10. The structure helps you to determine the most effective method for solving the system. For instance, if one of the equations is in *y*-intercept form, then it would be appropriate to use substitution to solve. If the variables in both equations have the same or opposite coefficients, then elimination might be more straightforward.

11. In a system with infinitely many solutions, the coefficients *A* and *B* and the constant *C* can be multiplied by a non-zero constant to equal *P*, *Q*, and *R*, respectively. In a system with no solution, the coefficients *A* and *B* can be multiplied by a non-zero constant to equal *P* and *Q*, respectively, but the same constant multiplied by *C* does not equal *R*.

12. The system is:

$$y = -\frac{3}{2}x + 7$$

$$y = \frac{1}{2}x + 1$$

The solution is (3, 2.5).

13. The student forgot to multiply the right side of the equation by –1.

$$-1(x - y) = (-1) - 4$$

$$2x - y = -1$$
$$-x + y = 4$$
$$x = 3$$

$$2(3) - y = -1$$
$$6 - y = -1$$
$$-y = -7$$
$$y = 7$$

The solution is (3, 7).

14. Using the substitution method is an advantage because it takes less steps to solve than the elimination method. The first equation is already solved for *x*, so you can substitute 6 + *y* for *x* in the second equation and solve for *y*.

15. (3, −1)

16. (7, 4.5)

17. (4, −2)

18. (−3, −2)

19. (−4, −4)

20. (−6, 4)

21. (−5, −2)

22. (5, 1)

23. No; there is no number $3x - 9y = 5$ can be multiplied by to equal $6x - 9y = 10$.

24. Yes; $4y - 12x = 16$ is equivalent to two times $2y - 6x = 8$.

25. Yes; $10x + 6y = 38$ is equivalent to two times $5x + 3y = 19$, and $10x + 20y = 100$ is equivalent to five times $2x + 4y = 20$.

26. Let x = cost of a pizza. Let y = cost of a sub sandwich.

$2x + 4y = 62$

$4x + 10y = 140$

Cost of pizza: $15

Cost of sub sandwich: $8

27. Let x = cost of a hat. Let y = cost of a shirt.

$8x + 3y = 65$

$2x + 2y = 30$

Cost of a hat: $4

Cost of a T-shirt: $11

28. Use elimination. Multiply the first equation by – 1 and then add equations to eliminate the x-terms.

The solution is (– 1, – 1).

29. Use substitution. Substitute $y - 4$ for x in the first equation and solve for y.

The solution is (3, 7).

30. Use elimination. Multiply the first equation by – 2 and then add the equations to eliminate the y-terms.

The solution is (2, 8).

31. Use elimination. Multiply the first equation by 4 and the second equation by 3. Then add equations to eliminate the y-terms.

The solution is (4, – 2).

32. Both methods will work. By addition, the y-terms will cancel each other out. Multiplying the first equation by – 3 and then adding will cancel out the x-terms. Either method will result in a solution of $\left(-2, \frac{3}{2}\right)$.

33. **a.** Graphing is most efficient if the equations in the system are in slope-intercept form or if there is an integer y-intercept. If the lines intersect, graphing is best when both coordinates of the solution are integers.

b. Substitution is most efficient when one equation or both equations has been solved for either x or y. Substitution is a more efficient method when the solution has rational numbers.

c. Elimination is most efficient when either the coefficients of the x-terms or y-terms in the equations are opposites and can easily be eliminated. Elimination is also the best method when all variables have a coefficient. Elimination is also more efficient when the solution has rational numbers.

34. The solution is (3.50, 2.75), which means that a drink costs $3.50 and a pretzel costs $2.75.

35. $5

36. $720

37. $x = 3$ and $y = -2$

38. B

39. Part A

Let x be the cost of a granola bar and y = the cost of a drink.

Concessions Unlimited:

$4x + 3y = 12.5$

$2x + 5y = 15$

Snacks To Go:

$3x + 3y = 10.5$

$4x + 2y = 10$

Part B The solution for Concessions Unlimited is (1.25, 2.5). That means they charge \$1.25 for a granola bar and \$2.50 for a drink.

The solution for Snacks To Go is (1.5, 2). That means they charge \$1.50 for a granola bar and \$2.00 for a drink.

Part C Answers may vary. Sample: Let granola bars cost \$1 and drinks cost \$1.50; So, if a person buys Let x represent the number of granola bars purchased, and let y represent the number of drinks purchased. For one granola bar and one drink, the equation would be $x + y = 2.5$. For one bar and two drinks, the equation would be $x + 2y = 4$. So a system of equations would be as follows.

$x + y = 2.5$

$x + 2y = 4$