Lesson 5.1

Unit 5 Homework Key

Solve each equation by combining like terms when necessary.

1. \(2x + 3 = 23\) \(\quad x = 10\)  
2. \(-7y + 2 = 16\) \(\quad y = -2\)

3. \(\frac{q}{3} + 7 = 12\) \(\quad q = 15\)
4. \(\frac{z+3}{4} = 5\) \(\quad z = 17\)

5. \(2g + 2g - 4 + 3 = 43\) \(\quad g = 11\)
6. \(4 + 3h - h = 2 + 10\) \(\quad h = 4\)

7. \(2t + 8 + \frac{1}{2}t - t = 11\) \(\quad t = 2\)
8. \(4a + 6a + 3 - 8 = 15\) \(\quad a = 2\)

9. \(3w + 15 - 5 + 2w = 5\) \(\quad w = -1\)
10. \(\frac{5}{2}r + 2r + 7 - 2 = 5\) \(\quad r = 0\)

11. \(2y + 2y + 6 + 10 = 18\) \(\quad y = \frac{1}{2}\)
12. \(5x + 7 - 2x + 1 = 12\) \(\quad x = \frac{4}{3}\)

13. \(3 - 2x + 4x + 6 = 9\) \(\quad x = 0\)
14. \(10 - 5 + 3x + 2x = 0\) \(\quad x = -1\)

Write an equation for each situation and then solve by combining like terms when necessary.

15. Great Uncle Wilbert splits his inheritance equally between his five nieces and nephews. Unfortunately each of them must pay a $7500 inheritance fee to the state government. If each niece or nephew got $237,500, how much money was Great Uncle Wilbert’s inheritance worth? $1,225,000

16. The Department of Designing the Death Star had a lot of money in a bank account and then received a large donation of $13,000 from George Lucas. They decided to split their money equally between the three research projects: Tie Fighters, Mega Lasers, and Air Conditioning/Power Grid. If each research project got $25,000, how much money did the Department of Designing the Death Star have in the bank account originally? $62,000
17. Logan collected pledges for the charity walk-a-thon. He will receive total contributions of $68 plus $20 for every mile that he walks. How many miles will he need to walk to raise $348? 14 miles

18. Jasmine bought 6 CDs, all at the same price. The tax on her purchase was $5.04, and the total was $85.74. What was the price of each CD? $13.45

19. A farmer buys 6 sheep to start his wool farm. He then decides to buy insurance for $100 just in case something baaaa...d happens. The farmer realizes that his six sheep just aren't enough and decides to buy 10 more sheep. He also thought the sheep would sleep better at night if he bought them a small space heater for $25. If the farmer paid a total of $925, how much did each sheep cost? $50

20. Nikki buys 7 packs of SillyBanz from the store. After school the next day, she decides to buy 3 more packs to give to her friend Olivia. Then she realized that if she didn’t buy something for Kerrie too, Kerrie would be mad. So Nikki then went back to the store again and bought 2 more packs of SillyBanz to give to Kerrie. If Nikki spent a total of $14.40, how much was each pack of SillyBanz? $1.20

21. During the spring car wash, the Activities Club washed 14 fewer cars than during the summer car wash. They washed a total of 96 cars during both car washes. How many cars did they wash during the summer car wash? 55 cars

22. The Marsh family took a vacation to Disney World that covered a total distance of 1356 miles. (That includes the trip there and the trip back.) The trip back was 284 miles shorter than the trip there. How long was the trip to Disney World (meaning the trip there)? 820 miles
Lesson 5.2

Solve each equation by using the distributive property and combining like terms.

1. \(2(x + 7) + x = 20\) \(x = 2\)  
2. \(2(x - 1) + 3x = 3\) \(x = 1\)

3. \(3(m + 1) - 2m = 0\) \(m = -3\)  
4. \(z + 4(2z + 3) = 15\) \(z = \frac{1}{3}\)

5. \(-\frac{1}{2}(b + 2) + 3b = -1\) \(b = 0\)  
6. \(4(n + 2) - 2n = 0\) \(n = -4\)

7. \(4 + 2(1 + x) = 12\) \(x = 3\)  
8. \(- (x + 3) + \frac{3}{4}x + 5 = 0\) \(x = 8\)

9. \(2(2x + 3) - 2 = 5\) \(x = \frac{1}{4}\)  
10. \(2(3x - 1) + 2(4x + 5) = 8\) \(x = 0\)

Write an equation for each situation and then solve by using the distributive property and combining like terms.

11. A gym charges a $50 activation fee and $17 per month for a membership. If you spend $356, for how many months do you have a gym membership? \textbf{18 months}

12. Suppose you go to a concert and purchase 3 identical T-shirts and a hat. The hat cost $21 and you spend $60 in all. How much does each T-shirt cost? $13

13. A store had homemade sweaters on sale for $20 off the original price. Aunt Ethel jumped at the bargain and bought a sweater for all 15 members of her family. If Aunt Ethel paid $375 for all the sweaters, what was the original price of each sweater? $45
14. After an oil pipeline burst one morning, gas prices went up by $2.20 per gallon. If that afternoon you bought 10 gallons of gas for $53.90, what was the price per gallon before the oil pipeline burst that morning? $3.19

15. For Christmas, Maryland purchased subscriptions to Xbox Live for her four children. Each subscription costs $5 per month plus a $15 sign-up fee. If she received a bill for $120, for how many months did she purchase subscriptions for her children? 3 months

16. When Apple sells their iPads, they increase the price $50 from what it costs them to actually make the iPads. One Apple store sold 10 iPads one day which cost a total of $5000. How much does an iPad cost to actually make? $450
Solve each equation by using the distributive property, combining like terms, and eliminating the variable on one side of the equation.

1. $2y + 3 + 4 = 5y + 10$  
   $y = -1$

2. $2p + 4p - 3 = 2p + 1$  
   $p = 1$

3. $8k + 5 + 2k = 23 + k$  
   $k = 2$

4. $4r + \frac{9}{4}r + 14 = 5r - \frac{3}{4}r + 1 - 3$  
   $r = -8$

5. $2x + 3 = 2x - (3 + 2x) + 6$  
   $x = 0$

6. $4(x - 1) + 2x = 2(x + 2)$  
   $x = 2$

7. $-5(f + 2) = 3f + 2$  
   $f = \frac{-3}{2}$

8. $\frac{3}{2}c - 3c + 4 = \frac{5}{2}c + 7 - 3$  
   $c = 0$

9. $10(a + 1) = 2(a + 2) - 2$  
   $a = -1$

10. $5x - 3x + 7 = 3x - 1$  
    $x = 8$

11. $5d - 25 + 2d = 2d$  
    $d = 5$

12. $4(2t + 1) + t = 3(t + 2)$  
    $t = \frac{1}{3}$

13. $\frac{1}{2}q + 2(q + 5) = -4(q + 1) + 1$  
    $q = -2$

14. $4(1 - 2u) = 2(u + 2)$  
    $u = 0$

15. $5z - z + 3 = z + 3 + 1$  
    $z = \frac{1}{3}$

16. $6x - 3x + 26 = 5(x + 8)$  
    $x = -7$

17. $6(x + 1) = 4\left(1 + \frac{1}{4}x\right) + 6 + 3x$  
    $x = 2$

18. $9m - m + 3 = -2(m + 1)$  
    $m = -\frac{1}{2}$

19. $-(y - 4) + 3y = 4(y + 1)$  
    $y = 0$

20. $-2(j + 5) + 6 = 4(j + 2)$  
    $j = -2$
Write an equation for each situation and then solve by using the distributive property, combining like terms, and eliminating the variable on one side of the equation.

21. Tao is making a 7 feet high door. If the height is 1 foot more than twice its width, what is its width?
   
   \[ 3 \text{ feet} \]

22. Terikka bought three bags of popcorn at the concession and a drink for $1.50. If she paid $3.75 total, how much was each bag of popcorn?
   
   \[ \$0.75 \]

23. Naphtali’s cell phone company charges $0.25 per text plus a $10 flat fee. Asher’s cell phone company charges $0.10 per text plus a $25 flat fee. At how many texts are Naphtali and Asher paying exactly the same amount?
   
   \[ 100 \text{ texts} \]

24. Stanley bought five packs of Yu-Gi-Oh cards, $7 worth of bubble gum, and then eight more packs of Yu-Gi-Oh cards. Simon bought four packs of Yu-Gi-Oh cards, $10 worth of Cheetos, $12 worth of Mt. Dew, and then six more packs of Yu-Gi-Oh cards. If they paid the same amount, how much was each pack of Yu-Gi-Oh cards?
   
   \[ \$5 \]

25. Toby sells his framed paintings for $20 each. Ishmael sells his paintings for $14 each and charges a flat fee of $18 for framing. How many paintings need to be purchased for Toby and Ishmael to charge the same amount?
   
   \[ 3 \text{ paintings} \]

26. The original price of Doritos is the same at both Wal-Mart and County Market. Jon found out that Wal-Mart had Doritos on sale at $0.50 off per bag and bought four bags. Later that day, he found out that County Market had Doritos on sale at $1 off per bag and bought six bags. If he paid the same amount at both stores, what was the original price of Doritos?
   
   \[ \$2 \]
Solve the following equations. Some equations will have a single answer, others will have no solution, and still others will have infinite solutions.

<table>
<thead>
<tr>
<th>Equation</th>
<th>Solution</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. (2x + 2x + 2 = 4x + 2)</td>
<td>infinite solutions</td>
</tr>
<tr>
<td>2. (3(x - 1) = 2x + 9)</td>
<td>(x = 12)</td>
</tr>
<tr>
<td>3. (2x + 8 = 2(x + 4))</td>
<td>infinite solutions</td>
</tr>
<tr>
<td>4. (2x - x + 7 = x + 3 + 4)</td>
<td>infinite solutions</td>
</tr>
<tr>
<td>5. (-2(x + 1) = -2x + 5)</td>
<td>no solution</td>
</tr>
<tr>
<td>6. (4x + 2x + 2 = 3x - 7)</td>
<td>(x = -3)</td>
</tr>
<tr>
<td>7. (2(x + 2) + 3x = 2(x + 1) + 1)</td>
<td>(x = -\frac{1}{3})</td>
</tr>
<tr>
<td>8. (4(x - 1) = \frac{1}{2} (x - 8))</td>
<td>(x = 0)</td>
</tr>
<tr>
<td>9. (x + 2x + 7 = 3x - 7)</td>
<td>no solution</td>
</tr>
<tr>
<td>10. (3x - x + 4 = 4(2x - 1))</td>
<td>(x = \frac{4}{3})</td>
</tr>
<tr>
<td>11. (4(2x + 1) = 5x + 3x + 9)</td>
<td>no solution</td>
</tr>
<tr>
<td>12. (10 + x = 5(\frac{1}{5}x + 2))</td>
<td>infinite solutions</td>
</tr>
<tr>
<td>13. (8(x + 2) = 2x + 16)</td>
<td>(x = 0)</td>
</tr>
<tr>
<td>14. (3 + \frac{3}{2}x + 4 = 4x - \frac{5}{2}x)</td>
<td>no solution</td>
</tr>
<tr>
<td>15. (\frac{3}{2}(2x + 6) = 3x + 9)</td>
<td>infinite solutions</td>
</tr>
<tr>
<td>16. (\frac{1}{2}(2 - 4x) + 2x = 13)</td>
<td>no solution</td>
</tr>
<tr>
<td>17. (12 + 2x - x = 9x + 6)</td>
<td>(x = \frac{3}{4})</td>
</tr>
<tr>
<td>18. (4x + 1 = 2(2x + 3))</td>
<td>no solution</td>
</tr>
<tr>
<td>19. (4(x + 3) - 4 = 8 (\frac{1}{2}x + 1))</td>
<td>infinite solutions</td>
</tr>
<tr>
<td>20. (x + 5x + 4 = 3(2x - 1))</td>
<td>no solution</td>
</tr>
<tr>
<td>21. (5(x + 2) - 3x = 2(x + 5))</td>
<td>infinite solutions</td>
</tr>
<tr>
<td>22. (3x + 1 = 3(x - 1) + 4)</td>
<td>infinite solutions</td>
</tr>
<tr>
<td>23. (4x + 2x - 5 = 7x - 1)</td>
<td>(x = -4)</td>
</tr>
<tr>
<td>24. (-2(x + 1) = 2(x - 1))</td>
<td>(x = 0)</td>
</tr>
<tr>
<td>25. (2(x + 5) = 2x + 5)</td>
<td>no solution</td>
</tr>
<tr>
<td>26. (2(3x + 3) = 3(2x + 2))</td>
<td>infinite solutions</td>
</tr>
<tr>
<td>27. (2x + 1 - 4 = -2x - 3)</td>
<td>(x = 0)</td>
</tr>
<tr>
<td>28. (4(x + 1) = 4(2 - x))</td>
<td>(x = \frac{1}{2})</td>
</tr>
<tr>
<td>29. (3x + 7x + 1 = 2(5x + 1))</td>
<td>no solution</td>
</tr>
<tr>
<td>30. (6(x + 1) + 5 = 13 - 2 + 6x)</td>
<td>infinite solutions</td>
</tr>
</tbody>
</table>
Create multi-step equations with the given number of solutions. All answers will vary.

31. A single solution  
32. Infinite solutions  
33. No solution

34. Infinite solutions  
35. No solution  
36. A single solution

37. No solution  
38. A single solution  
39. Infinite solutions

40. A single solution  
41. Infinite solutions  
42. No solution
Lesson 5.5

Solve.

1. \( x^2 = 100 \)  
   \[ x = \pm 10 \]

2. \( x^2 = 196 \)  
   \[ x = \pm 14 \]

3. \( x^2 = 25 \)  
   \[ x = \pm 5 \]

4. \( x^2 = 1 \)  
   \[ x = \pm 1 \]

5. \( x^2 = 81 \)  
   \[ x = \pm 9 \]

6. \( x^3 = 1 \)  
   \[ x = 1 \]

7. \( x^3 = 64 \)  
   \[ x = 4 \]

8. \( x^3 = -27 \)  
   \[ x = -3 \]

9. \( x^3 = -64 \)  
   \[ x = -4 \]

10. \( x^3 = -1 \)  
    \[ x = -1 \]

11. \( x^2 = \frac{25}{36} \)  
    \[ x = \pm \frac{5}{6} \]

12. \( x^2 = \frac{49}{16} \)  
    \[ x = \pm \frac{7}{4} \]

13. \( x^2 = \frac{64}{81} \)  
    \[ x = \pm \frac{8}{9} \]

14. \( x^3 = -\frac{27}{64} \)  
    \[ x = -\frac{3}{4} \]

15. \( x^3 = \frac{1}{8} \)  
    \[ x = \frac{1}{2} \]

16. \( x^2 = 64 \)  
    \[ x = \pm 8 \]

17. \( x^2 = 49 \)  
    \[ x = \pm 7 \]

18. \( x^2 = 144 \)  
    \[ x = \pm 12 \]

19. \( x^3 = -27 \)  
    \[ x = -3 \]

20. \( x^3 = 1000 \)  
    \[ x = 10 \]

21. \( x^3 = -125 \)  
    \[ x = -5 \]

22. \( x^3 = \frac{100}{121} \)  
    \[ x = \pm \frac{10}{11} \]

23. \( x^2 = \frac{4}{36} \)  
    \[ x = \pm \frac{1}{3} \]

24. \( x^3 = \frac{1}{125} \)  
    \[ x = \frac{1}{5} \]

25. \( x^3 = 0.125 \)  
    \[ x = \frac{1}{2} \]

26. \( x^2 + 25 = 50 \)  
    \[ x = \pm 5 \]

27. \( x^2 - 25 = 0 \)  
    \[ x = \pm 5 \]

28. \( x^2 - 16 = 10 \)  
    \[ x = \pm 5.1 \]

29. \( x^2 + 13 = 36 \)  
    \[ x = \pm 4.8 \]

30. \( x^2 = 200 \)  
    \[ x = \pm 14.1 \]

31. \( x^3 + 5 = 13 \)  
    \[ x = 2 \]

32. \( x^3 + 1 = 28 \)  
    \[ x = 3 \]

33. \( x^3 - 2 = 62 \)  
    \[ x = 4 \]

34. \( x^3 - 10 = 115 \)  
    \[ x = 5 \]

35. \( x^3 = \frac{8}{27} \)  
    \[ x = \frac{2}{3} \]