Chapter 3 Answer Key

1. $3(4) + 5$ does not belong because it is a numerical expression and the other three are algebraic expressions.

2. First: Perform operations in parentheses. Second: Evaluate terms with exponents. Third: Multiply or divide from left to right. Fourth: Add or subtract from left to right.

3. decrease; When you subtract greater and greater values from 20, you will have less and less left.

4. $8 \div 2$; \$4 per hour

5. 20×6; \$120

6. $95 - 82$; 13 points

7. $20 - 12$; \$8

8. Terms: $7h$, 3
Coefficient: 7
Constant: 3

9. Terms: g, 12, $9g$
Coefficients: 1, 9
Constant: 12

10. Terms: $5c^2$, $7d$
Coefficients: 5, 7
Constant: none

11. Terms: $2m^2$, 15, $2p^2$
Coefficients: 2, 2
Constant: 15

12. Terms: 6, n^2, $\frac{1}{2}d$
Coefficients: 1, $\frac{1}{2}$
Constant: 6

13. Terms: $8x$, $\frac{x^2}{3}$
Coefficients: 8, $\frac{1}{3}$
Constant: none

14. There is only one term, not three.
Term: $2x^2y$
Coefficient: 2
Constant: none

15. **a.** Terms: 2ℓ, $2w$; Coefficients: 2, 2; Constant: none

b. The coefficient 2 of ℓ represents that there are 2 lengths on the rectangle.
The coefficient 2 of w represents that there are 2 widths on the rectangle.

16. b^3

17. g^5

18. $8w^4$

19. $5.2y^3$

20. a^2c^2

21. $2.1xz^4$

22. The coefficient and exponent are reversed.
$3 \cdot n \cdot n \cdot n \cdot n = 3n^4$

23. $25d^2$

24. x^4

25. 9

26. 10

27. 11

28. 9

29. 10

30. 17

31. 6

32. 2

33. 5

34. 9

35. 4

36. 24

37. Multiplication should be done first, then addition.

$$5m + 3 = 5 \cdot 8 + 3$$
$$= 40 + 3$$
$$= 43$$

38. \$15; \$105

39. 34 mm; 118 mm

40.

x	3	6	9
$x \cdot 8$	24	48	72

41.

x	2	4	8
$64 \div x$	32	16	8

42. no; In 2 seconds, the rock has only fallen 64 feet.

43. 23

44. 8.2

45. $2\frac{5}{6}$

46. $10\frac{2}{3}$

47. 22

48. 82

49. 46

50. 48.3

51. 24

52. $4x + 3y$

53. See *Taking Math Deeper.*

54. **a.** $20 for an adult; $13 for a student; The coefficient of a represents the cost per adult. The coefficient of c represents the cost per student.

b. $392

c. yes; *Sample answer:* For 8 adults and 48 students, the cost is $20(8) + 13(48) = \$784$. Because $2(392) = 784$, the cost doubles when the number of adults and students in the group both double.

d. no; *Sample answer:* For 2 adults and 48 students, the cost is $20(2) + 13(48) = \$664$. The cost is not the same.

55. 64 in.^{3}

56. 243

57. 512

58. 2401

59. 256

60. C

53. *Sample answer:*

If the ride takes 8 minutes, then the rate is $2000 \div 8 = 250$ feet per minute.

If the ride takes 5 minutes, then the rate is $2000 \div 5 = 400$ feet per minute.

Answer should include a drawing of a water ride.

Section 3.2 Answer Key

1. x take away 12; $x - 12$; $x + 12$

2. The coefficient represents the cost to print each photo, 25 cents.

3. $8 - 5$

4. $3 \cdot 12$ or $12 \cdot 3$

5. $28 \div 7$

6. $6 + 10$ or $10 + 6$

7. $18 - 3$

8. $15 + 17$ or $17 + 15$

9. $x - 13$

10. $5 \cdot d$ or $d \cdot 5$

11. $18 \div a$

12. $s - 6$

13. $7 + w$ or $w + 7$

14. b^2

15. $y + 4$ or $4 + y$

16. $12 - x$

17. $2 \cdot z$ or $z \cdot 2$

18. t^3

19. The expression is not written in the correct order; $\frac{8}{y}$

20. The expression is not written in the correct order; $16 - x$

21. **a.** $x \div 5$

b. *Sample answer:* If the total cost is \$30, then the cost per person is $x \div 5 = 30 \div 5 = \$6$.
The result is reasonable.

22. **a.**

Seasons	1	2	3	4	5
Episodes	19	38	57	76	95

b. $19n$

23. The sum of n and 6; 6 more than a number n

24. 4 times a number w; The product of 4 and a number w

25. A number b less than 15; 15 take away a number b

26. 3 times a number z less than 14; 14 minus 3 times a number z

27. $\frac{y}{4} - 3$; 2

28. $\frac{x+4}{3}$; 3

29. $8x + 6$; 46

30. $\frac{40}{y - 16}$; 10

31. **a.**

Game	1	2	3	4	5
Cost	\$5	\$8	\$11	\$14	\$17

b. $2 + 3g$ **c.** \$26

32. **a.** $5a - 8$

b. $2f + 25$

c. Florida has 67 counties. Georgia has 159 counties.

33. See *Taking Math Deeper.*

34. $a + 8$

35. $\frac{x}{4}$

33. a. Let r be the number of rounds.

The competition starts with 140 people. After each round there are 15 less people in the competition.

Number of people after each round: $140 - 15r$

b. $140 - 15r = 140 - 15(8) = 140 - 120 = 20$

There are 20 people in the ninth round.

Because the expression $140 - 15r$ represents the number of people after round r, use $r = 8$ to determine how many people compete in the ninth round.

34. $a + 8$

35. $\frac{x}{4}$

36. 45

37. 59

38. 390

39. 140

40. D

Section 3.3 Answer key

1. *Sample answer:*

$$\frac{1}{5} + \frac{3}{5} = \frac{3}{5} + \frac{1}{5}$$

$$\frac{4}{5} = \frac{4}{5}$$

2. *Sample answer:*
$(x + 8) + 4 = x + (8 + 4) = x + 12$

3. *Sample answer:*
$(5 \cdot x) \cdot 1 = 5 \cdot (x \cdot 1)$
$= 5x$

4. $9 + (7 + w) = (9 + 7) + w$ does not belong because it demonstrates the Associative Property of Addition whereas the other statements demonstrate the Commutative Property of Addition.

5. Comm. Prop. of Mult.

6. Assoc. Prop. of Add.

7. Assoc. Prop. of Mult.

8. Comm. Prop. of Add.

9. Add. Prop. of Zero

10. Mult. Prop. of One

11. The grouping of the numbers did not change. The statement illustrates the Commutative Property of Addition because the order of the addends changed.

12. $6 + (5 + x) = (6 + 5) + x$ Assoc. Prop. of Add.
$= 11 + x$
Add 6 and 5.

13. $(14 + y) + 3 = (y + 14) + 3$ Comm. Prop. of Add.
$= y + (14 + 3)$
Assoc. Prop. of Add.
$= y + 17$
Add 14 and 3.

14. $6(2b) = (6 \cdot 2)b$
Assoc. Prop. of Mult.
$= 12b$
Multiply 6 and 2.

15. $7(9w) = (7 \cdot 9)w$
Assoc. Prop. of Mult.
$= 63w$
Multiply 7 and 9.

16. $3.2 + (x + 5.1) =$
$3.2 + (5.1 + x)$
Comm. Prop. of Add.
$= (3.2 + 5.1) + x$
Assoc. Prop. of Add.
$= 8.3 + x$
Add 3.2 and 5.1.

17. $(0 + a) + 8 = a + 8$ Add. Prop. of Zero

18. $9 \cdot c \cdot 4 = 9 \cdot 4 \cdot c$ Comm. Prop. of Mult.
$= (9 \cdot 4) \cdot c$ Assoc. Prop. of Mult.
$= 36c$ Multiply 9 and 4.

19. $(18.6 \cdot d) \cdot 1 = 18.6 \cdot (d \cdot 1)$ Assoc. Prop. of Mult.
$= 18.6\,d$ Mult. Prop. of One

20. $\left(3k + 4\frac{1}{5}\right) + 8\frac{3}{5} = 3k + \left(4\frac{1}{5} + 8\frac{3}{5}\right)$
Assoc. Prop. of Add.
$= 3k + 12\frac{4}{5}$
Add $4\frac{1}{5}$ and $8\frac{3}{5}$.

21. $(2.4 + 4n) + 9 =$ Comm. Prop. of Add.
$(4n + 2.4) + 9$
$= 4n + (2.4 + 9)$ Assoc. Prop. of Add.
$= 4n + 11.4$ Add 2.4 and 9.

22. $(3s) \cdot 8 = (s \cdot 3) \cdot 8$ Comm. Prop. of Mult.
$= s \cdot (3 \cdot 8)$ Assoc. Prop. of Mult.
$= s \cdot 24$ Multiply 3 and 8.
$= 24s$ Comm. Prop. of Mult.

23. $z \cdot 0 \cdot 12 = (z \cdot 0) \cdot 12$ Assoc. Prop. of Mult.
$= 0 \cdot 12$ Mult. Prop. of Zero
$= 0$ Mult. Prop. of Zero

24. $x + 16$

25. **a.** x represents the cost of a box of cookies.
b. $120x$

26. See *Taking Math Deeper.*

27. $7 + (x + 5) = x + 12$

28. $8 \cdot (y \cdot 9) = 72y$

29. $(7 \cdot 2) \cdot y$

30. $13.2 \cdot (1 \cdot x)$

31. $(17 + 6) + 2x$

32. $2 + c$

33. $w \cdot 16$

34. **a.** $x + 37$

b. In the expression $37(14) + 10x$, 37 represents the total number of hats you sold, 14 represents the price per hat you charged, 10 represents the price per hat your friend charged, and x represents the number of hats sold by your friend. Because \$14 > \$10, your friend was selling the hats at a discounted price.

c. $x \leq 51$

35. 98

36. 108

37. 90

38. 200

39. 37 is already prime.

40. $2^1 \times 3^2$

41. 3×7^2

42. 5×41

43. B

Section 3.4 Answer Key

1. *Sample answer:* You must distribute or give the number outside the parentheses to the numbers inside the parentheses.

2. *Sample answer:*
$6 + [2(2 + x)]$
$= 6 + [2(2) + 2(x)]$
$= 6 + (4 + 2x)$
$= (6 + 4) + 2x$
$= 10 + 2x$

3. $4 + (x \cdot 4)$ does not belong because it does not represent the Distributive Property.

4. $8x$ and $7x$, 1 and 4

5. 63

6. 684

7. 516

8. 440

9. 936

10. 216

11. 504

12. 196

13. $\frac{4}{-}$

14. 2

15. $2\frac{1}{2}$

16. $\frac{3}{4}$

17. $3x + 12$

18. $10b - 60$

19. $6s - 54$

20. $56 + 7y$

21. $96 + 8a$

22. $18n + 9$

23. $72 - 12k$

24. $90 - 54w$

25. $63 + 9c$

26. $70 + 7x$

27. $40g + 24$

28. $78 + 6z$

29. $4x + 4y$

30. $25x - 25y$

31. $7p + 7q + 63$

32. $13n + 52 + 91m$

33. The 6 was not distributed to the 8 inside the parentheses. $6(y + 8) = 6y + 48$

34. **a.** $30(8 + x) = 240 + 30x$

b. *Sample answer:* \$2; It is less than the regular price to the exhibit.

c. *Sample answer:* \$300; yes

35. $5(r + 15)$ and $5r + 5 \cdot 15$, because they are equivalent expressions.

36. $10(103 - x) = 1030 - 10x$

37. $16(10 + x) = 160 + 16x$

38. $16(12 + 4 + x) = 256 + 16x$

39. $6x + 25$

40. $29 + 8x$

41. $68 + 28k$

42. $6x + 3$

43. $19y + 5$

44. $7w$

45. $3d + 1$

46. $4n - 3$

47. $5v$

48. 30

49. $2.7w - 14.04$

50. $\frac{11}{6}y$

51. $\frac{11}{4}z + \frac{3}{10}$

52. $7y$

53. $7x + 12y$

54. Adding before subtracting.

$$\begin{aligned} 8x - 2x + 5x &= (8 - 2)x + 5x \\ &= 6x + 5x \\ &= (6 + 5)x \\ &= 11x \end{aligned}$$

55. $x = 8$

56. $x = 15$

57. $x = 3$

58. $4x + 24$; $4x + 24$; The results are the same. Multiplying $(x + 6)$ by 4 and adding 4 groups of $(x + 6)$ are equivalent operations.

59. Area: $8x + 64$
Perimeter: $2x + 32$

60. Area: $12x + 66$
Perimeter: $2x + 35$

61. Area: $9x + 108$
Perimeter: $2x + 42$

62. a. Total profit = Profit for large candles + Profit for small candles

$$= 42(10 - x) + 56(5 - y)$$
$$= 420 - 42x + 280 - 56y$$
$$= 700 - 42x - 56y$$

b. Total profit $= 700 - 42x - 56y$
$= 700 - 42(5) - 56(3)$
$= 700 - 210 - 168$
$= 490 - 168$
$= 322$

The club's profit is $322.

63. a. 6.2

b. 14

Sample answer: The preferred method is not the same for both expressions. For part (a), evaluating inside the parentheses first makes for easier and fewer calculations. For part (b), using the Distributive Property will eliminate the fractions.

64. 0; For every positive value of x, the perimeters are equal.

65. $7(x + 3) + 8 \cdot x + 3 \cdot x + 8 - 9 = 2(9x + 10)$

66. 10.641

67. 34.006

68. 135.213

69. 0.387

70. B