

Question

We have next system of the equations:

$$\begin{cases} y = -3x - 3z + 11 \\ x = -2y - z + 17 \\ z = x - y \end{cases}$$

Need to find: x, y, z - ?

Solution:

$$\begin{aligned} \begin{cases} y = -3x - 3z + 11 \\ x = -2y - z + 17 \\ z = x - y \end{cases} &\Rightarrow \begin{cases} y = -3(z + y) - 3z + 11 \\ z + y = -2y - z + 17 \\ x = z + y \end{cases} \Rightarrow \begin{cases} 4y = -6z + 11 \\ 3y = -2z + 17 \\ x = z + y \end{cases} \\ \Rightarrow \begin{cases} 12y = -18z + 33 \\ 12y = -8z + 68 \\ x = z + y \end{cases} &\Rightarrow \begin{cases} 0 = 10z + 35 \\ 4y = -6z + 11 \\ x = z + y \end{cases} \Rightarrow \begin{cases} z = -\frac{7}{2} \\ y = 8 \\ x = 8 - \frac{7}{2} = \frac{9}{2} \end{cases} \Rightarrow (x, y, z) = \left(\frac{9}{2}, 8, -\frac{7}{2}\right). \end{aligned}$$

Answer: $(x, y, z) = \left(\frac{9}{2}, 8, -\frac{7}{2}\right)$.