

# Selected Answers

## Chapter 1

### Get Ready!

p. 1

1. 6 2. 5 3. 1 4. 20 5. 15 6. 44 7. 72 8. 150 9. 400

10. 8 11. \$294 12.  $\frac{4}{5}$  13.  $\frac{5}{7}$  14.  $\frac{1}{7}$  15.  $\frac{12}{13}$  16. 0.7

17. 0.6 18. 0.65 19. 0.93 20.  $0.4\overline{6}$  21.  $\frac{11}{14}$

22.  $10\frac{7}{15}$  23.  $\frac{1}{10}$  24.  $3\frac{11}{12}$  25. Answers may vary.

Sample:  $20 + 15$  26. Answers may vary. Sample: A simplified expression is one that is briefer or easier to work with than the original expression. 27. Answers may vary. Sample: To evaluate an expression means to find its numeric value for given values of the variables.

### Lesson 1-1

pp. 4-9

**Got It?** 1.  $n + 18$  2a.  $6n$  b.  $\frac{18}{n}$  c. No; 6 less a number  $y$  means  $6 - y$  and 6 less than a number  $y$  means  $y - 6$ . 3a.  $4x - 8$  b.  $2(x + 8)$  c.  $\frac{5}{12+x}$  4a. the sum of a number  $x$  and 8.1 b. the sum of ten times a number  $x$  and 9 c. the quotient of a number  $n$  and 3 d. five times a number  $x$  less 1 5. subtract 2 from the number of sides in the polygon;  $n - 2$

**Lesson Check** 1a. numerical b. algebraic c. numerical 2a.  $9t$  b.  $x - \frac{1}{2}$  c.  $m + 7.1$  d.  $\frac{207}{n}$  3. six times a number  $c$  4. one less than a number  $x$  5. the quotient of a number  $t$  and 2 6. 4 less than the product of 3 and a number  $t$  7. Numerical expressions are mathematical phrases involving only numbers and operations. Algebraic expressions are mathematical phrases that include one or more variables. An algebraic expression includes at least one variable. A numerical expression does not include any variables. 8.  $49 + 0.75n$

**Exercises** 9.  $p + 4$  11.  $\frac{n}{8}$  13.  $\frac{t}{82}$  15.  $5n + 6.7$  17. 5 more than a number  $q$  19. the product of 12 and  $x$  21. one more than the product of 9 and a number  $n$  23. the difference of 15 and the quotient of 1.5 and  $d$  25. 5 more than the product of 9 and a number  $n$ ;  $9n + 5$  27.  $8 - 9r$  29.  $\frac{3}{7}y - 4$  31. It should be "the quotient of 5 and  $n$ ." 33a.  $4.50n$  b. \$40.50 35. A 37. Answers may vary. Sample: An umpire picks up  $b$  baseballs for a game in addition to the three he had. 39. Answers may vary. Sample: Yes; sometimes you cannot be sure from a verbal description what order is intended for the operations. 41.  $2x + 6$  or  $6 + 2x$  43. G 45.  $\frac{3}{4}$  46.  $\frac{5}{14}$  47.  $\frac{7}{10}$  48.  $\frac{1}{6}$  49. 3 50. 3 51. 1 52. 4

### Lesson 1-2

pp. 10-15

**Got It?** 1a. 81 b.  $\frac{8}{27}$  c. 0.125 2a. 27 b. 7 c. 17 d. A fraction bar acts as a grouping symbol since you simplify numerator and denominator before you divide.

3a. 3 b. 11 4.  $c + \frac{1}{10}c$ ; \$47.30, \$86.90, \$104.50, \$113.30

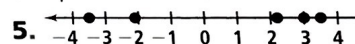
**Lesson Check** 1. 25 2. 8 3.  $\frac{9}{16}$  4. 23 5. 1728 6. 0 7. exponent 3; base 4 8. The student subtracted before multiplying;  $23 - 8 \cdot 2 + 3^2 = 23 - 8 \cdot 2 + 9 = 23 - 16 + 9 = 7 + 9 = 16$

**Exercises** 9. 243 11. 16 13.  $\frac{8}{27}$  15. 0.004096 17. 2 19. 4.5 21. 53 23. 16 25. 1728 27. 4 29. 1024 31. 496 33. 3458 35.  $mv$ ; 15,000, 20,000, 25,000 37. 256 39. 5 41. 12

### Lesson 1-3

pp. 16-22

**Got It?** 1a. 8 b. 5 c.  $\frac{1}{6}$  d.  $\frac{9}{11}$  2. about 6 3a. rational numbers, natural numbers, whole numbers, integers b. rational numbers c. rational numbers d. irrational numbers 4a.  $\sqrt{129} < 11.52$  b. Yes;  $4\frac{1}{3} > \sqrt{17}$  also compares the two numbers.

5.   $-\frac{7}{2}$ ,  $-2.1$ ,  $\sqrt{5}$ ,  $\sqrt{9}$ , 3.5

**Lesson Check** 1. irrational numbers 2. rational numbers, integers 3.  $-5$ ,  $\sqrt{16}$ , 4.1,  $\frac{47}{10}$  4. about 4 in.

5. rational numbers and irrational numbers 6. Answers may vary. Sample: 0.5 7. Rational; its value is 10, which can be written as a ratio of two integers,  $\frac{10}{1}$ . 8. Irrational;  $\sqrt{0.29}$  is a nonrepeating, nonterminating number.

**Exercises** 9. 6 11. 4 13.  $\frac{6}{7}$  15.  $\frac{1}{3}$  17. 1.4 19. about 4 21. about 16 23. about 18 25. about 13 in. 27. rational numbers 29. rational numbers, integers 31. irrational numbers 33. rational numbers 35. irrational numbers 37.  $5\frac{2}{3} > \sqrt{29}$  39.  $\frac{4}{3} < \sqrt{2}$  41.  $-\frac{7}{11} < -0.63$

43.  $-\frac{22}{25} < -0.\overline{8}$  45.  $-2$ ,  $-\frac{7}{4}$ ,  $\frac{1}{2}$ ,  $\sqrt{5}$ , 2.4 47.  $-\frac{59}{9}$ ,  $-6$ , 4.3,  $\sqrt{20}$  49.  $-\frac{9}{4}$ ,  $-\frac{13}{6}$ ,  $-2.1$ ,  $-\frac{26}{13}$  51. about 12 ft

53. True; Answers may vary; any integer can be expressed as a rational number. 55. False; Answers may vary; 2 is a positive number and an integer. 57.  $\frac{417}{1}$  59.  $\frac{201}{100}$  61.  $\frac{306}{100}$  63. about 12 ft 65.  $\frac{864}{275}$ ; its value 3.14181... is closer to the value of  $\pi$  than  $\sqrt{10}$ , which is 3.16227...

67. no; no the real number line extends indefinitely in both the positive and negative direction. 69. It is true for products involving two numbers greater than 0 and less than 1. 71a. 4 b. 10 c. 7 d. 13 73. 1 75. 16 76. 78 77. 512 78.  $14 + x$  79.  $4(y + 1)$  80.  $\frac{3880}{2}$  81.  $\frac{19}{3}t$  82. 18 83. 72 84. 442 85. 9

### Lesson 1-4

pp. 23-28

**Got It?** 1a. Identity Prop. of Mult. b. Commutative Prop. of Add. 2. 720 tennis balls 3a.  $9.45x$  b.  $9 + 4h$  c.  $\frac{2}{3n}$  4a. True; Commutative Prop. of Mult. and Identity

Prop. of Add. **b.** False; answers may vary. Sample:  $4(2 + 1) \neq 4(2) + 1$  **c.** No; it is true when  $a$  and  $b$  are both either 0 or 2.

**Lesson Check 1.** Comm. Prop. of Add. **2.** Assoc. Prop. of Mult. **3.** \$4.45 **4.** 24d **5a.** no **b.** yes **6.** Comm. Prop. of Mult.; Assoc. Prop. of Mult.; multiply; multiply

**Exercises 7.** Comm. Prop. of Add. **9.** Ident. Prop. of Add. **11.** Comm. Prop. of Mult. **13.** 36 **15.** 9.7 **17.** 80 **19.** \$110 **21.**  $18x$  **23.**  $110p$  **25.**  $11 + 3x$  **27.**  $1.2 + 7d$  **29.**  $1.5n$  **31.**  $11y$  **33.** False; answers may vary. Sample:  $8 \div 4 \neq 4 \div 8$  **35.** true; Mult. Prop. of  $-1$

**37a.** 497 mi **b.** 497 mi **c.** The Commutative Property of Addition applies to this situation. **39.** no **41.** yes **43.** yes **45.** no **47.** Hannah can only afford to give all her friends the same gift. **49.** 390 **51.** 0 **53.** no;  $(a - b) - c \neq a - (b - c)$  **55.** no;  $(a \div b) \div c \neq a \div (b \div c)$  **57.**  $(b + c)a = a(b + c)$  and  $ba + ca = ab + ac$  by the Comm. Prop. of Mult. **59.** H **61.** F **62.**  $-6, 1.6, \sqrt{6}, 6^3$  **63.**  $-17, 1.4, \frac{8}{5}, 10^2$  **64.**  $-4.5, 1.75, \sqrt{4}, 14^1$  **65.** 14 **66.** 1 **67.** 1.1 **68.**  $\frac{1}{18}$

### Lesson 1-5

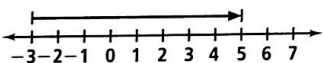
pp. 30-36

**Got It? 1.**  $-4$  **2a.**  $-24$  **b.**  $-2$  **c.**  $-2$  **d.**  $-8$  **3a.** 13.5 **b.** any value where  $a = b$  **4.**  $-2473$  ft, or 2473 ft below sea level

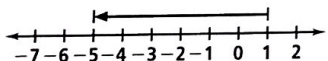
**Lesson Check 1.**  $-3$  **2.**  $-3$  **3.**  $-3$  **4.**  $-7$  **5.** 2 **6.**  $-7$  **7.** 0 **8.** Subtracting is the same as adding the opposite. **9.** The opposite of a number is the number that is added to it to equal 0. If a number is positive, its opposite is negative. However, if a number is negative, its opposite is positive.

#### Exercises

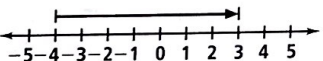
**11.** 5



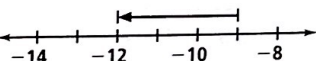
**13.**  $-5$



**15.** 3



**17.**  $-12$



**19.**  $-11$  **21.** 5 **23.**  $-11$  **25.** 4.4 **27.**  $-3$  **29.**  $\frac{13}{36}$  **31.**  $-20$  **33.** 48 **35.**  $-2$  **37.**  $-20.3$  **39.** 1.6 **41.**  $\frac{15}{16}$  **43.** \$48.54 **45.**  $-7.1$  **47.** The sum of  $-4$  and 5 is  $+1$ , not  $-1$ ;  $-4 - (-5) = -4 + 5 = 1$  **49.**  $-\frac{1}{12}$  **51.** 1 **53.** positive **55.** negative **57.** Find the absolute value of each number. The sign of the number with the larger absolute value will be the sign of the sum. **59.** False; if both numbers are negative, the difference is larger than the sum. If the absolute values are equal, the sum is 0. **61.** 29.62 in. **63.**  $-2$  **65.** Sometimes; only true when  $m = 0$ , the result will be  $-m = m$  **67.**  $\frac{W}{10}$  **69a.** Yes; check students' work. Sample:  $|3 - 1| = |2| = 2$  and

$|1 - 3| = |-2| = 2$  **b.** No; check students' work. Sample:  $|3 + (16)| = |-3| = 3$  but  $|3| + |-6| = 3 + 6 = 9$

**71.** H **73.** F **75.** yes **76.** no **77.** yes

**78.** rational numbers **79.** rational numbers **80.** rational numbers, whole numbers, natural numbers, and integers **81.** rational numbers **82.** irrational numbers **83.** 18.75 **84.** 17 **85.** 318

### Lesson 1-6

pp. 38-44

**Got It? 1a.**  $-90$  **b.** 2.4 **c.**  $-\frac{21}{50}$  **d.** 16 **2a.** 8 **b.**  $\pm 4$

**c.**  $-11$  **d.**  $\pm \frac{1}{6}$  **3.**  $-\$72$  **4a.**  $-\frac{3}{10}$  **b.** Yes; a positive divided by a negative is negative and the opposite of a positive divided by a positive is also negative.

**Lesson Check 1.** 36 **2.**  $-\frac{5}{32}$  **3.**  $-16$  **4.**  $\frac{9}{8}$  **5.**  $-5$

**6.** **7a.** 2; a positive number has a positive and negative square root. **b.** 1;  $\sqrt{0} = 0$ , so there is one square root.

**Exercises 9.** 96 **11.** 20.5 **13.**  $-25$  **15.**  $\frac{1}{17}$  **17.** 1

**19.** 1.44 **21.** 13 **23.**  $-30$  **25.**  $-\frac{5}{9}$  **27.**  $-\frac{11}{4}$  **29.**  $\pm 0.5$

**31.**  $-6$  **33.**  $-3$  **35.**  $-0.9$  **37.**  $-250$  **39.** \$115 **41.** 3 **43.**  $-1$  **45.**  $-\frac{25}{18}$  **47.**  $\frac{1}{2}$  **49.**  $-94\frac{1}{2}$  bushels **55.**  $-180$

**57.**  $38\frac{2}{5}$  **59.**  $-13^\circ\text{F}$  **61.** First change  $-2\frac{1}{2}$  to the improper fraction  $-\frac{5}{2}$ . Then multiply  $-\frac{5}{2}$  by the reciprocal of  $-\frac{5}{2}$ , which is  $-\frac{2}{5}$ . **63.**  $\frac{800}{63}$ , or  $12\frac{44}{63}$  **65a.** If  $0 \div x = y$ , then  $xy = 0$ . Since  $x \neq 0$ , then  $y = 0$  by the Zero Property of Multiplication. **b.** Suppose there is a value of  $y$  such that  $x \div 0 = y$ . Then  $x = 0 \cdot y$ , so  $x = 0$ . But this is a contradiction, since  $x \neq 0$ . So there is no value of  $y$  such that  $x \div 0 = y$ . **67.** Always; the quotient is  $-1$ . **69.**  $-8$  **71.** I **73.** 30 **74.**  $-10$  **75.**  $-10$  **76.** Ident. Prop. of Add. **77.** Comm. Prop. of Mult. **78.** Assoc. Prop. of Mult.

### Lesson 1-7

pp. 46-52

**Got It? 1a.**  $5x + 35$  **b.**  $36 - 2t$  **c.**  $1.2 + 3.3c$

**d.**  $-2y^2 + y$  **2a.**  $\frac{4}{3}x - \frac{16}{3}$  **b.**  $\frac{11}{6} + \frac{1}{2}x$  **c.**  $\frac{5}{4} + \frac{1}{2}x$

**d.**  $\frac{1}{2} - \frac{1}{4}x$  **3a.**  $-a - 5$  **b.**  $x - 31$  **c.**  $-4x + 12$

**d.**  $-6m + 9n$  **4.** \$29 **5a.**  $2y$  **b.**  $-12mn^4$  **c.**  $8y^3z - 6yz^3$  **d.** No; it is already simplified since there are no like terms to combine.

**Lesson Check 1a.**  $7j + 14$  **b.**  $-8x + 24$  **c.**  $-4 + c$

**d.**  $-11 - 2b$  **2.**  $-8x^2 + 3xy + (-9x) + (-3)$  **3.**  $2ab + (-5ab^2) + (-9a^2b)$  **4.** yes **5.** no **6a.** yes **b.** no;

Commutative Prop. of Mult. **c.** yes **d.** no; Associative Prop. of Add. **7.**  $500 - 1$ ; answers may vary. Sample: These numbers are easily multiplied by 5, making it possible to use the Distr. Prop. to solve this using mental math. **8a.** yes; no like terms **b.** This expression can be simplified by using the Distr. Prop. **c.** No;  $12xy$  and  $3yx$  are like terms.

**Exercises 9.**  $6a + 60$  **11.**  $25 + 5w$  **13.**  $90 - 10t$

**15.**  $112b + 96$  **17.**  $4.5 - 12c$  **19.**  $f - 2$  **21.**  $12z + 15$

23.  $\frac{3}{11} - \frac{7d}{17}$  25.  $\frac{2}{5}x + \frac{7}{5}$  27.  $\frac{8}{3} - 3x$  29.  $5 - \frac{8}{5}t$   
 31.  $11 - n$  33.  $-20 - d$  35.  $-9 + 7c$  37.  $-18a + 17b$   
 39.  $m - n - 1$  41. 40.8 43. 897 45. 23.4  
 47. 24.6 49. \$49.50 51. \$4725 53.  $20x$  55.  $-2t$   
 57.  $17w^2$  59.  $5y^2$  61.  $-3x + y + 11$   
 63.  $3h^2 - 11h - 3$  65. the product of 3 and the difference of  $t$  and 1;  $3t - 3$  67. one-third the difference of 6 times  $x$  and 1;  $2x - \frac{1}{3}$  69. The sum, not the product, of the terms should be found;  $4(x + 5) = 4x + 4 \cdot 5 = 4x + 20$ . 71.  $33x + 22$  73.  $35n - 63$  75. 0  
 77.  $-5m^3n + 5mn$  79.  $23x^2y - 8x^2y^2 - 4x^3y^2 - 9xy^2$   
 81.  $\frac{1}{3}(9 + 12n) = \frac{9}{3} + \frac{12n}{3} = 3 + 4n$  83. Answers may vary. Sample:  $3(m - 2n - 5)$ . 85.  $45d + 26$   
 87.  $24 + 2t$  89.  $-m - 9n + 12$

### Lesson 1-8

pp. 53-58

**Got It?** 1a. open b. true c. false 2. yes 3.  $49 = 14h$   
 4. 9 5a.  $-10$  b. Answers may vary. Sample:  $-5$  6. The solution is between  $-8$  and  $-9$ .

**Lesson Check** 1. no 2. 15 3.  $p = 1.5n$  5. Answers may vary. Sample:  $\frac{x}{3} = 15$ . 6. 9

**Exercises** 7. false 9. true 11. false 13. open 15. open  
 17. no 19. yes 21. no 23. yes 25.  $4x + (-3) = 8$   
 27.  $115d = 690$  29. 13 31. 6 33. 12 35. 6 37. 2  
 39. 4 41. 6 43. 4 45. 8 47. between  $-5$  and  $-4$   
 49. 2004 51. An expression describes the relationship between numbers and variables. An equation shows that two expressions are equal. An expression can be simplified but has no solution. 53.  $-6$  55. between 3 and 4  
 57. between  $-3$  and  $-2$  59. 0 61. Check students' work. 63. 120 lb 65. Answers may vary. Sample: The friend knows an odd number divided by an even number cannot be an integer.

### Review

p. 60

1. Answers may vary. Sample: For the sum  $-3$  for the  $x$ -coordinate, you could roll a 4 on the negative cube and a 1 on the positive cube. For the sum 4 for the  $y$ -coordinate, you could roll a 1 on the negative cube and a 5 on the positive cube. 3. Answers may vary. The number on the negative cube must be greater than the number on the positive cube.

### Lesson 1-9

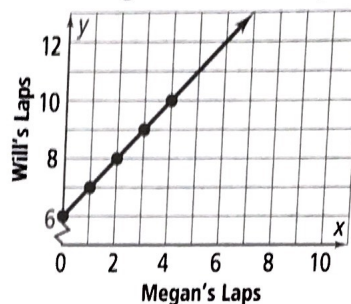
pp. 61-66

**Got It?** 1a. yes b. yes c. no d. yes  
 2a.

Megan's and Will's Laps					
Megan's laps	1	2	3	4	5
Will's laps	7	8	9	10	11

$$y = x + 6$$

Megan's and Will's Laps



b. The graph would start at  $(0, 5)$  instead of  $(0, 2)$  and  $y$  would always be 5 greater than  $x$ .

3a. 54 tiles

Orange tiles	4	8	12	16
Total tiles	9	18	27	36

b. 48 yellow tiles

Blue tiles	1	2	3	4
Yellow tiles	2	4	6	8

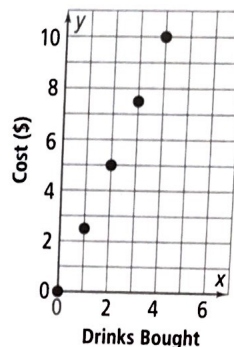
**Lesson Check** 1. no 2. yes

3.

Drink Cost				
Drinks bought	1	2	3	4
Cost (\$)	2.50	5	7.50	10

$$y = 2.50x$$

Drink Cost

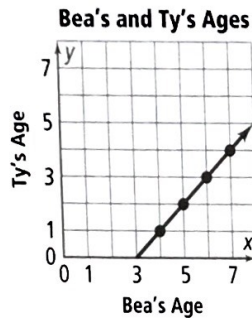


4. 110 Calories 5. With inductive reasoning, conclusions are reached by observing patterns. With deductive reasoning, conclusions are reached by reasoning logically from given facts. 6. Answers may vary. Sample: Both equations contain unknown values. An equation in one variable represents a situation with one unknown quantity. An equation in two variables represents a situation where two variable quantities have a relationship. 7. All;  $y$  is 2 more than  $x$ .  
**Exercises** 9. no 11. no 13. yes 15. yes

17.

Bea's and Ty's Ages				
Bea's age	4	5	6	7
Ty's age	1	2	3	4

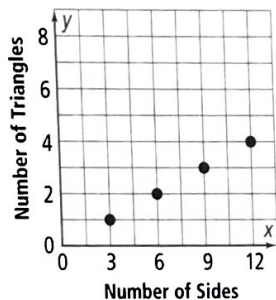
$y = x - 3$



19.

Sides and Triangles				
Number of sides	3	6	9	12
Number of triangles	1	2	3	4

$y = \frac{1}{3}x$

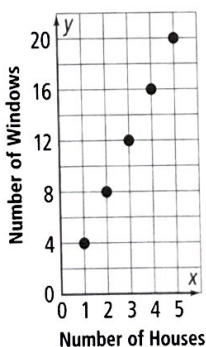


21. 56 in. 23.  $y = x - 12$ ; 52 in.

25.

Number of Houses	1	2	3	4	5
Number of Windows	4	8	12	16	20

a. 36 windows b.  $k + 4$

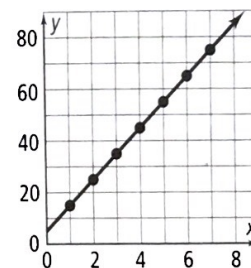


27. yes 29. no 31. 11 h 33. Check students' work.  
 35.  $y = -x - 3.5$ ; the graph is of a line, which passes through (0, -3.5), (3.5, 0) 37. H 39. F 40. no 41. yes  
 42. yes 43-48. Check students' work. 47. 9 48. -3  
 49. -14 50. -27 51. 40 52. -30 53. -1 54. -81

**Chapter Review pp. 68-72**

1. irrational 2. opposite 3. like terms 4. absolute value  
 5. inductive reasoning 6.  $737w$  7.  $q - 8$  8.  $x + 84$

9.  $51t + 9$  10.  $\frac{63}{h} - 14$  11.  $b - \frac{k}{5}$  12. the sum of 12 and a number  $a$  13. 31 less than a number  $r$  14. the product of 19 and a number  $t$  15. the quotient of  $b$  and 3 16. 3 less than the product of 7 and  $c$  17. the sum of 2 and the quotient of  $x$  and 8 18. 6 less than the quotient of  $y$  and 11 19. 13 more than the product of 21 and  $d$  20. 81 21. 125 22.  $\frac{1}{36}$  23. 9.8 24. 100  
 25. 48 26.  $8\frac{1}{3}$  27. 40 28. 79 29. 123 30a. 216  
 b. The surface area is reduced to a fourth of its previous value. 31. 615 mi 32. irrational 33. rational  
 34. irrational 35. rational 36. 10 37. 7 38. 5  
 39. rational numbers, integers 40. rational numbers  
 41. irrational numbers 42. rational numbers, whole numbers, natural numbers, integers 43. rational numbers  
 44. rational numbers 45.  $-1\frac{4}{5}$ ,  $-1\frac{2}{3}$ , 1.6 46.  $-0.8$ ,  $\frac{7}{9}$ ,  $\sqrt{3}$   
 47.  $9w - 31$  48. -96 49. 0 50.  $41 - 4t$  51. 1  
 52. yes 53. no 54. no 55. no 56. 5 57. -5 58. -9  
 59. 1.8 60. -144 61. 40 62. -3 63. -19 64. 3  
 65. -8 66. 60 67. 16 68. 12 69. -11 70. 19  
 71. -100 72. -56 73. 225 74.  $-\frac{3}{10}$  75.  $10x - 15$   
 76.  $-14 + 2a$  77.  $-\frac{1}{2}j + 4$  78.  $v^2$  79.  $6y - 6$   
 80.  $\frac{3}{2}y - \frac{1}{4}$  81.  $6 - 6y$  82.  $y - 3$  83.  $-\frac{1}{3}y + 6$   
 84.  $-2ab^2$  85. \$2850 86. Yes; the variable parts of the terms are the same. 87. yes 88. no 89. no 90. yes  
 91. 10 92. between 12 and 13 93. between 2 and 3  
 94. between 3 and 4 95. yes 96. no 97. no 98. no  
 99.  $y$  is 5 more than the product of 10 and  $x$ ;  
 $y = 10x + 5$ .  
 55, 65, 75



**Chapter 2**

**Get Ready!**

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1. Answers may vary. Sample: For each lawn mowed, \$7.50 is earned;  $y = 7.50x$ . 2. Answers may vary. Sample: 30 pages are read each hour;  $y = 30x$ . 3. 3  
 4. -10 5. 8 6. -8 7. 7.14 8. 16.4 9.  $-\frac{9}{20}$  10.  $-\frac{7}{15}$   
 11. 17 12. -3 13. 576 14. -2.75 15.  $16k^2$  16.  $13xy$   
 17.  $2t + 2$  18.  $12x - 4$  19. Answers may vary. Sample: The shirts might look the same but be different sizes or different colors; the triangles will be the same shape but different sizes. 20. Answers may vary. Sample: The model ship is the same shape but just a smaller size than the actual ship.