Student Workbook Answers

Chapter 1

1.1 Activity

1. a.

Not Simplified	$x = 0$	$x = 1$
$2x + 3 - 2 + x$	1	4
$4x - 5 - 2x$	-5	-3
$2 - 3(x + 1) + 4x$	-1	0
$4 + 3x - x - 1$	3	5
$6x - 5 - 6x$	-5	-5
$5(x + 1) - x + 2$	7	11
$2x - 7 + 5x - 3$	-10	-3
$3 + 2x - 3$	0	2
$14 - 2x - 3x + 2$	16	11
$5 - 4x(1 + 3) + 7x$	5	-4

Simplified	$x = 0$	$x = 1$	Same?
$3x + 1$	1	4	Yes
$2x + 5$	5	15	No
$x - 3$	-3	-2	No
$2x + 3$	3	5	Yes
$12x - 5$	-5	7	No
$4x + 7$	7	11	Yes
$6x - 5$	-5	1	No
$2x$	0	2	Yes
$16 - 5x$	16	11	Yes
$5 - 9x$	5	-4	Yes

The correctly simplified expressions are those that have the same corresponding values when they are evaluated. Simplified algebraic expressions should give equivalent expressions, so they should have the same value when evaluated at a given value of the variable.

b. *Sample answer:* The expressions in the right column have no parentheses and do not have more than one x-term or more than one constant term.

Write the expressions as sums of their terms. Then use the Distributive Property to add or subtract the coefficients of the terms that have the same variables raised to the same exponents.

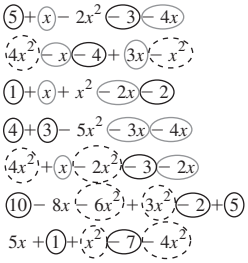
c. When simplifying $4x - 5 - 2x$, the student added 5 instead of subtracting 5. Correctly simplified, the expression is $2x - 5$.

When simplifying $2 - 3(x + 1) + 4x$, the student incorrectly added the constant terms. Correctly simplified, the expression is $x - 1$.

When simplifying $6x - 5 - 6x$, the student added the x-term coefficients instead of subtracting. Correctly simplified, the expression is -5.

When simplifying $2x - 7 + 5x - 3$, the student incorrectly added or subtracted the coefficients. Correctly simplified, the expression is $7x - 10$.

2. a.



b. yes; *Sample answer:* The terms $5x$ and x have the same variable, x, raised to the same exponent, 1, so you can add the terms to obtain $6x$.

c. no; *Sample answer:* The terms 5x and 5 do not have the same variable raised to the same exponent, so you cannot add the terms.

d. *Sample answer:* Circling the terms that have the same variable raised to the same exponent can help you identify all such terms when you add or subtract the coefficients.

3. *Sample answer:* You can simplify an algebraic expression by: (1) using the Distributive Property to eliminate parentheses, (2) use the Commutative and Associative Properties of Addition to get the variable terms together and the constant terms together, (3) combine the variable terms and combine the constant terms.
Sample answer:

$$\begin{aligned} 3(x - 2) + 5 - x &= 3x - 6 + 5 - x && (1) \\ &= 3x - x - 6 + 5 && (2) \\ &= 2x - 1 && (3) \end{aligned}$$

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4. *Sample answer:* It may be easier to evaluate an algebraic expression for a given value when the expression is simplified.
no; When you evaluate an algebraic expression, you get the same result regardless of whether the expression is simplified.

1.1 Practice

1. $1.3x$, $-2.7x^2$, $-5.4x$, 3; $1.3x$ and $-5.4x$

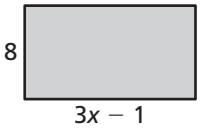
2. 10, $-\frac{3}{10}m$, $6m^2$, $\frac{2}{5}m$; $-\frac{3}{10}m$ and $\frac{2}{5}m$

3. $-\frac{35}{12}b$ **4.** $180m - 40$ **5.** $31.4 - 14x$

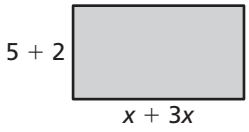
6. $-12y + 12$ **7.** $-7v - 3$ **8.** $\frac{17}{15}x + \frac{79}{5}$

9. $29x + 9$

10.



11.



12. $2.5x + 5$ **13.** $6w + 60$ **14.** $15.65x$

1.2 Activity

1. a. $x - 2$ **b.** $3x + 4$ **c.** $2x + 1$ **d.** $-3x - 2$

2. a. $(x - 3) + (x - 1) = 2x - 4$

b. $(x + 2) + (x - 2) = 2x$

c. $(2x + 1) + (-3x + 2) = -x + 3$

d. $(3x + 3) + (2x - 4) = 5x - 1$

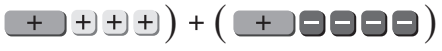
3. a. $(x + 4) - (x + 2) = 2$

b. $(x - 2) - (x - 4) = 2$

c. $(2x + 3) - (x - 4) = x + 7$

d. $(-2x + 2) - (3x - 4) = -5x + 6$

4. a.

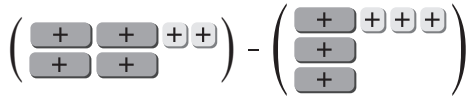


$(x + 3) + (x - 4) = 2x - 1$

b.

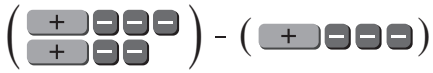
$(2x + 1) + (5 - x) = x + 6$

c.



$(4x + 2) - (3x + 3) = x - 1$

d.



$(2x - 5) - (x - 3) = x - 2$

5. *Sample answer:* Model the algebraic expressions using algebraic tiles.

To add: Combine "like" tiles and remove zero pairs. Write the resulting algebraic expression modeled by the remaining tiles.

To subtract: Remove any "like" tiles from the first expression and the second expression. If tiles remain in the second expression, add zero pairs to the first expression as necessary. Then remove any "like" tiles. Write the resulting algebraic expression modeled by the remaining tiles.

6. "Like" algebra tiles represent like terms, so once you have identified the "like" tiles, you can find the corresponding like terms.

7. When the terms represented by the algebra tiles in each pair are added, their sum is zero.

1.2 Practice

1. $2t + 7$ **2.** $11k + 6$

3. $-8y + 4$ **4.** $13.6g - 22$

5. $-8.3s$ **6.** $3p + 1$

7. $-5w - \frac{5}{2}$ **8.** $4k - \frac{13}{5}$

9. a. $5t + 7$ **b.** $29t + 45$ **c.** \$132

10. $-6u + 7$ **11.** $-28x + 55$ **12.** $11.4h - 26$

13. $4.5b + 24$ **14.** $2j - 8$ **15.** $6n + \frac{22}{5}$

16. a. $7d + 12$ **b.** 5 pairs

Student Workbook Answers

1.3 Activity

1.

Triangle	Angle A	Angle B	Angle C	$A + B + C$
a.	60	60	60	180
b.	90	45	45	180
c.	120	30	30	180
d.	30	60	90	180

2. a. The sum of the angle measures of a triangle is 180°.

b. *Answer should include, but is not limited to:* The sum of the angle measures of each triangle should be 180°. Some might be a little off due to rounding.

3. a. $27 + 82 + x = 180$; $x = 71$

b. $43 + 52 + x = 180$; $x = 85$

c. $x + 62.5 + 77 = 180$; $x = 40.5$

d. $33.4 + x + 51.3 = 180$; $x = 95.3$

4. *Sample answer:* If you notice a pattern, you can use inductive reasoning to write a rule. Then you can test your rule using several examples. You can use the rule to write an equation that can be used to solve a problem.

1.3 Practice

1. $x = 7$ **2.** $n = 34$ **3.** $k = -3$

4. $d = 3\pi$ **5.** $y = -1.3$ **6.** $w = \frac{19}{10}$

7. $49 = s + 19$; 30 points

8. $y = 8$ **9.** $d = -18$ **10.** $b = -0.4$

11. $x = -8.2$ **12.** $p = \frac{3}{2}$ **13.** $k = 3.75$

14. $7.50x = 33.75$; 4.5 hours

15. $s = 11.3$ **16.** $p = -8$ **17.** greater than

18. 13π cm^2 **19.** $20 + A = 44$; 24 in.^{2}

1.4 Activity

1. a. $2n + 42 = 180$; $n = 69$; 69°, 69°, 42°

b. $x + (x + 10) + (x + 5) = 180$; $x = 55$; 55°, 65°, 60°

c. $5q = 180$; $q = 36$; 36°, 36°, 108°

d. $3m + (m + 10) = 180$; $m = 42.5$; 42.5°, 85°, 52.5°

e. $y + (y - 30) + 90 = 180$; $y = 60$; 60°, 30°, 90°

f. $(t + 10.5) + 2t + 90 = 180$; $t = 26.5$; 37°, 53°, 90°

2. $f = 65$; $k = 135$; $m = 30$; $n = 60$; $p = 75$; $s = 15$; $t = 90$; $w = 25$; $x = 45$; $y = 40$

3. a–d.

	Monday	Tuesday	Wednesday
Degrees	36°	54°	90°
Percent	10%	15%	25%
People	20	30	50

	Thursday	Friday
Degrees	108°	72°
Percent	30%	20%
People	60	40

4. *Sample answer:* To solve a multi-step equation, use inverse operations. To check the reasonableness of a solution, make sure the solution makes sense and substitute the solution back into the equation.

1.4 Practice

1. $y = 2$ **2.** $m = 5$ **3.** $k = 10$

4. $z = -1$ **5.** $x = 3$ **6.** $x = -22$

7. 22 ft

8. $70 + 2x = 360$; $x = 145$

9. $3x + 1.75 = 9.25$; \$2.50

10. $1.50n + 2n = 10.50$; 3 magazines

11. a. $2x + 5x + 4 = 25$; $x = 3$

b. 6 ft and 15 ft

12. $\frac{14 + 19 + x}{3} = 17$; 18 points

13. $26 - 3.5x = 8.5$; 5 pens

Student Workbook Answers

1.5 Activity

1. a. $2x + 6 = 3x$; $x = 6$; 18 ft; 18 ft^2

b. $2x + 8 = 4x$; $x = 4$; 16 ft; 16 ft^2

c. $2x + 36 = 18x$; $x = 2\frac{1}{4}$; 40.5 ft; 40.5 ft^2

d. $2x + 5 = \frac{5}{2}x$; $x = 10$; 25 ft; 25 ft^2

e. $2x + 8 = 3x + 2$; $x = 6$; 20 ft; 20 ft^2

f. $2x + 16 = 2x + 4(x + 1)$; $x = 3$; 22 ft; 22 ft^2

g. $6x + 10 = 9x + x + x$; $x = 2$; 22 ft; 22 ft^2

Check your solution by comparing the value of the perimeter and the value of the area of each figure.

2. a. $12x + 72 + 12x = 36x$; $x = 6$; 216 in.^{2}; 216 in.^{3}

b. $8x + 16x + 64 = 32x$; $x = 8$; 256 in.^{2}; 256 in.^{3}

Check your solution by comparing the value of the perimeter and the value of the area of each figure.

3. smaller triangle: 6, 8, 10; larger triangle: 9, 12, 15

4. Add or subtract variable terms from each side of the equation, as done with constant terms, because you want to collect the variable terms on one side and the constant terms on the other side.

5. *Sample answer:*

$$\begin{aligned} 4(x + 2) &= x - 1 \\ 4x + 8 &= x - 1 \\ 4x - x + 8 &= -1 \\ 3x + 8 &= -1 \\ 3x &= -9 \\ x &= -3 \end{aligned}$$

1.5 Practice

1. $x = 3$ **2.** $x = 1.5$ **3.** $y = -4$

4. $n = 3$ **5.** $q = 15$ **6.** $d = 5$

7. $h = -3$ **8.** $b = -5$

9. $15 + 0.25m = 20 + 0.05m$; 25 minutes

10. $\frac{1}{3}x = x - 22$; $x = 33$

11. 150 **12.** $0.6p = p - 32$; \$80

13. no solution **14.** no solution

15. infinitely many solutions

16. infinitely many solutions

17. $x = \frac{1}{2}$ **18.** $x = -\frac{1}{4}$

1.6 Activity

1. a. $P = 2w + 2\ell$; $w = \frac{P - 2\ell}{2}$; $w = 4$ in.

b. $A = \frac{1}{2}bh$; $h = 2\frac{A}{b}$; $h = 8$ in.

c. $C = 2\pi r$; $r = \frac{C}{2\pi}$; $r = 4$ cm

d. $A = \frac{1}{2}h(b + B)$; $h = \frac{2A}{b + B}$; $h = 3$ in.

e. $A = bh$; $h = \frac{A}{b}$; $h = 7$ m

2. a. $V = Bh$; $h = \frac{V}{B}$; $h = 5$ in.

b. $V = \frac{1}{3}Bh$; $B = \frac{3V}{h}$; $B = 16$ ft^2

c. $S = 2\pi rh$; $h = \frac{S}{2\pi r}$; $h = 3$ cm

d. $S = 2\ell w + 2\ell h + 2wh$; $\ell = \frac{S - 2wh}{2(w + h)}$; $\ell = 6$ m

3. *Sample answer:* You can solve a given formula for a different variable to form a new formula that can be used to solve for the variable; Check students' work.

1.6 Practice

1. $y = 7 - \frac{2}{5}x$ **2.** $y = 4 - \frac{2}{3}x$

3. $y = -6 + 10x$ **4.** $y = 3\pi - \frac{1}{2}x$

5. a. $r = \frac{d}{2}$ **b.** 65 mi/h

6. $R = P - C$ **7.** $X = pN$

8. $h = \frac{3V}{\pi r^2}$ **9.** $b = \frac{2A}{h}$

10. a. $d = \frac{C}{\pi}$ **b.** $\frac{8}{\pi}$ in. **c.** 3 in.

11. a. $c = \frac{2A}{d}$ **b.** 7 ft **c.** 8 ft