Linear Systems of 3 Equations

1. Solve for real numbers.

1) $\begin{cases} x + y = 28, \\ z + x = 30, \\ y + z = 32; \end{cases}$

2) $\begin{cases} x - y = \dfrac{1}{3}, \\ y - z = \dfrac{1}{6}, \\ x + z = \dfrac{4}{3}; \end{cases}$

3) $\begin{cases} x + 2y = \dfrac{7}{4}, \\ y + 3z = \dfrac{5}{2}, \\ z + 4x = \dfrac{11}{3}; \end{cases}$

4) $\begin{cases} x + 2y = 9, \\ y - 3z = -5, \\ 5z - x = 14; \end{cases}$

5) $\begin{cases} x + y = 13, \\ x - z = 5, \\ y - z = 2; \end{cases}$

6) $\begin{cases} 2x + y = 7, \\ y - 3z = -9, \\ 5z - x = 18; \end{cases}$

7) $\begin{cases} 2x + 3y = 11, \\ 3x + 2z = 13, \\ 3y + 4z = 29; \end{cases}$

8) $\begin{cases} x + y - z = 11, \\ x - y + z = 1, \\ y + z - x = 5; \end{cases}$

9) $\begin{cases} x - y - z = 5, \\ y - x - z = 1, \\ z - x - y = -15; \end{cases}$

10) $\begin{cases} 7x + 6y + 7z = 100, \\ x - 2y + z = 0, \\ 3x + y - 2z = 0; \end{cases}$

11) $\begin{cases} 3x + 2y + 3z = 110, \\ 5x + y - 4z = 0, \\ 2x - 3y + z = 0; \end{cases}$

12) $\begin{cases} x + 2y - 3z = -8, \\ -3x + y + 2z = 10, \\ 2x - 3y + 2z = 5; \end{cases}$

13) $\begin{cases} 2x - 3y + 4z = 5, \\ 3x + 4y - 2z = 0, \\ -4x + 2y + 3z = 8; \end{cases}$

14) $\begin{cases} x + y - 2z = 0, \\ x - y - 8z = 0, \\ 3x + 5y + 4z = 4; \end{cases}$

15) $\begin{cases} x + 2y + 3z = 0, \\ x - y + z = 0, \\ x + y - 2z = 0; \end{cases}$

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

17) $\begin{cases} z = 3x - y + 1, \\ 2z = 5{,}6x - 2{,}4y + 0{,}8, \\ 3z = 10x - 2y; \end{cases}$

18) $\begin{cases} \dfrac{x}{5} - \dfrac{y}{4} - \dfrac{z}{10} = 0, \\ -0{,}2x + 0{,}6z = 1, \\ x - y - z = -1. \end{cases}$

[**1)** $[13; 15; 17]$; **2)** $\left[\dfrac{11}{12}; \dfrac{7}{12}; \dfrac{5}{12}\right]$; **3)** $\left[\dfrac{3}{4}; \dfrac{1}{2}; \dfrac{2}{3}\right]$; **4)** $[1; 4; 3]$;

5) $[8; 5; 3]$; **6)** $[2; 3; 4]$; **7)** $[1; 3; 5]$; **8)** $[6; 8; 3]$; **9)** $[7; 5; -3]$;
10) $[3; 5; 7]$; **11)** $[11; 13; 17]$; **12)** $[3; 5; 7]$; **13)** $[0; 1; 2]$;

14) $[5; -3; 1]$; **15)** $[0; 0; 0]$; **16)** $[1; 1; 2]$; **17)** No solution.
18) $x = t$; $y = \dfrac{2}{3}(t-1)$; $z = \dfrac{1}{3}(t+5)$; $t \in \mathbb{R}$.]

2. Solve for real numbers.

1) $\begin{cases} \dfrac{x}{2} + \dfrac{y}{3} + \dfrac{z}{4} = 1, \\ \dfrac{x}{3} + \dfrac{y}{4} + \dfrac{z}{5} = 1, \\ \dfrac{x}{4} + \dfrac{y}{5} + \dfrac{z}{6} = 1; \end{cases}$

2) $\begin{cases} 2x - \dfrac{y+z}{7} = \dfrac{11}{12}, \\ 3y - \dfrac{x+z}{9} = \dfrac{11}{12}, \\ 4z - \dfrac{x+y}{2} = \dfrac{7}{12}; \end{cases}$

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

[**1)** $[12; -60; 60]$; **2)** $\left[\dfrac{1}{2}; \dfrac{1}{3}; \dfrac{1}{4}\right]$; **3)** $\left[\dfrac{36}{5}; \dfrac{8}{5}; \dfrac{24}{5}\right]$.]