

**Extra Practice 1A****Lesson 6.1: Solving Equations**

- Look at the algebraic expressions and equations below.  
Which are expressions? Equations? How do you know?  
a)  $2m + 3$       b)  $x + 4 = 8$       c)  $2z - 1 = 3$   
d)  $\frac{y}{3} = 8$       e)  $\frac{3x-1}{2}$       f)  $3r + 5 = 23$
- Solve each equation in question 1. Explain why you chose the method you did.
- Solve by inspection.  
a)  $a + 7 = 15$       b)  $3b = 21$       c)  $x - 5 = 11$   
d)  $2s + 4 = 16$       e)  $3p - 1 = 17$       f)  $5v - 2 = 18$
- Solve by systematic trial.  
a)  $3x = 78$       b)  $\frac{r}{5} = 4$       c)  $5x + 3 = 38$   
d)  $4c + 7 = 31$       e)  $8p - 1 = 55$       f)  $7d - 9 = 47$
- Write an equation you could use to solve each problem.  
Solve each equation by inspection.  
a) Nine more than a number is 26.  
b) Five less than a number is 17.  
c) Eight times a number is 72.  
d) A number divided by seven is 9.  
e) Two less than three times a number is 19.
- Write an equation you could use to solve each problem.  
Solve each equation by systematic trial.  
a) Abi sold 82 stamps. He has 14 left.  
How many stamps did he have to start with?  
b) Josie had only nickels in her purse. The value of the coins was 80¢.  
How many nickels were in Josie's purse?  
c) Mario earns money by baby-sitting. He needs \$52 to buy a concert ticket.  
Mario has already earned \$24. If he baby-sits for 7 more hours,  
he will have earned enough to buy his ticket.  
How much money does Mario earn for each hour he baby-sits?
- The perimeter of a regular pentagon is 55 cm.  
a) Write an equation you can solve to find the side length of the pentagon.  
b) Solve the equation.

**Extra Practice 2A****Lesson 6.2: Using a Model to Solve Equations**

1.
  - a) Sketch balance scales to represent each equation.
  - b) Solve each equation.  
Verify the solution.

i) $3 + x = 9$	ii) $3y = 12$
iii) $r + 5 = 12$	iv) $7a = 35$
v) $3m + 2 = 14$	vi) $4p + 1 = 17$
vii) $2n + 5 = 13$	viii) $7 + 4s = 35$
  
2.
  - a) Write an equation for each sentence.
  - b) Solve each equation.  
Verify the solution.
    - i) Three more than a number is 19.
    - ii) A number decreased by eight is 24.
    - iii) A number divided by six is 9.
    - iv) Three times a number is 54.
    - v) Five more than twice a number is 23.
    - vi) Two less than three times a number is 22.
  
3. Suppose the masses for balance scales are only available in multiples of 5 g.
  - a) Sketch balance scales to represent the equation:  $15 + x = 25$
  - b) Solve the equation.  
Verify the solution.
  
4. Use the equation:  $x - a = 12$ 
  - a) What value of  $a$  will give the solution  $x = 16$ ?
  - b) What value of  $a$  will give the solution  $x = 30$ ?
  
5. Use the equation:  $x - a = 5$ 
  - a) What value of  $a$  will give the solution  $x = 13$ ?
  - b) What value of  $a$  will give the solution  $x = 9$ ?

**Extra Practice 3A****Lesson 6.3: Solving Equations Involving Integers**

1. Use tiles to solve each equation. Sketch the tiles you used.
  - a)  $x + 6 = 13$
  - b)  $5 + x = 10$
  - c)  $9 = x + 2$
  - d)  $x - 4 = 6$
  - e)  $x - 3 = 7$
  - f)  $11 = x - 3$
  
2. Solve by inspection. Show your work.
  - a)  $10 = a - 3$
  - b)  $6 = b + 4$
  - c)  $3 = p - 2$
  - d)  $s - 3 = -2$
  - e)  $-5 = p - 3$
  - f)  $y - 2 = -1$
  
3.
  - a) Five less than a number is 8.  
Let  $x$  represent the number.  
Write an equation you could use to find the value of  $x$ .  
Solve the equation.  
What is the number?
  - b) Two less than a number is  $-4$ .  
Let  $x$  represent the number.  
Write an equation you could use to find the value of  $x$ .  
Solve the equation.  
What is the number?
  
4. A group of 36 students visited an exhibition.  
Seven students had to leave after 2 hours.  
The rest of the students stayed for another hour.  
How many students stayed for the extra hour?  
Write an equation you can use to find how many students stayed for the extra hour.  
Solve the equation. Verify the solution.
  
5. Write an equation you can use to solve each problem.  
Solve the equation. Verify the solution.
  - a) During the afternoon, the temperature rose  $3^\circ$  to  $15^\circ\text{C}$ .  
What was the original temperature?
  - b) Overnight, the temperature dropped  $10^\circ$  to  $-5^\circ\text{C}$ .  
What was the original temperature?
  - c) During the night, the temperature rose  $5^\circ$  to  $0^\circ\text{C}$ .  
What was the original temperature?

**Extra Practice 4A****Lesson 6.4: Solving Equations Using Algebra**

1. Solve each equation using algebra. Verify each solution.
  - a)  $x - 16 = 17$
  - b)  $12x = 72$
  - c)  $x + 9 = 23$
  - d)  $58 = 15 + x$
  - e)  $2x + 4 = 66$
  - f)  $13 + 3x = 52$
  
2. Write, then solve, an equation to find each number. Verify the solution.
  - a) A number increased by thirteen is 29.
  - b) A number multiplied by three is 81.
  - c) Twenty four less than a number is 7.
  - d) Two less than five times a number is 13.
  - e) Three more than seven times a number is 24.
  
3. Write an equation you can use to solve each problem below. Solve the equation. Verify the solution.
  - a) Mary washed dishes for \$6/h. She was given a bonus of \$2. How many hours did she work if she was paid \$20?
  - b) David sells yearbooks for \$9 each. One week, he earned \$81. How many books did he sell that week?
  - c) Jody earned \$70 one weekend working in the local diner. Sixteen dollars were tips. If her hourly rate is \$9, how many hours did she work?
  
4. Write an equation you can use to solve each problem below. Solve the equation. Verify the solution.
  - a) Ali has \$810 in his savings account. Each week he saves \$9. When will he have \$909 in his account?
  - b) Jenna has \$264 in her savings account. Each week she saves \$12. When will she have a total of \$336 in her account?
  
5. Write an equation you can use to solve each problem below. Solve the equation. Verify the solution.
  - a) At a park, it costs \$15 to rent a boat, plus \$8/h for each hour it is borrowed. How many hours can you use the boat for, if you have \$39?
  - b) It costs \$250 to rent a skating rink for a party, plus \$8 for each party goer. How many people can attend the skating party for \$762?

**Extra Practice 5A****Lesson 6.5: Using Different Methods to Solve Equations**

- Use algebra to solve each equation. Verify each solution.
  - $\frac{x}{6} = 4$
  - $\frac{x}{9} = 6$
  - $\frac{x}{7} = 8$
- Solve each equation.
  - $x + 23 = 37$
  - $x - 5 = 26$
  - $8x = 96$
  - $\frac{x}{3} = 17$
  - $3x + 7 = 28$
  - $5x - 4 = 61$
- A banquet hall charged \$180 for the rental of a hall for a party, plus \$8 for each person for food. The bill for a party was \$452. How many people attended the party?
- Jerome baked 34 pies for a fund-raising sale. He gave 2 of his pies to his family. This left him with an equal number of fruit and meat pies to sell. How many of each kind of pie did he sell?
- Write, then solve, an equation to answer each question. Verify the solution.

John was sorting 36 marbles.

  - He divided the marbles into 5 equal groups and had 1 marble left over. How many marbles were in each group?
  - He divided the marbles into 4 equal groups and had 4 left over. How many marbles were in each group?
- Write, then solve, an equation to answer each question. Verify the solution.

At a grocery store, potatoes cost \$3 for a 2-kg bag or \$10 for a 10-kg bag.

  - The store sold \$58 worth of potatoes one day. If six 2-kg bags were sold that day, how many 10-kg bags were sold?
  - Another day, the value of potatoes sold was \$67. How many 2-kg bags were sold that day if four 10-kg bags were sold?

## Extra Practice Sample Answers

### Extra Practice 1A

#### Lesson 6.1

- Expressions: a, and e  
I know they are expressions because they do not contain an equals sign.  
Equations: b, c, d, and f  
I know they are equations because they each contain an equals sign.
- |                   |                   |                    |                   |
|-------------------|-------------------|--------------------|-------------------|
| <b>b)</b> $x = 4$ | <b>c)</b> $z = 2$ | <b>d)</b> $y = 24$ | <b>f)</b> $r = 6$ |
|-------------------|-------------------|--------------------|-------------------|
- |                   |                   |                    |
|-------------------|-------------------|--------------------|
| <b>a)</b> $a = 8$ | <b>b)</b> $b = 7$ | <b>c)</b> $x = 16$ |
| <b>d)</b> $s = 6$ | <b>e)</b> $p = 6$ | <b>f)</b> $v = 4$  |
- |                    |                    |                   |
|--------------------|--------------------|-------------------|
| <b>a)</b> $x = 26$ | <b>b)</b> $r = 20$ | <b>c)</b> $x = 7$ |
| <b>d)</b> $c = 6$  | <b>e)</b> $p = 7$  | <b>f)</b> $d = 8$ |
- |   |                                    |                                |
|---|------------------------------------|--------------------------------|
| <b>a)</b> $x + 9 = 26$<br>$x = 17$      | <b>b)</b> $x - 5 = 17$<br>$x = 22$ | <b>c)</b> $8x = 72$<br>$x = 9$ |
| <b>d)</b> $\frac{x}{7} = 9$<br>$x = 63$ | <b>e)</b> $3x - 2 = 19$<br>$x = 7$ |                                |
- |   |  |  |
|---|--|--|
| <b>a)</b> $x - 82 = 14$<br>$x = 96$<br>Ali had 96 stamps to start with. | <b>b)</b> $5x = 80$<br>$x = 16$<br>There were 16 nickels in Josie's purse. | <b>c)</b> $7x + 24 = 52$<br>$x = 4$<br>Mario earns \$4 for each hour he baby-sits. |
|---|--|--|
- |                     |   |
|---------------------|---|
| <b>a)</b> $5x = 55$ | <b>b)</b> $x = 11$<br>Each side of the pentagon has a side length $x$ of 11 cm. |
|---------------------|---|

### Extra Practice 2A

#### Lesson 6.2

- |  |                                       |  |
|--|---------------------------------------|--|
| <b>a)</b> Students' solutions should include sketches. |                                       |  |
| <b>b) i)</b> $x = 6$                                   | L.S. = $3 + x = 3 + 6 = 9$            |  |
|  | R.S. = 9                              |  |
| <b>ii)</b> $y = 4$                                     | L.S. = $3y = 3 \times 4 = 12$         |  |
|  | R.S. = 12                             |  |
| <b>iii)</b> $r = 7$                                    | L.S. = $r + 5 = 7 + 5 = 12$           |  |
|  | R.S. = 12                             |  |
| <b>iv)</b> $a = 5$                                     | L.S. = $7a = 7 \times 5 = 35$         |  |
|  | R.S. = 35                             |  |
| <b>v)</b> $m = 4$                                      | L.S. = $3m + 2 = 3 \times 4 + 2 = 14$ |  |
|  | R.S. = 14                             |  |
| <b>vi)</b> $f = 4$                                     | L.S. = $4f + 1 = 4 \times 4 + 1 = 17$ |  |
|  | R.S. = 17                             |  |
| <b>vii)</b> $n = 4$                                    | L.S. = $2n + 5 = 2 \times 4 + 5 = 13$ |  |
|  | R.S. = 13                             |  |
| <b>viii)</b> $s = 7$                                   | L.S. = $7 + 4s = 7 + 4 \times 7 = 35$ |  |
|  | R.S. = 35                             |  |
- |                            |                    |                              |
|----------------------------|--------------------|------------------------------|
| <b>i) a)</b> $3 + x = 19$  | <b>b)</b> $x = 16$ | L.S. = $3 + x = 3 + 16 = 19$ |
|                            |                    | R.S. = 19                    |
| <b>ii) a)</b> $n - 8 = 24$ | <b>b)</b> $n = 32$ | L.S. = $n - 8 = 32 - 8 = 24$ |

- iii) a)  $\frac{s}{6} = 9$       b)  $s = 54$       R.S. = 24  
 L.S. =  $\frac{s}{6} = \frac{54}{6} = 9$   
 R.S. = 9
- iv) a)  $3k = 54$       b)  $k = 18$       L.S. =  $3k = 3 \times 18 = 54$   
 R.S. = 54
- v) a)  $5 + 2m = 23$       b)  $m = 9$       L.S. =  $5 + 2m = 5 + 2 \times 9 = 23$   
 R.S. = 23
- vi) a)  $3q - 2 = 22$       b)  $q = 8$       L.S. =  $3q - 2 = 3 \times 8 - 2 = 22$   
 R.S. = 22
3. a) Students' solutions should include a sketch.  
 Left pan:  $x$ , 5 g, and 10 g      Right pan: 5 g, 10 g, and 10 g  
 b)  $x = 10$       L.S. =  $15 + x = 15 + 10 = 25$   
 R.S. = 25
4. a)  $16 - a = 12$ ;  $a = 4$   
 b)  $30 - a = 12$ ;  $a = 18$
5. a)  $13 - a = 5$ ;  $a = 8$   
 b)  $9 - a = 5$ ;  $a = 4$

## Extra Practice 3A

### Lesson 6.3

1. Students' solutions should include sketches.  
 a)  $x = 7$       b)  $x = 5$       c)  $x = 7$   
 d)  $x = 10$       e)  $x = 10$       f)  $x = 14$
2. a)  $a = 13$       b)  $b = 2$       c)  $p = 5$   
 d)  $s = 1$       e)  $p = -2$       f)  $y = 1$
3. a)  $x - 5 = 8$ ;  $x = 13$ ; The number is thirteen.  
 b)  $x - 2 = -4$ ;  $x = -2$ ; The number is  $-2$ .
4.  $x + 7 = 36$ ;  $x = 29$ ; 29 students stayed for the extra hour.  
 L.S. =  $x + 7 = 29 + 7 = 36$   
 R.S. = 36
5. a)  $t + 3 = 15$ ;  $t = 12$ ; The original temperature was  $12^\circ\text{C}$ .  
 b)  $t - 10 = -5$ ;  $t = 5$ ; The original temperature was  $5^\circ\text{C}$ .  
 c)  $t + 5 = 0$ ;  $t = -5$ ; The original temperature was  $-5^\circ\text{C}$ .

## Extra Practice 4A

### Lesson 6.4

1. a)  $x = 33$       b)  $x = 6$       c)  $x = 14$   
 d)  $x = 43$       e)  $x = 31$       f)  $x = 13$
2. a)  $n + 13 = 29$ ;  $n = 16$ ; The number is sixteen.  
 b)  $3n = 81$ ;  $n = 27$ ; The number is twenty-seven.  
 c)  $n - 24 = 7$ ;  $n = 31$ ; The number is thirty-one.  
 d)  $5n - 2 = 13$ ;  $n = 3$ ; The number is three.  
 e)  $7n + 3 = 24$ ;  $n = 3$ ; The number is three.
3. a)  $20 = 2 + 6x$ ;  $x = 3$ ; Mary worked for 3 hours.  
 b)  $9x = 81$ ;  $x = 9$ ; David sold 9 yearbooks.  
 c)  $70 = 16 + 9x$ ;  $x = 6$ ; Jody worked 6 hours.
4. a)  $909 = 810 + 9x$ ;  $x = 11$ ; Ali will have \$909 in his account in 11 weeks.  
 b)  $336 = 264 + 12x$ ;  $x = 6$ ; Jenna will have \$336 in her account in 6 weeks.
5. a)  $39 = 15 + 8x$ ;  $x = 3$ ; for \$39 you can rent a boat for 3 hours.  
 b)  $762 = 250 + 8x$ ;  $x = 64$ ; 64 people can attend the party for \$762.

Name \_\_\_\_\_ Date \_\_\_\_\_

## Extra Practice 5A

### Lesson 6.5

1. a)  $x = 24$                       b)  $x = 54$                       c)  $x = 56$
2. a)  $x = 14$                       b)  $x = 31$                       c)  $x = 12$   
d)  $x = 51$                       e)  $x = 7$                       f)  $x = 13$
3.  $452 = 180 + 8x$ ;  $x = 34$ ; 34 people attended the party.
4.  $34 - 2 = 2x$ ;  $x = 16$ ; Jerome sold 16 meat pies and 16 fruit pies.
5. a)  $36 = 5x + 1$ ;  $x = 7$ ; There were 7 marbles in each group.  
b)  $36 = 4x + 4$ ;  $x = 8$ ; There were 8 marbles in each group.
6. a)  $58 = 6 \times 3 + 10x$ ;  $x = 4$ ; The store sold 4, 10-kg bags of potatoes.  
b)  $67 = 4 \times 10 + 3x$ ;  $x = 9$ ; The store sold 9, 2-kg bags of potatoes.