	e. 0.0300 + 0.0006 = <u>0.0306</u>	h. 0.900 + 0.007 = <u>0.907</u>
c. 0.2000 + 0.0008 = <u>0.2008</u>	f. 0.03000 + 0.00006 = <u>0.03006</u>	i. 0.00009 + 0.00700 = <u>0.00709</u>

Add and Subtract Decimals, cont.

3.

a. 1.30 + 0.56 = 1.86	b. 0.20 + 0.27 = 0.47	c. 3.19 + 0.50 = 3.69	d. 2.289 − 0.100 = 2.189

4. a. 0.25, 0.28, 0.31, 0.34, 0.37, 0.40, 0.43, 0.46, 0.49
b. 3.275, 3.28, 3.285, 3.29, 3.295, 3.3, 3.305, 3.31, 3.315

5. a. 0.15 + 0.20 = 0.17 0.35   b. 1.06 + 0.04 = 1.10 was correct.   c. 0.90 − 0.08 = 0.10 0.82

6.

a. 0.5 − 0.2 = 0.3	b. 0.5 − 0.02 = 0.48	c. 0.5 − 0.002 = 0.498

7. As seen below, other tricks you can use when adding or subtracting in columns are:
- line the decimal points and then fill the missing spaces with zeroes
- group the decimal digits in threes, to help keep track of all the digits

7. a.
```
      6 . 907 00
   −  4 . 800 56
      2 . 106 44
```
b.
```
       2 . 000 000
   +   9 . 082 000
   +   0 . 038 284
   +   4 . 502 800
      15 . 623 084
```
c.
```
      410 . 000 00
   −   25 . 600 00
   −    4 . 593 84
      379 . 806 16
```

8. a. 0.200 + 0.035 = 0.235   b. 0.0004 + 0.0400 = 0.0404

c. 0.70000 + 0.00205 − 0.01800 = 0.68405   d. 9.0000 + 0.0009 − 0.5000 = 8.5009

9. a. x = 2.3000 − 0.0095 = 2.2905
b. x = 0.00311 + 0.39192 = 0.39503
c. x = 2.00480 − 1.28029 = 0.72451

Rounding Decimals, p. 99

1. a. 2.7   b. 3.055   c. 2.27   d. 0.049

2. a. 7.25   b. 0.02   c. 1.36   d. 4.98

3. 7.249   b. 0.027   c. 1.395   d. 4.908

4. a. $2 + $1 + $7 + $12 = $22
b. $30 − $22 = $8
c. Exact cost: $1.82 + $0.89 + $6.72 + 2 × $6.12 = $21.67. Error of estimation: $0.33.

5. a. 1.0   b. 2.060   c. 6.20
d. 0.050   e. 7.240   f. 0.200
g. 4.00   h. 0.100   i. 0.0090

6. a. 0.3840   b. 2.39   c. 0.03900
d. 938   e. 710   f. 1000

7.

Number:	0.289940	1.293854	2.5949405	0.394040	2.299775
...three decimals	0.290	1.294	2.595	0.394	2.300
...four decimals	0.2899	1.2939	2.5949	0.3940	2.2998
...five decimals	0.28994	1.29385	2.59494	0.39404	2.29978

Rounding Decimals, cont.

8.

a. $0.1539204 + 0.23609$	b. $1.39821 + 0.2831$
Estimate: $0.15 + 0.24 = 0.39$	Estimate: $1.40 + 0.28 = 1.68$
Exact: $\quad 0.1539204$ $+0.23609$ $\quad 0.3900104$	Exact: $\quad 1.39821$ $+0.2831$ $\quad 1.68131$

c. $3.4822 + 3 - 4.5078$

Estimate:
$3.48 + 3 - 4.51 = 6.48 - 4.51 = 1.97$ Exact:

$$\begin{array}{r} \overset{11}{} \\ \overset{5}{}\ \overset{14}{4}\ \overset{7}{8}\ \overset{\cancel{+}\,12}{\cancel{2}}\,\cancel{2} \\ 6.4822 \\ -4.5078 \\ \hline 1.9744 \end{array}$$

d. $2.917328 - 0.302849 - 1.0549$

Estimate:
$2.92 - 0.30 - 1.05 = 2.62 - 1.05 = 1.57$ Exact:

$$\begin{array}{r} 0.302849 \\ +1.0549 \\ \hline 1.357749 \end{array} \qquad \begin{array}{r} \overset{10\ \ 16\ \ 12\ \ 11}{8\ \cancel{0}\ \cancel{6}\ \cancel{2}\ \cancel{+}\,18} \\ 2.9\cancel{+}\cancel{7}\cancel{3}\cancel{2}\cancel{8} \\ -1.357749 \\ \hline 1.559579 \end{array}$$

Mystery Number 5.448

Review: Multiply and Divide Decimals Mentally, p. 102

1. a. $7 \times 0.6 = 4.2$ b. $4 \times 1.5 = 6.0$ c. $3 \times 0.05 = 0.15$ d. $9 \times 0.8 = 7.2$
   $7 \times 0.06 = 0.42$ $4 \times 0.15 = 0.60$ $3 \times 0.005 = 0.015$ $9 \times 0.008 = 0.072$
   $7 \times 0.006 = 0.042$ $4 \times 0.0015 = 0.0060$ $3 \times 0.0005 = 0.0015$ $9 \times 0.00008 = 0.00072$

2.
a. $0.36 \div 4 = 0.09$ $0.09 \times 4 = 0.36$	b. $3.5 \div 7 = 0.5$ $0.5 \times 7 = 3.5$	c. $0.008 \div 2 = 0.004$ $0.004 \times 2 = 0.008$	d. $0.099 \div 9 = 0.011$ $0.011 \times 9 = 0.099$
e. $0.0046 \div 2 = 0.0023$ $0.0023 \times 2 = 0.0046$	f. $0.0024 \div 3 = 0.0008$ $0.0008 \times 3 = 0.0024$	g. $0.00049 \div 7 = 0.00007$ $0.00007 \times 7 = 0.00049$	h. $0.144 \div 12 = 0.012$ $0.012 \times 12 = 0.144$

3.
a. $0.36 \div 0.06 = 6$ $6 \times 0.06 = 0.36$	b. $1.8 \div 0.2 = 9$ $9 \times 0.2 = 1.8$	c. $0.054 \div 0.006 = 9$ $9 \times 0.006 = 0.054$

4. a. $4 \div 0.5 = 8$ b. $2 \div 0.4 = 5$ c. $0.56 \div 0.07 = 8$
   d. $0.0012 \div 0.0004 = 3$ e. $0.015 \div 0.005 = 3$ f. $0.0032 \div 0.0008 = 4$

5.
a. $0.30 \div 0.15 = 2$ $2 \times 0.15 = 0.30$	b. $0.040 \div 0.005 = 8$ $8 \times 0.005 = 0.040$	c. $0.40 \div 0.02 = 20$ $20 \times 0.02 = 0.40$
d. $0.600 \div 0.002 = 300$ $300 \times 0.002 = 0.600$	e. $0.70 \div 0.01 = 70$ $70 \times 0.01 = 0.70$	f. $0.00800 \div 0.00002 = 400$ $400 \times 0.00002 = 0.00800$

6. a. $15.3 \text{ m} \div 0.3 \text{ m} = 51$ pieces.
   b. $\$63.96 \div 3 = \$21.32$. Divide in parts: $(\$60 \div 3) + (\$3 \div 3) + (\$0.90 \div 3) + (\$0.06 \div 3) = \$21.32$.

7. a. $2.5 \div 5 = 0.5$ b. $3.0 \div 0.6 = 5$ c. $1.02 \div 2 = 0.51$
   d. $0.048 \div 0.008 = 6$ e. $0.60 \div 0.02 = 30$ f. $0.0056 \div 7 = 0.0008$
   g. $4.018 \div 2 = 2.009$ h. $0.0306 \div 3 = 0.0102$ i. $0.5055 \div 5 = 0.1011$

Review: Multiply Decimals by Decimals, p. 104

1.

a. $0.2 \times 0.8 = 0.16$ d. $0.004 \times 0.5 = 0.0020$	b. $0.7 \times 0.12 = 0.084$ e. $0.02 \times 0.0009 = 0.000018$	c. $0.03 \times 0.9 = 0.027$ f. $0.011 \times 0.06 = 0.00066$

2.
a. $1.1 \times 0.02 \times 0.5 = 0.0110$
b. $0.3 \times 0.07 \times 0.2 = 0.0042$
c. $5 \times 0.02 \times 0.004 = 0.00040$
d. $0.3 \times 4 \times 0.002 = 0.0024$
e. $0.3 \times 0.3 \times 0.3 = 0.027$
f. $4 \times 0.4 \times 0.0005 = 0.00080$

3. a. 0.3 m × \$3.20/m = \$0.96. Multiply 3 × 32 = 96. The only reasonable answer is \$0.96 (\$9.60 would not make sense).

b. 1.2 kg × \$50/kg = \$60. Multiply 12 × 5 = 60. The only reasonable answer is \$60 - slightly more than \$50, since 1.2 kg is slightly more than 1 kg.

4.

a. $3k = 3 \times 0.008 = 0.024$	b. $s^2 = 0.3^2 = 0.09$	c. $k^2 = 0.008^2 = 0.000064$
d. $s - k = 0.3 - 0.008 = 0.292$	e. $sk + 1 = 0.008 \times 0.3 + 1 = 1.0024$	f. $2s + 2k = 2 \times 0.3 + 2 \times 0.008 = 0.616$

5.

a. $0.4 \times 0.03 = 0.012$ $\downarrow$ $\downarrow$ $\downarrow$ $\dfrac{4}{10} \times \dfrac{3}{100} = \dfrac{12}{1000}$	b. $0.009 \times 0.3 = 0.0027$ $\downarrow$ $\downarrow$ $\downarrow$ $\dfrac{9}{1000} \times \dfrac{3}{10} = \dfrac{27}{10000}$	c. $0.011 \times 0.0006 = 0.0000066$ $\downarrow$ $\downarrow$ $\downarrow$ $\dfrac{11}{1000} \times \dfrac{6}{10,000} = \dfrac{66}{10,000,000}$
d. $1.1 \times 0.002 = 0.0022$ $\downarrow$ $\downarrow$ $\downarrow$ $\dfrac{11}{10} \times \dfrac{2}{1000} = \dfrac{22}{10,000}$	e. $0.21 \times 0.0004 = 0.000084$ $\downarrow$ $\downarrow$ $\downarrow$ $\dfrac{21}{100} \times \dfrac{4}{10,000} = \dfrac{84}{1,000,000}$	f. $0.005 \times 0.005 = 0.000025$ $\downarrow$ $\downarrow$ $\downarrow$ $\dfrac{5}{1000} \times \dfrac{5}{1000} = \dfrac{25}{1,000,000}$

6. $800 \times 1.4 = 1120$ and $1000 \times 1.4 = 1400$. The new image would be 1120 by 1400 pixels.

7.

a. $y = 0.006 \div 3 = 0.002$	b. $z = 0.00033 \div 3 = 0.00011$	c. $d = 0.72 \div 0.9 = 0.8$
d. $x = 2 \times 0.008 = 0.016$	e. $z = 0.5 \times 0.07 = 0.035$	f. $h = 2.1 \times 0.001 = 0.0021$

8. Please check the student's work. There can be various answers depending on how they round the numbers.

a. 0.37×0.91 $\approx 0.4 \times 0.9 = 0.36$	b. 1.205×0.51 $\approx 1.2 \times 0.5 = 0.6$	c. 3.93×0.043 $\approx 4 \times 0.04 = 0.16$
$0.37 \times 0.91 = 0.3367$	$1.205 \times 0.51 = 0.61455$	$3.93 \times 0.043 = 0.16899$

9. a. $12.345 \times 678.9 = 8381.0205$ b. $123.45 \times 0.6789 = 83.810205$ c. $1.2345 \times 67.89 = 83.810205$

10. a. $3.4 \times 0.28 = \underline{0.952}$. Estimate: $3 \times 0.3 = \underline{0.9}$
b. $0.455 \times 6.4 = \underline{2.912}$. Estimate: $0.5 \times 6 = \underline{3}$
c. $3.08 \times 0.0034 = \underline{0.010472}$. Estimate: $3 \times 0.003 = \underline{0.009}$
d. $0.007 \times 0.000135 = \underline{0.000000945}$. Estimate: $0.007 \times 0.0001 = \underline{0.0000007}$

11. a. $x = 4.5 \times 0.6 = 2.7$
b. $z = 2.2 \times 0.002 = 0.0044$

Review: Long Division with Decimals, p. 107

1. a. 1.57   Check: $5 \times 1.57 = 7.85$
   b. 0.687   Check: $3 \times 0.687 = 2.061$
   c. 0.87957   Check: $0.87957 \times 7 = 6.15699 \approx 6.157$

2. a. $7.1 \div 6 \approx 1.183$ b. $1.3 \div 3 \approx 0.433$ c. $2.509 \div 7 \approx 0.358$

3. a. $7 \div 11 \approx 0.636$ b. $21 \div 8 = 2.625$ c. $14.2 \div 5 = 2.84$
   d. $45.08 \div 9 \approx 5.009$ e. $48.44 \div 14 = 3.46$ f. $52.7 \div 23 \approx 2.291$

4. a. $4.1314 \div 7 = 0.590$ b. $46.08 \div 9 = 5.12$
   c. $0.342 \div 6 = 0.057$ d. $125 \div 13 \approx 9.615$
   e. $212.5 \div 23 \approx 9.239$ f. $460 \div 51 \approx 9.020$

Problem Solving with Decimals, p. 109

1. Two fathoms are 2×6 feet = 12 feet, and 3 2/3 m are about 3.667 m or 3.667×3.28 feet $\approx$ 12.03 feet. Since 12.03 feet > 12 feet, 3 2/3 m are longer than two fathoms (by about a third of an inch).

2. Jack, John, and Jerry each got $200.00 \div 3 = \underline{\$66.66}$ (with two cents left over).

3. 45 books. Five books would weigh 2 kg. You can pack nine times that many books, or 45 books, into a 18-kg suitcase.

4. The average is the sum of all of the student's scores divided by the total number of students:
   $(21 + 15 + 18 + 29 + 19 + 34 + 39 + 21 + 11 + 8 + 15 + 28 + 15 + 11 + 12) / 15 \approx 19.73$.

5. $A = 2.4 \text{ m} \times 1.2 \text{ m} + 1.2 \text{ m} \times 2.4 + 1.8 \times 1.8 = 9 \text{ m}^2$. The area is 9 square meters.
   $P = 2.4 \text{ m} + 1.2 \text{ m} + 1.2 \text{ m} + 2.4 \text{ m} + 0.6 \text{ m} + 1.8 \text{ m} + 1.8 \text{ m} + 5.4 \text{ m} = 16.8 \text{ m}$. The perimeter is 16.8 meters.

6. One 40-kg crate will hold the weight of $(40 \text{ kg}) \div (1.2 \text{ kg} / \text{blender}) = 33$ 1/3 blenders. Since they will pack only whole blenders, they can pack $\underline{33 \text{ blenders}}$ into each shipping crate.

7.

Item and price	Unit price	What would this cost...?	
32 oz of orange juice for $3.65	$0.11 per oz	12 oz of orange juice	$1.32
3 lb of chicken for $3.24	$1.08 per lb	5.7 lb of chicken	$6.16
4 lb of bananas for $1.99	$0.50 per lb	2.5 lb of bananas	$1.25

Multiply and Divide by Powers of Ten p. 114

1.

a. $10 \times 3.84 = 38.4$ $1{,}000 \times 3.84 = 3{,}840$	b. $100 \times 0.09 = 9.$ $10{,}000 \times 0.594 = 5{,}940$	c. $10{,}000 \times 3.84 = 38{,}400$ $1{,}000 \times 0.0038 = 3.8$
d. $10^3 \times 1.09 = 1{,}090$ $10^4 \times 1.09 = 10{,}900$	e. $10^3 \times 0.0075 = 7.5$ $10^5 \times 0.0075 = 750$	f. $10^7 \times 0.0021 = 21{,}000$ $10^6 \times 4.8 = 4{,}800{,}000$

2.

a. $1.5 \div 10 = 0.15$ $0.43 \div 10 = 0.043$	b. $1.08 \div 100 = 0.0108$ $2.3 \div 100 = 0.023$	c. $56 \div 10 = 5.6$ $56 \div 1000 = 0.056$
d. $0.69 \div 10^3 = 0.00069$ $51.0 \div 10^4 = 0.0051$	e. $2.9 \div 10^5 = 0.000029$ $4{,}500 \div 10^6 = 0.0045$	f. $67.8 \div 100 = 0.678$ $251 \div 10^4 = 0.0251$

3.

a. $0.23 \div 100 = 0.0023$ $1{,}400 \div 10{,}000 = 0.14$ $3.892 \div 1000 = 0.003892$	b. $1{,}000 \times 97.201 = 97{,}201$ $10^6 \times 0.004835 = 4{,}835$ $10^4 \times 3.49284 = 34{,}928.4$	c. $10^6 \times 34.2958 = 34{,}295{,}800$ $10^5 \times 0.00293 = 293$ $10^7 \times 2.19304 = 21{,}930{,}400$

4.

a. $0.15 \times 100 = 15$ $0.932 \times 10 = 9.32$	b. $100 \times 30.4 = 3{,}040$ $1{,}000 \times 5.5 = 5{,}500$
c. $0.029 \times 100{,}000 = 2{,}900$ $0.0006 \times 1{,}000{,}000 = 600$	d. $100{,}000 \times 0.34 = 34{,}000$ $100 \times 0.00478 = 0.478$

e. $\dfrac{17}{1{,}000} = 0.017$	f. $\dfrac{2.3}{100} = 0.023$	g. $\dfrac{412}{100} = 4.12$	h. $\dfrac{0.58}{10} = 0.058$

Review: Divide Decimals by Decimals, p. 116

1. The answers are the same. In each case, moving the decimal point of *both* the dividend and the divisor the same number of places makes no change in the quotient.

a. $120 \div 20 = 6$	e. $28 \div 4 = 7$
b. $12 \div 2 = 6$	f. $2.8 \div 0.4 = 7$
c. $1.2 \div 0.2 = 6$	g. $0.28 \div 0.04 = 7$
d. $0.12 \div 0.02 = 6$	h. $0.028 \div 0.004 = 7$

2.

a. $0.8 \div 0.02$ $8 \div 0.2$ $80 \div 2 = 40$	b. $12 \div 0.4$ $120 \div 4 = 30$	c. $4.5 \div 0.05$ $45 \div 0.5$ $450 \div 5 = 90$

3.

a. $1.6 \div 0.04$ $160 \div 4 = 40$	b. $2.6 \div 0.2$ $26 \div 2 = 13$	c. $36 \div 0.009$ $36000 \div 9 = 4{,}000$
d. $0.6 \div 0.003$ $600 \div 3 = 200$	e. $5.4 \div 0.009$ $5400 \div 9 = 600$	f. $0.5 \div 0.005$ $500 \div 5 = 100$