

Intermediate Algebra Skill

Solving 3 x 3 Linear System by Substitution

Solve the following Linear Systems of Equations by Substitution:

$$1) \begin{cases} 2x - y + z = 10 \\ 4x + 2y - 3z = 10 \\ x - 3y + 2z = 8 \end{cases}$$

$$2) \begin{cases} x - y + z = 6 \\ 2x + 3y + 2z = 2 \\ 3x + 5y + 4z = 4 \end{cases}$$

$$3) \begin{cases} 6x - 4y + 5z = 31 \\ 5x + 2y + 2z = 13 \\ x + y + z = 2 \end{cases}$$

$$4) \begin{cases} x + y + z = 0 \\ 2x + 3y + 2z = -3 \\ -x + 2y - 3z = -1 \end{cases}$$

$$5) \begin{cases} 2x + y - 3z = -4 \\ 4x - 2y + z = 9 \\ 3x + 5y - 2z = 5 \end{cases}$$

$$6) \begin{cases} 2x + y + 2z = 11 \\ 3x + 2y + 2z = 8 \\ x + 4y + 3z = 0 \end{cases}$$

$$7) \begin{cases} -2x + 8y + 2z = 4 \\ x + 6y + 3z = 4 \\ 3x - 2y + z = 0 \end{cases}$$

$$8) \begin{cases} a + 2b + c = 1 \\ 7a + 3b - c = -2 \\ a + 5b + 3c = 2 \end{cases}$$

$$9) \begin{cases} 5x + 3y + \frac{1}{2}z = \frac{7}{2} \\ 0.5x - 0.9y - 0.2z = 0 \\ 3x - 2.4y + 0.4z = -1 \end{cases}$$

$$10) \begin{cases} 3p + 2r = 11 \\ q - 7r = 4 \\ p - 6q = 1 \end{cases}$$

$$11) \begin{cases} x + y + z = 105 \\ 10y - z = 11 \\ 2x - 3y = 7 \end{cases}$$

$$12) \begin{cases} 2a - 3b = 2 \\ 7a + 4c = \frac{3}{4} \\ 2c - 3b = 1 \end{cases}$$

$$13) \begin{cases} x + y + z = 180 \\ y = 2 + 3x \\ z = 80 + x \end{cases}$$

$$14) \begin{cases} x + y = 0 \\ x + z = 1 \\ 2x + y + z = 2 \end{cases}$$

Answers to Solving 3 x 3 Linear System by Substitution

- 1) $(4, 0, 2)$
- 2) $(2, -2, 2)$
- 3) $(3, -2, 1)$
- 4) $(7, -3, -4)$
- 5) $(2, 1, 3)$
- 6) $(2, -5, 6)$
- 7) *Dependent*
- 8) $(3, -5, 8)$
- 9) $\left(\frac{3}{5}, \frac{2}{3}, -3\right)$
- 10) $\left(4, \frac{1}{2}, -\frac{1}{2}\right)$
- 11) $(17, 9, 79)$
- 12) $\left(\frac{1}{4}, -\frac{1}{2}, -\frac{1}{4}\right)$
- 13) $\left(\frac{98}{5}, \frac{304}{5}, \frac{498}{5}\right)$
- 14) $\emptyset$