

A.REI.C.6: Solving Linear Systems 3

- 1 For the system shown below, what is the value of z ?

$$y = -2x + 14$$

$$3x - 4z = 2$$

$$3x - y = 16$$

- 1) 5
- 2) 2
- 3) 6
- 4) 4

- 4 Consider the system below.

$$x + y + z = 9$$

$$x - y - z = -1$$

$$x - y + z = 21$$

Which value is *not* in the solution, (x, y, z) , of the system?

- 1) -8
- 2) -6
- 3) 11
- 4) 4

- 2 What is the value of y for the system shown below?

$$3x + 4y - 5z = -27$$

$$2x + 3y - z = -3$$

$$6x - y + 4z = 3$$

- 1) -27
- 2) 6
- 3) 3
- 4) -3

- 5 Consider the system of equations below:

$$x + y - z = 6$$

$$2x - 3y + 2z = -19$$

$$-x + 4y - z = 17$$

Which number is *not* the value of any variable in the solution of the system?

- 1) -1
- 2) 2
- 3) 3
- 4) -4

- 3 What is the value of x in the solution of the system of equations below?

$$5x + 2y - z = -14$$

$$7y - z = 31$$

$$5y + 4z - 5x = -23$$

- 1) -17
- 2) 2
- 3) $-\frac{1}{5}$
- 4) -7

- 6 Which value is *not* contained in the solution of the system shown below?

$$a + 5b - c = -20$$

$$4a - 5b + 4c = 19$$

$$-a - 5b - 5c = 2$$

- 1) -2
- 2) 2
- 3) 3
- 4) -3

- 7 What is the solution for the system of equations below?

$$x + y + z = 2$$

$$x - 2y - z = -4$$

$$x - 9y + z = -18$$

- 1) $(-2, 2, 2)$
- 2) $(-2, -2, 6)$
- 3) $(0, 2, 0)$
- 4) $(0, 2, 4)$

- 8 Consider the system of equations below?

$$x + 2y - z = 1$$

$$-x - 3y + 2z = 0$$

$$2x - 4y + z = 10$$

What is the solution to the given system of equations?

- 1) $(1, 1, 2)$
- 2) $(3, -1, 0)$
- 3) $(5, -1, 2)$
- 4) $(3, 5, 8)$

- 9 Solve the following system of equations algebraically for all values of x , y , and z :

$$x + 3y + 5z = 45$$

$$6x - 3y + 2z = -10$$

$$-2x + 3y + 8z = 72$$

- 10 Solve the following system of equations algebraically for all values of a , b , and c .

$$a + 4b + 6c = 23$$

$$a + 2b + c = 2$$

$$6b + 2c = a + 14$$

- 11 Solve the following system of equations algebraically for all values of x , y , and z :

$$x + y + z = 1$$

$$2x + 4y + 6z = 2$$

$$-x + 3y - 5z = 11$$

- 12 Solve the following system of equations algebraically for all values of x , y , and z :

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

$$x - 2y + 5z = 3$$

$$-4x + y + z = 16$$

- 13 Solve the following system of equations algebraically for x , y , and z :

$$2x + 4y - 3z = 12$$

$$3x - 2y + 2z = -9$$

$$-x + y - 3z = 0$$

- 14 Solve the following system of equations algebraically for all values of x , y , and z :

$$3x - 8y + 2z = -60$$

$$2x - 7y - 5z = -31$$

$$-6x + 2y - 4z = 36$$

- 15 Seth has one less than twice the number of compact discs (CDs) that Jason has. Raoul has 53 more CDs than Jason has. If Seth gives Jason 25 CDs, Seth and Jason will have the same number of CDs. How many CDs did *each* of the three boys have to begin with?

A.REI.C.6: Solving Linear Systems 3**Answer Section**

1 ANS: 4

$$3x - (-2x + 14) = 16 \quad 3(6) - 4z = 2$$

$$5x = 30 \quad -4z = -16$$

$$x = 6 \quad z = 4$$

REF: 011803aii

2 ANS: 3

$$6x + 8y - 10z = -54 \quad 6x + 8y - 10z = -54 \quad 6x + 9y - 3z = -9 \quad 10y - 7z = -12$$

$$6x + 9y - 3z = -9 \quad \underline{6x + 9y - 3z = -9} \quad \underline{6x - y + 4z = 3} \quad \underline{y + 7z = 45}$$

$$6x - y + 4z = 3 \quad y + 7z = 45 \quad 10y - 7z = -12 \quad 11y = 33$$

$$y = 3$$

REF: 082421aii

3 ANS: 4

$$z = 7y - 31 \quad 5x + 2y - (7y - 31) = -14 \rightarrow 5x - 5y = -45 \rightarrow x - y = -9 \rightarrow y = x + 9$$

$$5y + 4(7y - 31) - 5x = -23 \rightarrow -5x + 33y = 101$$

$$-5x + 33(x + 9) = 101$$

$$28x = -196$$

$$x = -7$$

REF: 012515aii

4 ANS: 1

$$x + y + z = 9 \quad 4 - y - z = -1 \quad 4 - 6 + z = 9$$

$$\underline{x - y - z = -1} \quad 4 - y + z = 21 \quad z = 11$$

$$2x = 8 \quad -y - z = -5$$

$$x = 4 \quad \underline{-y + z = 17}$$

$$-2y = 12$$

$$y = -6$$

REF: 012018aii

5 ANS: 2

$$\begin{array}{l}
 x + y - z = 6 \quad 2x + 2y - 2z = 12 \quad 5y - 4z = 31 \quad 5y - 2(-4) = 23 \quad x + 3 - (-4) = 6 \\
 \underline{-x + 4y - z = 17} \quad \underline{2x - 3y + 2z = -19} \quad \underline{5y - 2z = 23} \quad 5y = 15 \quad x = -1 \\
 5y - 2z = 23 \quad 5y - 4z = 31 \quad -2z = 8 \quad y = 3 \\
 z = -4
 \end{array}$$

REF: 061923aii

6 ANS: 2

$$\begin{array}{lll}
 \text{Combining (1) and (3): } -6c = -18 & \text{Combining (1) and (2): } 5a + 3c = -1 & \text{Using (3): } -(-2) - 5b - 5(3) = 2 \\
 c = 3 & 5a + 3(3) = -1 & 2 - 5b - 15 = 2 \\
 & 5a = -10 & b = -3 \\
 & a = -2
 \end{array}$$

REF: 081623aii

7 ANS: 3

$$\begin{array}{llllll}
 x + y + z = 2 & x - 2y - z = -4 & 2x - y = -2 & x + 2 + z = 2 & x + z = 0 & 0 + 2 + z = 2 \\
 \underline{x - 2y - z = -4} & \underline{x - 9y + z = -18} & \underline{2x - 11y = -22} & x - 2(2) - z = -4 & \underline{x - z = 0} & z = 0 \\
 2x - y = -2 & 2x - 11y = -22 & 10y = 20 & & 2x = 0 & \\
 & & y = 2 & & x = 0 &
 \end{array}$$

REF: 062311aii

8 ANS: 2

$$\begin{array}{llllll}
 2x + 4y - 2z = 2 & -x - 3y + 2z = 0 & x + y = 2 & 3 + 2y - z = 1 & 2y - z = -2 \\
 \underline{-x - 3y + 2z = 0} & \underline{4x - 8y + 2z = 20} & \underline{x - y = 4} & 6 - 4y + z = 10 & \underline{2(-1) - z = -2} \\
 x + y = 2 & 5x - 5y = 20 & 2x = 6 & 2y - z = -2 & z = 0 \\
 x - y = 4 & x = 3 & \underline{-4y + z = 4} & & \\
 & & -2y = 2 & & \\
 & & y = -1 & &
 \end{array}$$

REF: 062208aii

9 ANS:

$$\begin{array}{llllll}
 6x - 3y + 2z = -10 & x + 3y + 5z = 45 & 4x + 10z = 62 & 4x + 4(7) = 20 & 6(-2) - 3y + 2(7) = -10 \\
 -2x + 3y + 8z = 72 & 6x - 3y + 2z = -10 & 4x + 4z = 20 & 4x = -8 & -3y = -12 \\
 4x + 10z = 62 & 7x + 7z = 35 & 6z = 42 & x = -2 & y = 4 \\
 4x + 4z = 20 & & z = 7 & &
 \end{array}$$

REF: spr1510aii

10 ANS:

$$\begin{array}{l}
 a + 4b + 6c = 23 \\
 a + 2b + c = 2 \\
 \hline
 a + 2b + c = 2 \\
 -a + 6b + 2c = 14 \\
 \hline
 2b + 5c = 21
 \end{array}
 \quad
 \begin{array}{l}
 8b + 3c = 16 \\
 2b + 5(4) = 21 \\
 \hline
 8b + 20c = 84
 \end{array}
 \quad
 \begin{array}{l}
 2b = 1 \\
 b = \frac{1}{2} \\
 c = 4
 \end{array}
 \quad
 \begin{array}{l}
 a + 4\left(\frac{1}{2}\right) + 6(4) = 23 \\
 a + 2 + 24 = 23 \\
 a = -3
 \end{array}$$

REF: 011933aii

11 ANS:

$$\begin{array}{l}
 x + y + z = 1 \\
 x + 2y + 3z = 1 \\
 -x + 3y - 5z = 11
 \end{array}
 \quad
 \begin{array}{l}
 x + y + z = 1 \\
 x + 2y + 3z = 1 \\
 y + 2z = 0
 \end{array}
 \quad
 \begin{array}{l}
 x + y + z = 1 \\
 -x + 3y - 5z = 11 \\
 4y - 4z = 12
 \end{array}
 \quad
 \begin{array}{l}
 -2z - z = 3 \\
 -3z = 3 \\
 z = -1
 \end{array}
 \quad
 \begin{array}{l}
 y - (-1) = 3 \\
 y = 2
 \end{array}
 \quad
 \begin{array}{l}
 x + 2 - 1 = 1 \\
 x = 0
 \end{array}$$

REF: 061733aii

12 ANS:

$$\begin{aligned}
 4x + 6y - 8z &= -2 & 4x + 6y - 8z &= -2 & 4x - 8y + 20z &= 12 & z + 2 &= 3z - 4 & y = 3 + 2 & -4x + 5 + 3 &= 16 \\
 4x - 8y + 20z &= 12 & \underline{-4x + y + z = 16} && \underline{-4x + y + z = 16} && 6 &= 2z & & = 5 & -4x &= 8 \\
 -4x + y + z &= 16 & 7y - 7z &= 14 & -7y + 21z &= 28 & z &= 3 & & & x &= -2 \\
 & & y - z &= 2 & & y - 3z &= -4 & & & & & \\
 & & y &= z + 2 & & y &= 3z - 4 & & & & &
 \end{aligned}$$

REF: 081833aii

13 ANS:

$$\begin{array}{l}
 2x + 4y - 3z = 12 \quad 2x + 4y - 3z = 12 \quad 8x + z = -6 \quad 32x + 4z = -24 \quad 8(-1) + z = -6 \quad -(-1) + y - 3(2) = 0 \\
 2(3x - 2y + 2z = -9) \quad 6x - 4y + 4z = -18 \quad 2x - 8z = -18 \quad \underline{x - 4z = -9} \quad z = 2 \quad y = 5 \\
 4(-x + y - 3z = 0) \quad -4x + 4y - 12z = 0 \quad 33x = -33 \\
 \qquad \qquad \qquad x = -1
 \end{array}$$

REF: 082335aii

14 ANS:

$$\begin{array}{l}
 6x - 16y + 4z = -120 \quad 6x - 21y - 15z = -93 \quad 6x - 16y + 4z = -120 \quad 6 + z = 3 \quad -6x + 2(6) - 4(-3) = 36 \\
 6x - 21y - 15z = -93 \quad \underline{-6x + 2y - 4z = 36} \quad \underline{-6x + 2y - 4z = 36} \quad z = -3 \quad -6x + 24 = 36 \\
 -6x + 2y - 4z = 36 \quad -19y - 19z = -57 \quad -14y = -84 \quad -6x = 12 \\
 \qquad \qquad y + z = 3 \qquad \qquad y = 6 \qquad \qquad x = -2
 \end{array}$$

REF: 062433aii

15 ANS:

$$\begin{array}{llll} s = 2j - 1 & s - 25 = j + 25 & r = j + 53 & s = 2j - 1 \\ \text{Seth}=101, \text{ Jason}=51, \text{ Raoul}=104. & r = j + 53. \quad (2j - 1) = j + 50. & r = (51) + 53. \quad s = 2(51) - 1 \\ s - 25 = j + 25 & j = 51 & r = 104 & s = 101 \end{array}$$

REF: 060326a