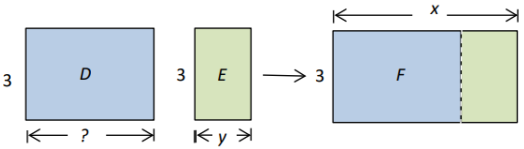


Dimensions Math Textbook 7A			
Updated 02/24/2020			
Page	Question or Section	Error	Date Added
80	(b)	$\frac{q - pr}{qr} = \frac{5 - \frac{1}{2} \times (-2)}{5 \times (-2)}$ $= \frac{6}{-10}$ $= -\frac{2}{3}$	3/14/2013
98	Class Activity 2	<p>5. x should indicate the entire length for Rectangle F. The length of rectangle D should not be labeled. (a) needs to be changed to finding the length of rectangle D in terms of x and y.</p> <p>The expected answers are given below:</p> <p>5. Consider the following diagram:</p>  <p>(a) Find the length of rectangle D in terms of x and y: $x - y$</p> <p>(b) Find the area of</p> <p>(i) rectangle D: $3(x - y)$ (ii) rectangle E: $3y$ (iii) rectangle F: $3x$</p> <p>(c) Use the areas in question 5(b) to write the relationship: The area of rectangle D = the difference between the areas of rectangle F and rectangle E: $3(x - y) = 3x - 3y$</p>	3/14/2013
101	Recall	$(-a + b)$ should be $-(a + b)$	3/14/2013
112	Nutshell	Under Distributive Law $-(x + y) = -x - y$	4/23/2013
114	Example 14(b)	Answer cannot have more significant figures than those used in calculation. Speed = 53 mi/h \times 1.6 km/mi = 85 km/hr (rounded to whole number)	5/19/2017
219 - 231		For first printing only, see answer key at the end with revised answers, corrections highlighted.	
224	17(b)	$x + \left(\frac{3}{5}x + 18\right) + \left[2\left(\frac{3}{5}x + 18\right) - 45\right]$	3/21/2013
224	19(a)(iii)	$x + 2(3x + 5) + 3\left(\frac{4}{5}x\right)$	3/21/2013
224	19(b)	104	3/14/2013
227	Chapter 6 Try It! 14	Same conversion factor as used in Example should be used, i.e. 1.6 km/mi, and answer should be rounded to a whole number. The measurement has only 2 significant figures. 98 km/h (rounded to a whole number)	5/19/2017
231	Ex 8.4, 2(c)	(i) right angled ($m\angle R = 90^\circ$) (ii) scalene	12/25/2013
231	Ex 8.4, 2(e)	(i) acute angled (ii) isosceles ($m\angle R = 65^\circ$)	12/25/2013
231	Ex 8.5, 2(b)	4.8 cm	2/27/2018

Dimensions Math Textbook 7A includes activities using The Geometer's Sketchpad, which is no longer available. We recommend using GoeGebra instead.

Dimensions Math Workbook 7A Updated 06/27/2018			
Page	Question or Section	Error	Date Added
8	Chapter 2, 11(b)	$4^3 - 52$ 7/20	
10	Chapter 2, 23(d)	Problem should be: $\left(\frac{2}{5} - \frac{3}{10} + \frac{1}{4}\right) + \left(\frac{3}{4} - \frac{1}{5} + \frac{1}{2}\right)$	12/18/20
11	Chapter 2, 28(b)	Renumber the parts. (i), (ii), (iii) , and (iv)	
14	Chapter 2, 42(a)	Clive wants to paint the walls of a rectangular room which are 5.26 m long....	
18	Chapter 3, 20	The amount of kinetic energy, E, in any moving object can be expressed by the formula: E = (1/2)MV²	
23	Chapter 4, 15(h)	$12\left(\frac{m+2n}{3} - \frac{m-3n}{6} + \frac{m+n}{2}\right)$	
25	Chapter 4, 22	Last year, Sheryl borrowed (6x + 12y) books from the library. Murray borrowed 2/3 as many books as Sheryl and Lina borrowed 1/2 as many books as Murray.	
29	Chapter 5, 12(f)	$\frac{5}{4}\left(8 - \frac{3n+2}{25}\right) + 7 = \frac{36(1+2n)}{5}$	
55	Chapter 1, 14(b)(iii)	125	
56	Chapter 2, 5(a)(iii)	21	
56	Chapter 2, 5(a)(iv)	18	
56	Chapter 2, 5(b)	80	
56	Chapter 2, 7(f)	-23/16 or -1 9/16	
57	Chapter 2, 13(b)(iv)	10.00	
57	Chapter 2, 20(f)	0	
57	Chapter 2, 20(g)	7	
58	Chapter 2, 33(a)	3/14	
58	Chapter 3, 6(f)	$p^2 + q^2 + mn$	
59	Chapter 3, 23(iii)	$\$ \left(\frac{3d}{m} + \frac{5c}{n}\right)$	
60	Chapter 4, 5(d)	-5	
60	Chapter 4, 11(c)	(Sub-part (b)(iv) should be (c)	
60	Chapter 4, 18(d)(iii)	91	
61	Chapter 5, 4(e)	13	
61	Chapter 5, 11(f)	28 3/4	
63	Chapter 6, 17(a)	400 cm ² , 8,000 cm³	
64	Chapter 7, 23(a)	\$8,500	
65	Chapter 8, 20(a)	12	
65	Chapter 8, 20(b)	62 cm	
65	Chapter 8, 20(c)	1, 922 cm ²	
65	Chapter 8, 23(b)	ABC = BAD = 90°	
66	Chapter 8, 29(a)	64° (remove sub-parts)	
66	Chapter 8, 30(c)	One of the solutions is x = 20. (No sub-part (d))	

Dimensions Math Workbook Solutions 7A Updated 07/10/20			
Page	Question or Section	Error	
3	Chapter 2, 14(b)(iii)	5 x 5 x 5 = 125	
10	Chapter 2, 23(c)	Both the problem and solution: exponent 3 $\frac{1}{12} - \frac{3}{14} + \frac{4}{17} + \left(\frac{1}{2}\right)^3$	
13	Chapter 2, 12(a)	Both axes in the graph should have the same scale.	
13	Chapter 2, 12(b)	Isosceles triangle	

14	Chapter 2, 42(a)	Problem: Clive wants to paint the walls of a rectangular room which are 5.26 m long....
21	Chapter 4, 5(d)	Solution: $10(6x^2 - 1/2x + 4) = 60x^2 - 5x + 40$; -5
22	Chapter 4, 9(b)	Second line of solution: $(2y - 5 + 5y + 7) / 3$
23	Chapter 4, 12(g)	Solution: Last term should be $-3\left(\frac{1}{6}a + \frac{1}{4}b - 2\right) + 4\left(\frac{5}{8}a + \frac{9}{16}b - 1\right)$
35	Chapter 5, 22(b)	Solution: Distance Hendrick would have jogged
39	Chapter 6, 8(f)	Solution, last line: 736.56
44	Chapter 6, 30	Solution: Assume the car overtakes the truck after 10:00.
47	Chapter 7, 18(a)(ii)	Solution: The concert is estimated to end at 10:05 P.M.
48	Chapter 7, 22(b)	Solution: (remove extra space) $100(810 + x)$
58	Chapter 8, 26	Question: (a) (b) (i) (ii) (c) B is cut off on lower left of diagram.

Dimensions Math Teaching Notes and Solutions 7A			
Updated 05/19/2017			
Page	Question or Section	Error	Date Added
27	Ex. 1.5, 14(a)	$600 = 2^3 \times 3 \times 5^2$ A perfect square has an even number of each prime factor. Thus another 2 and 3 is needed, or 2×3 . $(2^3 \times 3 \times 5^2) \times 2 \times 3 = (2^2 \times 3 \times 5^2)^2 = 600 \times 6$. $(2^3 \times 3 \times 5^2)$ does not equal $(2^2 \times 3 \times 5^2) \times 2 \times 3$ as shown in the current solution. Remove the equal sign in the second line of the solution.)	12/04/2013
27	Ex. 1.5, 14(b)	Again, remove the equal sign in the second line of the solution. A perfect square has a multiple of 3 for each prime factor. Thus another 5 and two more 3's are needed, or $3 \times 3 \times 5$. $(2^3 \times 3 \times 5^2) \times 3 \times 3 \times 5 = (2 \times 3 \times 5)^3 = 600 \times 45$.	12/04/2013
33	CA 4, 3	Second table, column 1, row 4: $-1 - (-4) = 3$	02/22/2013
45	Ex. 2.3, 6(d)	$- -7 - (-3) = -7 + 3$ $= -4$	04/01/2013
50	Ex. 2.5, 5(a)	In both the question and the solution: $\left(-\frac{2}{3}\right)^3 \times \frac{9}{16} \div (-4)$	04/01/2013
51	Ex. 2.5, 8(a)	Suggested answers: $\frac{17}{28}, \frac{9}{14}$	03/14/2013
64	Ex. 3.1, 6(b)	Final line of solution: $= \left(\frac{t}{8} + \frac{1}{3}\right)$ hours	03/13/2013
73	Ex. 3.3, 17(b)	Delete the second line of the solution. The answer should not be simplified; algebraic manipulations are in the next chapter.	03/21/2013

73	Ex. 3.3, 17(c)	When $x = 75$, Sum of the three students' scores $= x + \left(\frac{3}{5}x + 18\right) + \left[2\left(\frac{3}{5}x + 18\right) - 45\right]$ $= 75 + \left(\frac{3}{5} \times 75 + 18\right) + \left[2\left(\frac{3}{5} \times 75 + 18\right) - 45\right]$ $= 219$	03/21/2013
74	Ex. 3.3, 19(a)(iii)	Total score in the game $= x + 2(3x + 5) + 3\left(\frac{4}{5}x\right)$ Answer does not need to be simplified further, since algebraic manipulations are in the next chapter.	03/21/2013
74	Ex. 3.3, 19(b)	When $x = 10$, Total score in the game $= 10 + 2(3 \times 10 + 5) + 3 \times \frac{4}{5} \times 10$ $= 10 + 70 + 24$ $= 104$	03/21/2013
89	Ex. 4.3, 5	Express each of the following as a single fraction in simplest form.	04/23/2013
89	Ex. 4.3, 5(b)	$\frac{-3t}{7} + \frac{t+8}{2}$ Under solutions: $\frac{-3t}{7} + \frac{t+8}{2} = \frac{-2(3t) + 7(t+8)}{14}$ $= \frac{-6t + 7t + 56}{14}$ $= \frac{t + 56}{14}$	04/23/2013
89	Ex. 4.3, 5(b)	Under solutions, last step should be: $= \frac{5t - 16}{15}$	04/23/2013
89	Ex. 4.3, 5(h)	The solution is correct, but does not use the LCM. This can lead to confusion, since simplifying algebraic fractions is not covered, and all the examples in the chapter use LCM and thus do not require simplification at the final step since it involves factorizing, or additional discussion of distributive property. So the steps should be changed to: $\frac{-y}{5} + \frac{3y-1}{2} - \frac{4y+7}{3}$ $= \frac{-6y + 15(3y-1) - 10(4y+7)}{30}$ $= \frac{-6y + 45y - 15 - 40y - 70}{30}$ $= \frac{-y - 85}{30}$	04/23/2013
114	6.3 Try It! 14	Same conversion factor as used in Example should be used, i.e. 1.6 km/mi, and answer should be rounded to a whole number. The measurement has only 2 significant figures. $61 \text{ mph} \times 1.6 \text{ km/mi} = 97.6 \text{ km/h}$ $98 \text{ km/h (rounded to a whole number)}$	05/19/2017
162	Ex. 8.4, 2(c)	(i) right angled ($m \square R = 90^\circ$) (ii) scalene (The side given does not have to be between the 2 given angles.)	11/25/2013
162	Ex. 8.4, 2(e)	(i) acute angled (ii) isosceles ($(m \square R = 65^\circ)$)	11/25/2013
166	Ex. 8.5, 2(b)	FH = 4.9 cm (6.8 cm is length of EG)	12/06/2013

167	Ex. 8.5, 4(a)	Problem in this book is different from one in textbook, which states that $XY = YZ = 4.5$ cm. Change problem to read: Construct a quadrilateral $XYZT$ in which $XY = YZ = 4.5$ cm, $ZT = 2$ cm, $XT = 4$ cm, and $YT = 5$ cm. Change diagram so that distance for XY is labeled 4.5 . Change first direction: 1. Draw a line segment XY 4.5 cm long. (Or change problem in textbook)	12/06/2013
167	Ex. 8.5, 4(b)	For changes in 4(a) above: $m\angle YZT = 92^\circ$ $m\angle YTZ = 123^\circ$	12/06/2013

The revised answer key for the textbook with corrections highlighted is provided on the next page. This is for the first printing only.

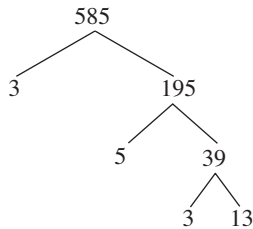


ANSWERS

Chapter 1 Factors and Multiples

Try It!

- 105: 1, 3, 5, 7, 15, 21, 35, 105
- (a) prime number
(b) composite number
- 3.



$$585 = 3^2 \times 5 \times 13$$

- $2 \times 3^3 \times 13$
- 36
- 22
- 7 cm
- 600
- 1,938
- 41,580
- (a) 80 tooth contacts
(b) big wheel: 4 revolutions
small wheel: 5 revolutions
- 22
- 85 in.
- 10
- 14 cm

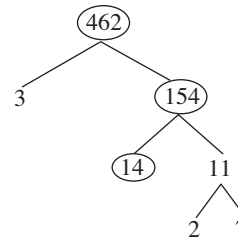
Exercise 1.1

- (a) 1, 3, 5, 15 (b) 1, 2, 4, 7, 14, 28
(c) 1, 2, 4, 8, 16, 32 (d) 1, 43
- (a) 2, 4, 6, 8 (b) 5, 10, 15, 20
(c) 11, 22, 33, 44 (d) 23, 46, 69, 92
- not a factor of 2,395
- 2,816 is a multiple of 111
- 96, 144, 304
- 8, 16, 24, 48, 72
- 9, 12, 24, 27, 36, 54
- 986
- 513
- (a) 1, 2, 4, 7, 8, 14, 28, 56
(b) 1, 2, 3, 4, 6, 7, 12, 14, 21, 28, 42, 84
(c) 1, 2, 4, 7, 14, 28
- (a) 2, 4, 6, 8, 10, 12, 14, 16, 18, 20
(b) 3, 6, 9, 12, 15, 18, 21, 24, 27, 30
(c) 6, 12, 18
(d) first 3 multiples of 6
- (a) true (b) true (c) false
- (a) true (b) false
- 2016, 2020, 2024
- (a) 6
(b) 2

- (a) 7 groups of 5 or 5 groups of 7
(b) 6 ways
(c) 7 groups of 11, each group with 5 U.S. and 6 overseas participants

Exercise 1.2

- (a) prime (b) prime
(c) not prime
- (a) 2×3^3 (b) $2^3 \times 3^2$
- (a) $2^5 \times 3$ (b) $2^3 \times 13$
(c) $3^3 \times 5$ (d) $2^2 \times 7^2$
(e) $2^2 \times 3 \times 17$ (f) $2^2 \times 3^2 \times 7$
(g) $3^2 \times 5 \times 7$ (h) $2^3 \times 3^2 \times 5$
- (a) 8^3 (b) 3^5
(c) $7^2 \times 9$ (d) $4^2 \times 6^2$
(e) $2 \times 3 \times 11^3$ (f) $5^3 \times 13^2 \times 37$
- (a) 289 (b) 125
(c) 484 (d) 2,592
- (a) $2^2 \times 3^2 \times 5$ (b) $2^3 \times 7 \times 11$
(c) $3 \times 5 \times 7^2$
(d) $2 \times 3^3 \times 5^2$
- (a)



- (b) Yes, the top number = $2 \times 3 \times 7 \times 11 = 462$.
- (a) $2^2 \times 3^2 \times 5$ (b) $2^2 \times 3^3 \times 7^2$
(c) $2^2 \times 3^3 \times 5^3$ (d) $2^2 \times 3^2 \times 5^4 \times 11$
- 997
- (a) 2^5 (b) 3^9 (c) 11^3 (d) 5^6
- 3 and 5, 5 and 7, 11 and 13, ...
- (a) (i) 13 + 19
(ii) 11 + 67
(iii) 13 + 103
(b) The statement is known as the Goldbach Conjecture. No one can approve or disprove it. The statement is true to a large extent. Therefore, we should agree.
- 528, 336, 243
- 3, 7, 13, 21, 49, 91, ...

Exercise 1.3

- (a) 4 (b) 9 (c) 21 (d) 18
(e) 1 (f) 15 (g) 12 (h) 33
- (a) 7 (b) 15 (c) 12 (d) 22
(e) 1 (f) 70
- 24 cm
- (a) 40 cm (b) 63
- 36 and 54 or 18 and 90
- 15, 21, 35

7.	Price (\$)	Number of model cars sold	
		Day 1	Day 2
	2	759	1,173
	3	506	782
	6	253	391
	23	66	102
	46	33	51
	69	22	34
	138	11	17

Exercise 1.4

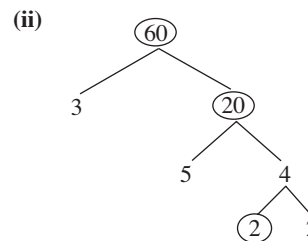
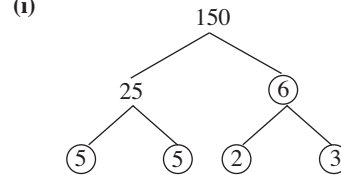
- (a) 60 (b) 84 (c) 200 (d) 736
(e) 216 (f) 300 (g) 118 (h) 455
- (a) 180 (b) 2,730 (c) 120 (d) 420
(e) 3,036 (f) 819
- (a) $2^3 \times 3^5 \times 5 \times 7^2$ (b) $2^4 \times 3^6 \times 5^3 \times 7^8$
- (a) GCF: 6 LCM: 90 (b) GCF: 7 LCM: 70
(c) GCF \times LCM = product of given numbers
- after 30 seconds
- (a) 336 (b) John: 7
Andrew: 6
- (a) 140 mm (b) Science: 7
Mathematics: 5
- (a) 180 cm (b) rows: 4
columns: 3
- 8 and 3, 4 and 24, 2 and 24, 8 and 6
- 21 and 630, 42 and 315, 105 and 126

Exercise 1.5

- (a) 6 (b) 11 (c) 14
(d) 16 (e) 21 (f) 26
- (a) 7 (b) 8 (c) 9
(d) 11 (e) 16 (f) 20
- (a) $5^2 \times 7$ (b) $2^3 \times 11^5$
- (a) 2×19^2 (b) $3^4 \times 5^3$
- (a) GCF: 9 (b) 3
- (a) LCM: 216 (b) 6
- (a) $2^{12} \times 5^6$ (b) $2^6 \times 5^3$
- (a) $7^{12} \times 19^6$ (b) $7^4 \times 19^2$
- 84 in.
- 204 cm
- 12 mm
- (a) 22 cm (b) 264 cm
- (a) 2, 5, and 8 (b) (i) 8 (ii) 18
(c) Numbers are all even;
sum of digits of each number is a multiple of 3
- (a) 6 (b) 45

Review Exercise 1

- 70
- $999 = 3^3 \times 37$
- (a) composite (b) composite
- (a) true (b) false
- (a) (i)

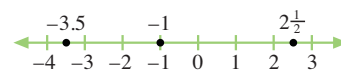


- (b) $150 = 2 \times 3 \times 5^2$ (c) LCM: 300
 $60 = 2^2 \times 3 \times 5$ GCF: 30
- (a) GCF: 1 (b) 360 (c) 9,720
 - (a) (i) $2^2 \times 3$ (ii) $2^4 \times 3^2$
 - (b) 420
 - (a) $(2^6 \times 5^2 \times 7^4)$ cm² (b) 1,960 cm
 - (a) 39 (b) 45 (c) GCF: 3
 - 9:20 A.M.
 - (a) 6 (b) 5
 - (a) (i) 18 cm (ii) 770 (b) (i) 9 cm (ii) 3,080

Chapter 2 Real Numbers

Try It!

- airplane: 3,200 m; submarine: -456 m

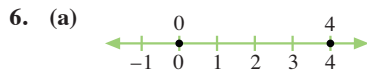


- (a) $2\frac{1}{2}, -1, -3.5$
- (a) 5 (b) -24 (c) -3
- (a) 106, -13.4, -218 (b) |-13.4|, |106|, |-218|
- (a) -11 (b) 8 (c) -21
- (a) -60 (b) 244 (c) 8,921
- (a) -13 (b) -8 (c) 13
- (a) -20 (b) -12 (c) 16 (d) -6
- 67 m below sea level
- 56 units
- (a) -96 (b) 18 (c) 120
- (a) -9 (b) 15
- (a) 56 (b) -13 (c) -512 (d) -512

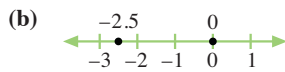
14. -32
 15. $-3\frac{7}{12}$
 16. $-\frac{31}{36}$
 17. (a) -1 (b) 14 (c) $-\frac{1}{32}$
 18. $-\frac{8}{3}$
 19. $1\frac{13}{32}$
 20. 0.625
 21. 0.63
 22. (a) $1,574$ (b) $1,570$
 23. (a) $37,254,000$ (b) $37,000,000$
 24. (a) 9.0 (b) 9.048
 25. (a) $-5\frac{3}{11}$ (b) -5.2727

Exercise 2.1

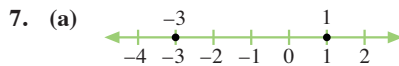
1. (a) 2 lb (b) -3 lb
 2. (a) $-\$2,800$ (b) $\$1,650$
 3. 12 mph means 12 mph above the speed limit.
 4. 5°C means a temperature rise of 5°C .
 5. $A = -4, B = -\frac{1}{2}, C = 2$



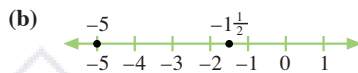
$0 < 4$



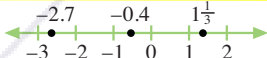

$-2.5 < 0$



$1 > -3$



$-1\frac{1}{2} > -5$

8. (a) $<$ (b) $>$ (c) $>$
 (d) $<$ (e) $<$ (f) $<$
 9. (a) 45 (b) 8 (c) -22 (d) -4
 10. (a) $<$ (b) $<$ (c) $=$
 (d) $>$ (e) $>$ (f) $<$
 11. (a) The hourly wage is decreased by $\$5$.
 (b) The elevator moves up by 2 levels.
 (c) The bank account is $\$1$ in debit.
 12. (a) 
 (b) $-2.7, -0.4, 1\frac{1}{3}$
 13. (a) 
 (b) $5, 0.9, -3\frac{1}{2}$

14. $|9.5|, |-12.3|, |-46|$
 15. (a) $-300, -50, 0, 210$
 (b) $|-300|, |210|, |50|, |0|$
 16. (a) $18, 0.7, -4.2, -42$
 (b) $|0.7|, |-4.2|, |18|, |-42|$

17.

Date	Deposit/ Withdrawal	Balance
01/02/2012	$\$3,000.00$	$\$3,000.00$
01/04/2012	$-\$200.00$	$\$2,800.00$
01/11/2012	$\$150.00$	$\$2,950.00$
01/23/2012	$-\$400.00$	$\$2,550.00$

18. Churchill, Denver, Portland, Singapore
 19. (a) Sue (b) Rex
 20. (a) does not exist (b) 1
 (c) -1 (d) does not exist
 21. (a) false; '0' is neither positive nor negative.
 (b) true (c) true

Exercise 2.2

1. (a) 3 (b) -2 (c) -2
 (d) -4 (e) -5 (f) 3
 2. (a) 12 (b) -37 (c) -6
 (d) -32 (e) -100 (f) 66
 3. (a) -50 (b) 17
 (c) -123 (d) $4,560$
 4. (a) 0 (b) 1 (c) -27
 (d) -37 (e) -21 (f) 29
 5. (a) -4 (b) -16
 (c) 14 (d) -1
 6. (a) 55 (b) 2
 (c) -12 (d) 15
 7. (a) 16 (b) -11 (c) 0
 (d) -10 (e) 0
 8. (a) $\$210$ (b) $-\$240$
 9. 5 miles North
 10. It still holds.

Suggested Solution:

If $a = -4, b = -5$, then

$$-a + (-b) = -(a + b)$$

$$-(-4) + (-(-5)) = -(-4 - 5)$$

$$9 = 9$$

Exercise 2.3

1. (a) -4 (b) 6 (c) -8 (d) 3
 2. (a) -9 (b) -20 (c) 35
 (d) -24 (e) 14 (f) -17
 3. (a) -7 (b) 20 (c) 6 (d) -18
 4. (a) -13 (b) -1 (c) -8
 (d) 7 (e) -13 (f) 3
 5. (a) 15 (b) 27
 (c) 14 (d) 6
 6. (a) -2 (b) 21
 (c) -11 (d) -4
 (e) -7 (f) -14

7. (a) = (b) > (c) > (d) >
 8. 159 m
 9. (a) Tuesday (b) Wednesday
 10. -15°F
 11. (a) 2 A.M., May 5, 2012
 (b) 6 P.M., May 4, 2012

Exercise 2.4

1. (a) -72 (b) 20 (c) -42
 (d) 51 (e) 19 (f) -12
 (g) 13 (h) -19 (i) 144
 (j) -64
 2. (a) 18 (b) -60 (c) 8
 (d) 13 (e) -15 (f) 28
 (g) -36 (h) 10 (i) -100
 (j) 24
 3. (a) -1 (b) -16 (c) 25
 (d) 4
 4. (a) \$1,300 (b) \$5,300
 5. \$200 gain
 6. 1,500 m South
 7. (a) 15
 (b) -10
 (c) 1 correct, 4 unanswered
 (d) 3 incorrect, 1 correct, 1 unanswered

Exercise 2.5

1. (a) 4 (b) 8 (c) -80 (d) 3
 2. (a) $-\frac{13}{4}, -3, \frac{7}{12}, \frac{2}{3}$ (b) $\frac{4}{5}, \frac{7}{10}, -\frac{3}{4}, -\frac{11}{12}$
 3. (a) $\frac{9}{4}$ (b) $-\frac{13}{7}$ (c) $-\frac{1}{20}$ (d) $\frac{5}{8}$
 4. (a) $\frac{17}{35}$ (b) $-1\frac{1}{4}$
 (c) $-1\frac{1}{6}$ (d) $-1\frac{11}{30}$
 (e) $-2\frac{7}{10}$ (f) $-\frac{28}{121}$
 (g) $1\frac{1}{5}$ (h) 1
 5. (a) $\frac{1}{24}$ (b) -250
 (c) -60 (d) $2\frac{1}{3}$
 6. (a) 0 (b) $-\frac{4}{21}$
 (c) $\frac{7}{12}$ (d) $\frac{1}{2}$
 7. $\frac{6}{10}$
 8. (a) $\frac{17}{28}, \frac{9}{14}$ (b) $-\frac{3}{4}, -\frac{17}{22}$
 9. (a) $1\frac{3}{20}$ hours
 (b) Julia: 20 min, Katie: 24 min, Lisa: 25 min
 (c) Julia: 30 loops, Katie: 25 loops, Lisa: 24 loops
 10. (a) $\frac{9}{11}$ (b) $\frac{17}{22}, \frac{35}{44}$

Exercise 2.6

1. (a) 0.75 (b) -1.4 (c) $0.\overline{2}$
 (d) $-1.\overline{18}$ (e) $-0.58\overline{3}$ (f) -0.85
 2. (a) 841 (b) 3,375 (c) 7,776
 (d) 123 (e) 3.107232506 (f) 99
 (g) 2.24 (h) -0.714285714
 (i) $0.91\overline{6}$ (j) -4.75
 3. (a) $0.0\overline{6}$ (b) 0.75
 4. (a) 12 (b) 2.732150083
 (c) 0.421875 (d) 0.76
 (e) $-0.013\overline{7}$ (f) -9.09375

Exercise 2.7

1. (a) 13 (b) 322
 2. (a) 7,300 (b) 13,600
 3. (a) 23.7 (b) 0.7
 4. (a) 10.75 (b) 3.00
 5. (a) 0.040 (b) 17.927
 6. (a) 3.0041 (b) 8.4713
 7. (a) 377 (b) 380
 8. (a) 14,348,907 (b) 14,000,000
 9. (a) 0.5556 (b) 0.9091
 10. (a) 2.667 (b) -0.982
 (c) -2.667 (d) 1.154
 11. (a) 12,800 (b) 13,000
 12. (a) 219 ft² (b) 220 ft²
 13. (a) 2.10 m (b) 2.104 m
 14. (a) 30 cm (b) 29.7 cm
 (c) 29.730 cm
 15. (a) 1.8 mm (b) Yes
 16. (a) nearest thousand, hundred, ten or whole number
 17. 9.957; 9.962

Review Exercise 2

1.

+	8	1	-2
2	10	3	0
-5	3	-4	-7
-3	5	-2	-5
2.

×	-3	-4	-6
-5	15	20	30
-2	6	8	12
7	-21	-28	-42
3. (a) -8°F (b) 2.6°F
 4. (a) 68 m (b) 9,002 m
 5. (a) 4; $\frac{49}{36}$
 (b)

 (c) (i) < (ii) >

6. (a) Packet 1: 370 mL
Packet 2: 387 mL
(b) 2,247 mL
7. (a) Alex
(b) Alex: -8, Ben: 0, Charles: 9, Dave: -2
(c) Alex
8. (a) 88 (b) -729
(c) -10 (d) $\frac{1}{96}$
9. (a) $9\frac{1}{2}$ (b) -4 (c) -25
10. (a) 27,120 (b) 27,100
11. (a) 1.44 (b) 1.4
12. (a) Auckland and Los Angeles; 21
(b) (i) 16 hours
(ii) 3 hours
(c) (i) behind of
(ii) ahead of
(d) 6 A.M., December 31, 2011

Chapter 3 Introduction to Algebra

Try It!

1. (a) 12 (b) 19 (c) $9 + t$
2. (a) \$2,200 (b) \$2,800 (c) $\$ \left(\frac{m}{3} - 200 \right)$
3. (a) \$39 (b) $\$(5n + 12m)$
4. (a) de^2 (b) $20m^3n$ (c) $\frac{14t}{y}$
5. $3z^2 = 3 \times z \times z$
 $(3z)^2 = 3z \times 3z$
 $= 9 \times z \times z$
 $= 9z^2$
6. (a) $u(c + d)$ (b) $v^3 - \frac{a}{b}$
7. (a) -4 (b) 0
8. (a) -2 (b) $3\frac{2}{3}$
9. 210 m
10. (a) 5 (b) 54
11. $11\frac{1}{4}$
12. (a) $s + \frac{1}{4}$ (b) $p = s + \frac{1}{4}$
13. (a) $\frac{2}{3}b - 7$ (b) $g = \frac{2}{3}b - 7$
14. (a) $v = \frac{f}{6} + 7$
 $m = 3 \left(\frac{1}{6}f + 7 \right) - 4$
(b) $v = 15$
 $m = 41$

Exercise 3.1

1. (a) \$1,100 (b) \$200 (c) $\$(3,600 - x)$
2. (a) 165 cm (b) 173 cm (c) $(h + 5)$ cm
3. (a) 35 days (b) 84 days (c) $7n$ days
4. (a) 57 (b) 69 (c) $\frac{3}{4}s$

5. (a) 43 (b) $2p + 23$
6. (a) $1\frac{5}{6}$ hours (b) $\left(\frac{t}{8} + \frac{1}{3} \right)$ hours
7. (a) $5a$ (b) $4b^2$ (c) $\frac{2c}{d}$
(d) $\frac{eg}{f}$ (e) $18hk$ (f) $\frac{m}{3}$
(g) $15p^3$ (h) $20q^2r$ (i) $\frac{s}{6} + t$
(j) $u + \frac{2v}{3w}$
8. (a) $hk + 5$ (b) $\frac{n}{p} - 3m$
(c) $\frac{2t + 3u}{v}$ (d) $7y^2z$
9. (a) \$15 (b) $\$(2x + 5y)$
10. (a) 4,236 g (b) $\$(759p + 400q)$ g
11. (a) \$350 (b) $\$(500 - k - d)$
12. (a) \$33 (b) $\$[(n - 2)p]$
13. (a) 8 (b) $\frac{n - 4}{m}$
14. (a) \$16,400 (b) $\$(2,000 + 800n)$
15. (a) pq (b) $p(q - r)$
16. (a) $(nL + k)$ ft (b) $\left(\frac{nL + k}{m} \right)$ ft
17. (a) $(x + 5)$ years (b) $2(x + 5)$ years
(c) $(3x + 4)$ years (d) $(2x - 1)$ years
18. (a) 100 points (b) $(an + bm)$ points
(c) $[am + b(m - 1)]$ points
20. (b) (i) $60n$ (ii) 1,440n

Exercise 3.2

1. (a) 2 (b) $\frac{7}{5}$
2. (a) 25 (b) 15
3. (a) 1 (b) -3
4. (a) 39 (b) 288
5. (a) 7 (b) 12
(c) 15 (d) 96
(e) $\frac{1}{7}$ (f) $-\frac{1}{7}$
6. (a) 23 (b) 60
(c) 20 (d) $-2\frac{1}{2}$
(e) -162 (f) 32
7. (a) 13 (b) 55
8. (a) 156 (b) 17
9. (a) 4 (b) 37
10. (a) $\frac{3}{20}$ (b) 20
11. $3\frac{1}{8}$
12. 250
13. (a) \$120 (b) hourly wage in dollars
14. (a) \$75 (b) \$200
15. (a) \$310
(b) \$80 is the fee for each adult.
\$50 is the fee for each child.
16. (a) 100°C (b) 25°C

17. (a) \$32 (b) \$8 increase
 18. (a) 12 (b) $6\frac{2}{3}$ ohms

Exercise 3.3

1. $(w + 10)$ ft
 2. $\$(p - 6)$
 4. $m = 4d$
 5. $x = 3y$
 6. $s = \frac{1}{10}a$
 7. (a) $a - 7$ (b) 25
 8. (a) \$3p (b) $q = 50 - 3p$
 (c) \$23
 9. (a) $2t - 30$ (b) 80 minutes
 10. (a) $y = \frac{1}{4}x + 51$ (b) 261
 11. (a) $v = \frac{3}{2}w - 12$ (b) \$75
 12. (a) $3x$ (b) $4x - 6$
 (c) 2nd number = 27, 3rd number = 30
 13. (a) $m = 2p + 2$ (b) $m = 28$
 $q = 3p - 2$ $q = 37$
 14. (a) $d + 0.5$ (b) $\frac{3}{2}(d + 0.5)$
 (c) Emily: 2.2 miles, Fred: 3.3 miles
 15. (a) $a = \frac{3}{4}b, c = \frac{3}{2}b$ (b) \$156
 16. (a) $r = \frac{3}{2}t$
 $s = \frac{9}{8}t + 1$
 (b) Richard: 48 hr, Simon: 37 hr
 (c) 117 hr
 17. (a) Yan: $\frac{3}{5}x + 18$
 Zoe: $2\left(\frac{3}{5}x + 18\right) - 45$
 (b) $\frac{8}{5}x + 2\left(\frac{3}{5}x + 18\right) - 27$
 (c) 219
 18. (a) $p = 4(c + 35)$ (b) $p = 256$
 $q = c + 35$ $q = 64$
 (c) \$262.80
 19. (a) (i) $3x + 5$ (ii) $\frac{4}{5}x$
 (iii) $\frac{4}{5}x + 5$
 (b) 53
 20. Let x = number of adults.
 \therefore total ticket sales = $\$(75x + 40(1200 - x))$

Review Exercise 3

1. (a) $15st + u$ (b) $m - 24m^2n$
 (c) $\frac{4a - b^2}{2c}$ (d) $3x - \frac{b}{c} - 5y$
 2. (a) $5d - c^2$ (b) $\frac{x^3}{y^2}$
 (c) $\frac{3a}{b}$

3. $E = 180$
 4. $y = -\frac{1}{8}$
 5. $5m + 8n$
 6. 16
 7. (a) $(100 - a - 2b)$ cm
 (b) (i) $\frac{(100 - a - 2b)}{4}$ cm
 (ii) 11 cm
 8. (a) (i) $x + y$ (ii) $\frac{1}{2}x + \frac{1}{3}y$
 (b) 17
 9. (a) (i) \$4,000 (ii) \$6,100
 (b) (i) $\frac{2,500 + 300n}{g}$ (ii) 43
 10. (a) (i) $(h - 3)$ years old (ii) $(h + 3)$ years old
 (b) $4(h - 3)$ years old
 (c) $\left[\frac{1}{3}(h + 3) + 2\right]$ years old
 (d) mother: 36 years old, sister: 7 years old
 11. (a) $\$(k + 80)$
 (b) $\$25(k + 80)$
 (c) $T = 2k + 25(k + 80) + 80$
 (d) \$3,403
 12. (a) $y = 30 + x$
 $z = 2(30 + x) - 15$
 (b) 48 dimes, 81 quarters
 (c) \$25.95

Chapter 4 Algebraic Manipulation

Try It!

1. (a) $4t$ (b) $-\frac{9}{2}bz$
 (c) 0
 2. (a) $2c - 5d$ (b) $3ax - 9x + \frac{13}{10}$
 3. (a) $2ab - 3ac$ (b) $5xy - xz$
 4. $7a - 5b$
 5. $2p - 5q + 9$
 6. $-y + 7$
 7. (a) $10x + 35y$ (b) $12a - 14b$
 8. (a) $4cx + 6cy + 9cz$ (b) $-12dm + 24dn - 4dp$
 9. $-8y + 3$
 10. (a) $-\frac{7p}{9}$ (b) $\frac{9 - 5p}{2}$
 11. (a) $\frac{8x + 11}{6}$ (b) $\frac{143x - 59}{70}$
 12. $3(7a + 6b)$
 13. $7b(2y - 5z + 1)$
 14. (a) $(3x + 5y)(2a + b)$
 (b) $(3a - 5c)(6z - 5)$
 15. $(a - 3)(7x - 4)$

Exercise 4.1

1. (a) terms : 3, constant : -1
 (b) terms : 4, constant : 5
 2. (a) $x : 5, y : -2$
 (b) $x : -1, y : 1$

3. (a) $9a$ (b) $-3b$ (c) $5c$
 (d) $-7d$ (e) $3p$ (f) $-7q$
 (g) 0 (h) $-2m$
4. (a) $-n - 1$ (b) $-k + 1$ (c) $-3x + 2y$
 (d) $5w$ (e) $\frac{5}{6}p - \frac{3}{4}q$ (f) $\frac{16}{3}t + \frac{9}{2}av$
5. (a) $1 - x$ (b) -1
6. (a) $6a + 3b - 3$ (b) -3
7. (a) $\frac{5}{8}x - \frac{1}{15}ax - y$ (b) $5\frac{3}{20}$
8. $(5x + 4y)$ units
9. (a) $10p$ units (b) 120 units
10. (a) $(12t - y)$ hr (b) 51 hr
11. $\left(\frac{11}{2}d + \frac{3}{4}\right)$ km east
12. $2p + q - 6$
13. Find the number of days in x weeks.
14. $\frac{x}{2}$ km, $\left(\frac{x}{2} - 4\right)$ km, x km, and $(x + 3)$ km

Exercise 4.2

1. (a) $2a - 7$ (b) $-4b + c + 5d$
 (c) $-2 + 7k$ (d) $-7m + 9$
2. (a) $8a + 9$ (b) $6b + c$
 (c) $-10d - 6e$ (d) $f - 11$
 (e) $-9x + 9y$ (f) $11t + 16z$
3. (a) $3p - 1$ (b) $2q$
 (c) $-6x + 2y$ (d) $2t + 5u$
 (e) $-6w$ (f) $-8n - 5s$
4. (a) $10h - 8k + 4$ (b) $-8m - 2n + 2$
 (c) $11x - 3$
5. $5x + y - 9z$
6. $4a + 4b + 6c$
7. $6b - 3c$
8. $9t + 3u - 8v$
9. $3n + 3$
10. $(8p + 17q + 16)$ g
11. (a) $(4x - 2y - 3)$ feet
 (b) 19 feet
12. $(x + y)$ cm, $\left(2x + \frac{3}{2}y\right)$ cm
 $3x$ cm, $\frac{5}{2}y$ cm
13. (a) $9 \times 15 = 135$ (b) $9n + 72$
 (c) $9m$ (d) $m = n + 8$
 (e) Sum of numbers is a multiple of 9.
 Sum of each diagonal is equal.

Exercise 4.3

1. (a) $6 + 3a$ (b) $28b + 20c$
 (c) $10d - 30e$ (d) $-6g - 8h$
 (e) $-28 + 20n$ (f) $15p - 45q$
 (g) $12r - 18s + 24t$ (h) $-5ax + 3ay - 8az$
 (i) $4a - 12b - 16c$ (j) $-10a + 20b - 30c$
2. (a) $7x + 43$ (b) $33a - 6b$
 (c) -13 (d) $-7bv - 12b$
 (e) $-3p$ (f) $-2r + 25s$
 (g) $a - 9b$ (h) $4x + 18$

3. (a) $-\frac{x}{5}$ (b) $\frac{16 - 3x}{8}$
 (c) $\frac{7x - 2}{6}$ (d) $\frac{1 - 2x}{3}$
 (e) $\frac{7x - 5}{20}$ (f) $\frac{5x + 6}{6}$
4. (a) $a + 3$ (b) $-13s - 9t$
 (c) $3m + 7n$ (d) $3a + 9b$
 (e) $10y - 20z$ (f) $4p + 8q$
5. (a) $\frac{5x - 16}{6}$ (b) $\frac{t + 56}{14}$
 (c) $\frac{6x + 17}{20}$ (d) $\frac{5x - 16}{15}$
 (e) $\frac{-28x + 1}{12}$ (f) $\frac{15x - 8}{18}$
 (g) $\frac{3}{2}$ (h) $\frac{-y - 85}{30}$
6. (a) $n + 10$ (b) $2(n + 10)$
 (c) $2(n + 10) - 4$ (d) $\frac{2(n + 10) - 4}{2}$
 (e) $\frac{2(n + 10) - 4}{2} - n$ (f) 8

7. $(4a + 2b)$ cm
8. sales: $\$n(x + y)$
9. (a) $6(2m - 3) + 5 = 12m - 13$
 (b) 71
10. (1) think of a number
 (2) add 9 to the number
 (3) multiply the sum by 3
 (4) subtract 6 from (3)
 (5) divide (4) by 3
 (6) subtract original number from (5)
11. $56 \times 101 = 56 \times (100 + 1)$
 $= 5,600 + 56$
 $= 5,656$
 $387 \times 999 = 387 \times (1,000 - 1)$
 $= 387,000 - 387$
 $= 386,613$

12. (a)

n	1	2	3	4	5
Total number of matchsticks	4	7	10	13	16

- (b) $3n + 1$
 (c) $(6n + 6)$ cm

Exercise 4.4

1. (a) $3(2a + b)$ (b) $2(5c - 6d)$
 (c) $7(4e + 3)$ (d) $6(f - 1)$
 (e) $3a(6x - 5y)$ (f) $-5m(x + 2y)$
 (g) $3a(5b - 1)$ (h) $12s(1 + 4b)$
 (i) $17c(3u + v)$ (j) $-8a(7y + 1)$
2. (a) $7(a + b + c)$ (b) $4(3a - 2b + 5c)$
 (c) $5x(a - 3b - 6)$ (d) $-6(3 + 4ay + y)$
 (e) $m(x + y + 3z)$ (f) $-7b(3 + 4t)$
 (g) $(x + y)(3a - 4b)$ (h) $(5m - 4)(a + b)$
3. (a) $389(57 + 43) = 38,900$ (b) $471(86 - 76) = 4,710$
4. $ax + ay, ax^2 + axy, -2a^2 - 2a^2y$

$$5. \quad 148 \times 4 - 123 \times 4 = 4(148 - 123) \\ = 100 \\ 839 \times 537 + 839 \times 463 = 839(537 + 463) \\ = 839,000$$

Exercise 4.5

- $(a + 3b)(x + y)$
 - $(5 + a)(r + s)$
 - $(a + b)(x - y)$
 - $(5x - 1)(7m + n)$
 - $(5x + 4y)(2p + 3q)$
- $(8 - a)(9 - 2b)$
 - $(4q + p)(9y - 4x)$
 - $(a - 5)(u + b)$
 - $(2b + 5a)(4x - 3y)$
- $(3a + b)(7x + 2y)$
 - $AR = 2y$ cm, $DP = 3a$ cm
- No
 - No
 - Not all algebraic expressions can be factored.
 - $x + y + z + 1$

Review Exercise 4

- $-2a + 8b$
 - $-x + 3y + 3$
- $20m - 1$
 - $4x - 13y$
- $\frac{8-9x}{20}$
 - $\frac{-8x-37}{9}$
- $c(5a - 1)$
 - $-3p(3q + 5r)$
- $-22x + 33y$
 - 187
- $3ax - ay + 6bx - 2by$
 - $(3x - y)(a + 2b)$
 - $(3x - y)$ marbles
- $(4x + 2y + 4)$ points
 - $(4x + 2y - 4)$ points
 - $2(2x + y - 2)$
- | n | 1 | 2 | 3 | 4 | 5 |
|-----------------------|---|----|----|----|----|
| Total number of seats | 6 | 10 | 14 | 18 | 22 |
 - $4n + 2$

Chapter 5 Simple Equations in One Variable

Try It!

- $x = 9$
- $x = 6$
- $x = 15$
- $x = -3\frac{1}{2}$
- $x = 1\frac{1}{2}$

- $x = 1\frac{1}{3}$
- $x = 3\frac{6}{7}$
- $x = 2\frac{8}{13}$
- $z = 6$
- $a = 7$
- $x = 1$
- $y = 8$
- 47, 48, 49
- 9 years old
- pen: \$3, book: \$7

Exercise 5.1

- $x = 1$
 - $x = -76$
 - $x = 14$
 - $x = 7$
 - $x = 6$
 - $x = -2\frac{1}{3}$
 - $x = -3$
 - $x = -12$
 - $x = 10$
 - $x = -2\frac{1}{2}$
 - $x = 7$
 - $x = -4$
- $x = 10$
 - $x = -2$
 - $x = -2\frac{1}{2}$
- $4x + 11 = 27$

Exercise 5.2

- $x = -10$
 - $x = -1\frac{2}{3}$
 - $x = -1\frac{1}{2}$
 - $x = 16$
 - $x = 17$
 - $x = \frac{13}{17}$
 - $x = 2\frac{1}{2}$
 - $x = -\frac{2}{5}$
- $x = 8$
 - $x = 8\frac{1}{3}$
 - $x = 0$
 - $x = -6$
 - $x = -10$
 - $x = 10\frac{3}{7}$
- $x = 12$
 - $x = 42$
 - $t = 40$
 - $t = 4\frac{1}{4}$
 - $y = -4\frac{4}{7}$
 - $y = -9$
 - $z = 1$
 - $z = -2$
- $r = \frac{1}{10}$
- $f = 10.4^\circ\text{F}$
- $v = 62$
- $v = 60$
- unsolvable as $0 \neq 4$
 - always true

Exercise 5.3

- (a) $x = 5$
(b) $x = -3\frac{1}{2}$
(c) $x = \frac{1}{4}$
(d) $x = \frac{2}{3}$
(e) $x = \frac{4}{7}$
(f) $x = 3\frac{1}{2}$
(g) $x = 2\frac{3}{4}$
(h) $x = 10\frac{2}{5}$
- (a) $x = -2$
(b) $x = 7$
(c) $y = 6$
(d) $y = -8$
(e) $u = -10$
(f) $u = 1$
- $a = -3$
- $r = -1\frac{1}{4}$
- $v = 60$
- $n = 3$
- Not always equal. When $x = 0$, $\frac{x}{x} = \text{undefined}$.

Exercise 5.4

- (a) $x + 5$
(b) $x = 121$
- (a) $\$(2x + 50)$
(b) $\$79$
- (a) $3x$ hours
(b) $x = 14$ hours
- (a) $x + 2, x + 4$
(b) $20, 22, 24$
- $\$14$
- $\$9$
- 8 years old
- three $\$10$ bills
- $\$750$
- Aaron: 25, Ben: 50, Charles: 35
- 12 children
- $\frac{4}{7}$
- (a) $n = 7$
(c) (i) 10 apples
(ii) $\$0.20$
(b) $\$12$
- $31\frac{1}{2}$ miles

Review Exercise 5

- (a) 4
(b) $2\frac{1}{10}$
(c) 15
(d) -14
(e) $1\frac{17}{22}$
(f) $-\frac{2}{5}$
(g) $7\frac{1}{3}$
(h) 4
- (a) 13
(b) -5
- (a) 156
(b) 3
- (a) $(9x + 2)$ cm
(b) 5
- 10 stamps
- 10 years old
- $\$49$
- 9 hours
- 37 students
- 12, 48

Chapter 6 Ratio, Rate, and Speed

Try It!

- (a) 5 : 3
(b) 3 : 8
- 4 : 3
- (a) 2 : 1
(b) 7 : 24
(c) 40 : 17
- 21 : 30 : 16
- (a) 600 g
(b) 900 g
- X: 24, Y: 36, Z: 72
- May: 90 lb, Terry: 120 lb
- (a) 8 m/s
(b) $\$0.05/\text{fl. oz.}$
- $\$1,398/\text{m}^2$
- (a) $\$19/\text{hr}$
(b) $\$95$
- 69 mph
- $61\frac{5}{7}$ km/hr
- (a) $22\frac{2}{9}$ m/s
(b) 50 mi/hr
- 98.39 km/hr

Exercise 6.1

- (a) 2 : 3
(b) 12 : 11
(c) 1 : 3
(d) 20 : 9
(e) 2 : 3
(f) 9 : 40
(g) 8 : 15
(h) 1 : 4
(i) 4 : 1
(j) 2 : 5
- (a) 4 : 7 : 3
(b) 4 : 7
(c) 3 : 7
- (a) 25 : 21 : 150
(b) 21 : 25
(c) 1 : 6
- (a) 3 : 4 : 9
(b) 20 : 12 : 3
(c) 3 : 6 : 2
(d) 9 : 21 : 49
(e) 5 : 9
(f) 25 : 81
- 5 : 2
- (a) 5 : 6, 4 : 3
(b) 10 : 12 : 9
- (a) 15 : 8, 12 : 7
(b) 60 : 32 : 35
- (a) 14 : 11
(b) 11 : 25
- (a) 3 : 4
(b) 3 : 4
(c) 9 : 16
- 3 kg
- 20
- 150 cm^3
- $\$1,750, \$2,450$
- (a) 2.7 lb
(b) 1.8 lb
- (a) 75
(b) 150
- (a) 45
(b) 54
- (a) 6 : 15 : 2
(b) 18, 45, 6
(c) No, z is too short.
- $\$16$
- 6 : 8 : 10
- (a) 4 : 3 : 5
(b) (i) $-\$1,800$
(ii) $\$7,200$
(c) They made a loss in their first year.
(d) $\$2,400$

Exercise 6.2

- (a) 0.15 (b) 72
(c) 47 (d) 8
(e) 4 (f) 2.25
- (a) \$23/hr (b) \$920/week
- (a) 22 mi/gal (b) \$2.80/gal
- (a) 87.5 g/cube (b) 0.7g/cm³
- (a) \$15/ticket (b) \$150
- (a) \$22.50/m² (b) \$450
- (a) 27 L/min (b) 3 min
- (a) \$26/kg (b) 25 g/m²
(c) 3 kg, \$78
- (a) \$624 (b) \$0.65/sq ft
- (a) 19.3 g/cm³
(b) No, as its density is 15 g/cm³, which is lesser than pure gold.

Exercise 6.3

- (a) 32 km/hr (b) 8m/s
(c) 57.5 mph (d) 66 km
(e) 35 m (f) 310 mi
(g) 1.5 hr (h) 13 s
(i) 2.5 hr
- (a) $6\frac{2}{3}$ m/s, 14.88 mph (b) $13\frac{8}{9}$ m/s, 31 mph
(c) $22\frac{2}{9}$ m/s, 49.6 mph (d) 35 m/s, 78.12 mph
- (a) 7.2 km/hr, 4.464 mph (b) 18 km/hr, 11.16 mph
(c) 46.8 km/hr, 29.016 mph (d) 72 km/hr, 44.64 mph
- (a) 35.42 km/hr (b) 77.28 km/hr
(c) 104.65 km/hr (d) 128.8 km/hr
- (a) 40 miles (b) $33\frac{1}{3}$ min
- (a) 3 m/s (b) 75 min
- 38 km/hr
- $6\frac{2}{3}$ mph
- (a) $1\frac{1}{3}$ m/s (b) $\frac{8}{9}$ m/s
- (a) 2.4 km (b) 510 m
- (a) 500 mph (b) 3:59 P.M.
- (a) 10 mins (b) 400 m
- 25 mph and 50 mph; 40 mph and 40 mph
- (a) 45 mph
(b) The distance between the cars A and B is decreasing.
(c) Yes, 8 min later

Review Exercise 6

- (a) 3 : 4 (b) 9 : 16
(c) 27 : 64
- (a) 80 mph (b) 54 mph
(c) 40 : 27
- (a) 144 (b) 96
(c) 3 : 4
- (a) 120 gallons (b) 480 gallons
(c) 40 gallons
- (a) 75 cm (b) 120 cm
(c) 3 kg/m (d) 1.35 kg
- (a) (i) 5 : 8 (ii) 3 : 10
(b) 15 : 24 : 80 (c) \$63.03

- Stock A: \$48; Stock B: \$72
- (a) \$7.50/L (b) \$12/L
(c) 5 : 8 (d) Canola oil
(e) $\frac{1}{8}$ L/day (f) 20 days
- (a) 78 km/hr (b) 9.75 km/L
(c) $64\frac{2}{7}$ km/hr
- (a) 90 km/hr (b) 12.5 m/s
(c) $15\frac{5}{6}$ m/s (d) 20 m/s
- (a) 63 mph
(b) (i) $55\frac{5}{13}$ mph (ii) 57.6 mph

Chapter 7 Percentage

Try It!

- (a) 75% (b) $266\frac{2}{3}\%$
(c) 87.1%
- (a) 0.0034 (b) 1.26
- (a) 68% (b) 32%
- Group A
- (a) 156 (b) 208
(c) 286
- 90%
- 32
- \$170
- 6.25%
- 290
- 125cm
- 15%
- 28°C
- 67 kg
- 20%
- (a) \$95 (b) \$285
(c) \$750 (b) \$10.13 more
- (a) \$1.40 (b) \$21.40
- (a) \$200 (b) \$10

Exercise 7.1

- (a) 25% (b) $83\frac{1}{3}\%$
(c) $207\frac{1}{2}\%$
- (a) 67% (b) 4.56%
(c) 381%
- (a) $\frac{4}{75}$ (b) $\frac{661}{800}$
(c) $1\frac{1}{11}$
- (a) 0.03 (b) 0.44
(c) 6.85
- (a) 66% (b) 62.5%
- (a) 36 gal (b) 16.2 lb
- (a) 84% (b) 16%
- (a) 35% (b) 40%
(c) 25%
- 27
- (a) 164 (b) 130
(c) 106

11. (a) 112.5% (b) 88.9%
12. Cliff
13. Line 2
14. (a) 4.2 kJ/kcal (b) 9%
- (c) No
15. (a) impossible
- (b) In year 2011, labor force: 64%,
unemployment rate: 8.9%

Exercise 7.2

1. (a) 60 (b) \$288
- (c) 198 kg (d) 84 cm²
- (e) 1,400°C (f) 3,600 hr
2. 80
3. (a) 160 (b) 88
4. (a) 2,800 (b) 420
5. (a) 40 km (b) 22 km
- (c) $2\frac{5}{6}$ hr (d) $14\frac{2}{17}$ km/h
6. (a) bottled juice, 187 (b) bottled water, 87.5%
- (c) bottled Soda, 225
7. (a) 250 (b) 95
- (c) 66
8. (a) $x\%$ of y and $y\%$ of x are equal.
- (b) $x \neq y$

Exercise 7.3

1.

	Original value	Increased value	Increase	Percentage increase
(a)	\$25	\$28	\$3	12%
(b)	16 s	20 s	4 s	25%
(c)	40 oz	52 oz	12 oz	30%
(d)	20 ft	23 ft	3 ft	15%
(e)	50 °C	55 °C	5 °C	10%
(f)	60 copies	69 copies	9 copies	15%

2.

	Original value	Decreased value	Decrease	Percentage increase
(a)	36 lb	30 lb	6 lb	$16\frac{2}{3}\%$
(b)	2 hr	1.5 hr	0.5 hr	25%
(c)	80 miles	64.8 miles	15.2 miles	19%
(d)	15 cm ³	12 cm ³	3 cm ³	20%
(e)	\$70	\$49	\$21	30%
(f)	55 pint	44 pint	11 pint	30%

3. \$3,180

4. \$720
5. 16%
6. \$2,800
7. (a) $177\frac{7}{9}$ (b) $38\frac{8}{9}\%$
8. (a) \$1,248 (b) 22%
9. (a) 30 inches (b) 34.5 inches
10. (a) 7.5% (b) 3,771,960
11. (a) (i) \$4,600 (ii) \$5,400
- (iii) \$2,700 (iv) \$12,700
- (b) 1.6%
12. (a) 2,000 cm²
- (b) 1,980 cm²
- (c) 1,980 cm²
- (d) The result in (b) and (c) are the same. Both of them are 20 cm² less than original rectangle.
- (e) 1,920 cm²
- (f) 1,920 cm²
- (g) The result in (e) and (f) are the same. Both of them are 80 cm² less than the original rectangle. Hence, a similar change in percentage of the width and length will both result in less area than the original.
- (h) No. $A = 2,000 \times \left(1 - \frac{x^2}{10,000}\right)$

Exercise 7.4

1.

	Marked price	Selling price	Discount	Discount %
(a)	\$125	\$100	\$25	20%
(b)	\$70	\$49	\$21	30%
(c)	\$240	\$204	\$36	15%
(d)	\$320	\$256	\$64	20%
(e)	\$450	\$351	\$99	22%
(f)	\$500	\$345	\$155	31%

2. \$784
3. (a) \$160 (b) \$136
4. (a) \$90 (b) \$11.25

5.

	Marked price	Price before Sale Tax	Amount of Sales Tax
(a)	\$210	\$200	\$10
(b)	\$378	\$360	\$18
(c)	\$105	\$100	\$5
(d)	\$493.50	\$470	\$23.50
(e)	\$420	\$400	\$20
(f)	\$546	\$520	\$26

6. (a) \$15 (b) \$315
 7. (a) \$800 (b) \$40
 8. \$1,026
 9. (a) 0% (b) $33\frac{1}{3}\%$
 10. (a) \$3,850 (b) \$3,465
 (c) 1%
 11. (a) \$1,600 (b) \$80
 (c) \$1,512 (d) \$72
 (e) 10%
 12. (a) \$47.50 (b) \$150
 (c) \$62.50 (d) $17\frac{6}{7}\%$
 13. (a) \$1.80 (b) 375
 (c) 10% decrease (d) $16\frac{2}{3}\%$
 14. (a) \$271.60 (b) 258.70
 (c) option 3

Review Exercise 7


1. (a) \$3,000 (b) \$360
 2. (a) (i) 15 kg (ii) 10 kg
 (b) 3 : 2 : 1
 3. (a) 150 (b) 54
 (c) 41.875%
 4. (a) 150 (b) 500
 (c) 60
 5. (a) 8% (b) \$40,000
 6. (a) \$2,500 (b) \$3,125
 7. (a) 110 lb (b) 112.2 lb
 (c) 102%
 8. (a) (i) \$240 (ii) \$360
 (b) 6%
 9. (a) \$8 (b) \$4.80
 (c) 32%
 10. (a) 400 cm^3 (b) 60 cm^3
 11. (a) \$240 (b) \$45
 (c) \$237 (d) $35\frac{10}{11}\%$
 (e) \$25.38
 12. (a) (i) 14 (c) \$20
 (ii) 28 (d) (i) \$420
 (iii) 42 (ii) $33\frac{1}{3}\%$
 (b) \$20 (c) \$20
 (d) (i) \$420 (ii) $33\frac{1}{3}\%$
 (e) $23\frac{7}{11}\%$

Chapter 8 Angles, Triangles, and Quadrilaterals

Try It!

1. $w = 20$
 2. $x = 34$
 3. $m\angle x = 38^\circ$; $m\angle y = 142^\circ$
 4. $z = 55$
 5. $LN = 2\text{ cm}$
 6. (b) $EG = 6.2\text{ cm}$
 7. (b) $m\angle XTZ = 64^\circ$

Exercise 8.1

1. (a) infinite (b) 1
 2. 
 3. (a) 3 (b) 6
 4. (a) $AC = BD$
 (b) $AB = CD$ (given)
 $AB + BC = BC + CD$
 $AC = BD$
 5. (a) (i) infinite (ii) infinite
 (b) No

Exercise 8.2

1. (a) not complementary (b) complementary
 2. (a) 70° (b) 48°
 3. (a) not supplementary (b) supplementary
 4. (a) 137° (b) 104°
 5. (a) 50° (b) 70°
 6. (a) 81° (b) 79°
 7. (a) $x = 33^\circ$, $y = 147^\circ$ (b) $p = 52^\circ$, $q = 52^\circ$
 8. $x = 30$
 9. $y = 36$
 10. (a) $x = 90$ (b) right-angle
 11. (a) $y = 23$ (b) right-angle
 (b) (i) acute angle (ii) straight angle
 12. (a) $x = 22.5$ (b) obtuse angle
 13. $x = 30$
 14. (a) $x = 48$ (b) $x = 36$
 15. $a = 87$, $b = 55$, $c = 87$
 16. $x = 45$
 17. $y = 120$
 18. $x = 20$, $y = 40$
 19. (a) $\angle ABF$, $\angle FBE$, $\angle ABE$, $\angle CBD$
 (b) $\angle ABD$, $\angle FBD$, $\angle FBC$, $\angle EBC$
 (c) $\angle ABE$ and $\angle CBD$
 (d) $\angle ABF$ and $\angle CBF$, $\angle ABE$ and $\angle CBE$,
 $\angle ABD$ and $\angle CBD$
 20. (a) $x = 30$, $y = 100$; $x = 40$, $y = 90$
 (b) $x = 32.5$, $y = 97.5$

Exercise 8.3

5. (c) $PM \parallel QN$ (d) $MN = \frac{1}{2}AC$
 6. (b) $m\angle SBT = 90^\circ$
 $\frac{1}{2}(110^\circ) + \frac{1}{2}(70^\circ) = 90^\circ$
 7. (b) The 3 perpendicular bisectors meet at a point O . If we draw a circle with centre O and radius $OA/OB/OC$, the circle will touch vertices A , B and C .
 8. (b) The 3 angle bisectors meet at a point I . If we draw a circle with center I and the perpendicular distance from I to $XY/XZ/YZ$ as its radius, the circle will touch the 3 sides of $\triangle XYZ$.
 10. The hospital should be located at the point of intersection of the perpendicular bisectors of $\triangle ABC$, where A , B , and C are locations of towns A , B , and C respectively.

Exercise 8.4

- (a) sufficient, isosceles
(b) sufficient, equilateral
(c) not sufficient
(d) sufficient, isosceles
- (a) no unique triangle
(b) no unique triangle
(c) no unique triangle
(d) (i) obtuse-angled
(ii) isosceles, $m\angle R = 34^\circ$
(e) no unique triangle
(f) (i) obtuse-angled
(ii) scalene, $m\angle R = 100^\circ$
- (b) right-angled isosceles
(c) 45°
- (b) $m\angle D = 57^\circ$, $m\angle E = 44^\circ$, $m\angle F = 79^\circ$
(c) acute-angled
(d) $\angle DFE$
(e) DF
- (b) $HK = 7.4$ cm
(c) scalene
- (b) $m\angle LMN = 90^\circ$
(c) $LN = MN = 2.8$ cm
(d) right-angled isosceles
- (b) $XY = 6.0$ cm
(c) scalene
- (b) $m\angle BAC = 120^\circ$, $m\angle ACB = 30^\circ$
(c) isosceles
- (b) 55°
(c) 4 cm
(d) acute-angled isosceles
- (b) 100°
(c) obtuse-angled scalene
- (b) $m\angle ABC = 25^\circ$, $m\angle ACB = 25^\circ$
(d) $BD = 4.1$ cm, $CD = 4.1$ cm
(e) When $AB = AC$, the perpendicular AD from A to BC bisects BC .
- (d) equilateral triangle
(e) 0.5
- No

Exercise 8.5

- (b) 5.8 cm
- (b) 6.8 cm
- (d) 3.4 cm
- (b) $m\angle YZT = 89^\circ$, $m\angle XTZ = 121^\circ$
- (b) $QR = 3.35$ cm, $m\angle PQR = 116.6^\circ$
- (b) 3.9 cm
- (b) $m\angle A = 93^\circ$, $m\angle D = 77^\circ$
- (b) $AB = 5.2$ cm
- (a) $m\angle SPQ = 120^\circ$
(d) 4.3 cm
(e) PT . Because T is a point on the perpendicular bisector of PR .
- (b) 800 m
- (b) rectangle or parallelogram

Review Exercise 8

- (a) $p = 25$ (b) $q = 26$
- (a) $x = 62^\circ$, $y = 23^\circ$ (b) $x = 23^\circ$, $y = 18^\circ$
- (a) 22.5 (b) 30
- (a) 19 (b) 25
- (a) $a = 4$, $b = 6$ (b) $a = 9$, $b = 3$
(c) $a = 4.5$, $b = 3$
- (a) $\triangle ABC$ cannot be constructed. $\triangle PQR$ can be constructed.
(c) Scalene right-angled triangle
- (b) They meet at a point E outside $\triangle ABC$.
A circle with center E and radius EA will pass through the points B and C .
- (b) Yes, because $m\angle AOX = m\angle BOY$ and $m\angle COX = m\angle DOY$
(c) 90°
- (a) 3.9 cm (b) 80°
- (b) 3.1 cm
- (c) 4.3 cm