

Esimerkkejä yhtälöryhmistä

①

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

$$\left(\begin{array}{cc|c} 1 & -3 & -1 \\ 2 & 4 & 2 \end{array} \right) \begin{array}{l} \cdot (-2) \\ \leftarrow + \end{array}$$

$$\left(\begin{array}{cc|c} 1 & -3 & -1 \\ 0 & 10 & 4 \end{array} \right) \rightarrow \begin{cases} x - 3y = -1 & (1) \\ 10y = 4 & (2) \end{cases}$$

$$\begin{aligned} (2) &\rightarrow y = 0,4 \\ (1) &\rightarrow x - 3 \cdot 0,4 = -1 \\ &\quad x = -1 + 1,2 \\ &\quad \underline{x = 0,2} \end{aligned}$$

Vastaus $x = 0,2$, $y = 0,4$

$$\begin{aligned} \text{Tarkk:} \quad 0,2 - 3 \cdot 0,4 &= -1 \quad \text{ok} \\ 2 \cdot 0,2 + 4 \cdot 0,4 &= 2 \quad \text{ok} \end{aligned}$$

②

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

$$\left(\begin{array}{ccc|c} 1 & -1 & 3 & 4 \\ 0 & 1 & 1 & 2 \\ 2 & 1 & -1 & 4 \end{array} \right) \begin{array}{l} \cdot (-2) \\ \leftarrow + \end{array} \sim \left(\begin{array}{ccc|c} 1 & -1 & 3 & 4 \\ 0 & 1 & 1 & 2 \\ 0 & 3 & -7 & -4 \end{array} \right) \begin{array}{l} \cdot (-3) \\ \leftarrow + \end{array}$$

$$\sim \left(\begin{array}{ccc|c} 1 & -1 & 3 & 4 \\ 0 & 1 & 1 & 2 \\ 0 & 0 & -10 & -10 \end{array} \right) \rightarrow \begin{cases} x - y + 3z = 4 & (1) \\ y + z = 2 & (2) \\ -10z = -10 & (3) \end{cases}$$

$$\begin{aligned} (3) &\rightarrow z = 1 \\ (2) &\rightarrow y + 1 = 2 \rightarrow y = 1 \\ (1) &\rightarrow x - 1 + 3 \cdot 1 = 4 \rightarrow \underline{x = 2} \end{aligned}$$

$$\text{Vastus: } \begin{cases} x = 2 \\ y = 1 \\ z = 1 \end{cases}$$

$$\textcircled{3} \quad \begin{cases} x + 2y + z = 6 & \cdot (-1) \\ x + 2y + 3z = 10 & \leftarrow + \end{cases}$$

$$\Rightarrow \begin{cases} \underline{x} + 2y + z = 6 \\ \underline{2z} = 4 & | :2 \end{cases}$$

$$\Leftrightarrow \begin{cases} x + z = 6 - 2y & (1) \\ z = 2 & (2) \end{cases}$$

Validasi $y = a$

$$(2) \rightarrow \underline{z = 2}$$

$$(1) \rightarrow x + z = 6 - 2a$$

$$\underline{x = 4 - 2a}$$

Verifikasi: $\begin{cases} x = 4 - 2a \\ y = a \\ z = 2 \end{cases}$

Tarbiatus

$$(4 - 2a) + 2a + 2 = 6 \quad \text{ok}$$

$$(4 - 2a) + 2a + 3 \cdot 2 = 10 \quad \text{ok}$$