

HA: LGS 5.214 1626364a6

ATR!

$$\textcircled{1} \text{ b.) } \begin{cases} \text{I} & 3x_1 + 8x_2 - 3x_3 = 5 \\ \text{II} & 4x_2 + x_3 = 1 \\ \text{III} & -5x_3 = 10 \end{cases}$$

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$$x_3 = -2 \quad \text{in II: } x_2 = \frac{3}{4}$$

$$\text{in I: } 3x_1 = 5 - \frac{8 \cdot 3}{4} + 3 \cdot (-2) = -1 - 6$$

$$x_1 = -\frac{7}{3} \quad \mathbb{L} = \left\{ \left( -\frac{7}{3}, \frac{3}{4}, -2 \right) \right\}$$

$$3x_1 = 2 + 4 \cdot \left( \frac{3}{5} \right) = \frac{22}{5}$$

$$\textcircled{2} \text{ b.) } \begin{cases} \text{I} & 3x_1 - 4x_2 + x_3 = 4 \\ \text{II} & 3x_1 + x_2 - 2x_3 = 1 \\ \text{III} & 3x_3 = 6 \end{cases}$$

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$$x_3 = 2 \quad \text{in I und II:}$$

$$3x_1 - 4x_2 + 2 = 4$$

$$3x_1 + x_2 - 4 = 1$$

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$$\text{Ia} \quad \begin{cases} 3x_1 - 4x_2 = 2 \\ \text{IIa} \quad 3x_1 + x_2 = 5 \end{cases}$$

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$$\text{Ia} \quad 3x_1 - 4x_2 = 2$$

$$\text{IIa} \quad 3x_1 - 4x_2 = 2$$

$$\text{Ia} \cdot \text{IIa} \quad -5x_2 = -3$$

$$x_2 = \frac{3}{5}; x_1 = \frac{22}{5} \quad \mathbb{L} = \left\{ \left( \frac{22}{5}, \frac{3}{5}, 2 \right) \right\}$$

S. 214 ③ b.) Beachte: Es gibt natürlich etliche Möglichkeiten, wie Zeilen vervielfacht und

addiert/subtrahiert werden können, um die Stufenform zu erhalten...

$$\begin{cases}
 \text{I} & 2x_1 - 3x_2 - x_3 = 1 \\
 \text{II} & 2x_2 + 3x_3 = 1 \\
 \text{III} & 4x_1 + 2x_2 + 3x_3 = 6
 \end{cases}$$

$\begin{matrix} 2 \cdot \text{I} \\ \text{II} \\ \text{III} \end{matrix}$

$$\begin{cases}
 \text{Ia} & 4x_1 - 6x_2 - 2x_3 = 2 \\
 \text{IIa} & 4x_1 + 2x_2 + 3x_3 = 6 \\
 \text{IIIa} & 2x_2 + 3x_3 = 1
 \end{cases}$$

$$\begin{cases}
 2 \cdot \text{I} - \text{III} \\
 \text{II} \\
 \text{III}
 \end{cases}
 \begin{cases}
 \text{Ia} & 4x_1 - 6x_2 - 2x_3 = 2 \\
 \text{IIb} & -8x_2 - 5x_3 = -4 \\
 \text{IIIa} & 2x_2 + 3x_3 = 1
 \end{cases}$$

$\begin{matrix} 3 \cdot \text{IIIa} \\ \text{IIb} \\ \text{Ia} \end{matrix}$

$$\begin{cases}
 \text{Ia} & 4x_1 - 6x_2 - 2x_3 = 2 \\
 \text{IIb} & -8x_2 - 5x_3 = -4 \\
 \text{IIIb} & 8x_2 + 12x_3 = 4
 \end{cases}$$

$$\begin{cases}
 \text{Ia} + 3 \cdot \text{IIb} \\
 \text{IIb} \\
 \text{IIIb}
 \end{cases}
 \begin{cases}
 \text{Ia} & 4x_1 - 6x_2 - 2x_3 = 2 \\
 \text{IIb} & -8x_2 - 5x_3 = -4 \\
 \text{IIIb} & 7x_3 = 0
 \end{cases}$$

$\begin{matrix} \text{in Ia} \\ \text{in IIb} \end{matrix}$

$$\begin{cases}
 \text{Ia} & 4x_1 - 6x_2 - 2x_3 = 2 \\
 \text{IIb} & -8x_2 - 5 \cdot 0 = -4 \Rightarrow x_2 = \frac{1}{2} \\
 \text{IIIb} & 7 \cdot 0 = 0 \Rightarrow x_3 = 0
 \end{cases}$$

$$\mathbb{L} = \left\{ \left( \frac{5}{4}, \frac{1}{2}, 0 \right) \right\}$$

S.214 (4) a.)

$$I \left\{ \begin{array}{l} 2x_1 - 4x_2 + 5x_3 = 3 \\ 3x_1 + 3x_2 + 7x_3 = 13 \\ 4x_1 - 2x_2 - 3x_3 = -1 \end{array} \right.$$

$$II \left\{ \begin{array}{l} 2x_1 - 4x_2 + 5x_3 = 3 \\ 3x_1 + 3x_2 + 7x_3 = 13 \\ 4x_1 - 2x_2 - 3x_3 = -1 \end{array} \right.$$

$$III \left\{ \begin{array}{l} 2x_1 - 4x_2 + 5x_3 = 3 \\ 3x_1 + 3x_2 + 7x_3 = 13 \\ 4x_1 - 2x_2 - 3x_3 = -1 \end{array} \right.$$

$$I \left\{ \begin{array}{l} 2x_1 - 4x_2 + 5x_3 = 3 \\ 3x_1 + 3x_2 + 7x_3 = 13 \\ 6x_2 - 13x_3 = -7 \end{array} \right.$$

$$II \left\{ \begin{array}{l} 2x_1 - 4x_2 + 5x_3 = 3 \\ 3x_1 + 3x_2 + 7x_3 = 13 \\ 6x_2 - 13x_3 = -7 \end{array} \right.$$

$$III \left\{ \begin{array}{l} 2x_1 - 4x_2 + 5x_3 = 3 \\ 3x_1 + 3x_2 + 7x_3 = 13 \\ 6x_2 - 13x_3 = -7 \end{array} \right.$$

$$I \left\{ \begin{array}{l} 2x_1 - 4x_2 + 5x_3 = 3 \\ -18x_2 + x_3 = -14 \\ 6x_2 - 13x_3 = -7 \end{array} \right.$$

$$II \left\{ \begin{array}{l} 2x_1 - 4x_2 + 5x_3 = 3 \\ -18x_2 + x_3 = -14 \\ 6x_2 - 13x_3 = -7 \end{array} \right.$$

$$III \left\{ \begin{array}{l} 2x_1 - 4x_2 + 5x_3 = 3 \\ -18x_2 + x_3 = -14 \\ 6x_2 - 13x_3 = -7 \end{array} \right.$$

$$I \left\{ \begin{array}{l} 2x_1 - 4x_2 + 5x_3 = 3 \\ -18x_2 + x_3 = -14 \\ -38x_3 = -38 \end{array} \right.$$

$$II \left\{ \begin{array}{l} 2x_1 - 4x_2 + 5x_3 = 3 \\ -18x_2 + x_3 = -14 \\ -38x_3 = -38 \end{array} \right.$$

$$III \left\{ \begin{array}{l} 2x_1 - 4x_2 + 5x_3 = 3 \\ -18x_2 + x_3 = -14 \\ -38x_3 = -38 \end{array} \right.$$

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$$III \left\{ \begin{array}{l} 2x_1 - 4x_2 + 5x_3 = 3 \\ -18x_2 + x_3 = -14 \\ -38x_3 = -38 \end{array} \right.$$

$$x_3 = 1$$

$$x_1 = 1$$

$III_a = -2 \cdot I + III$

$III_b = 3 \cdot III_a + I_a$

$III_c = 3 \cdot III_a + I_a$

$$L = \{(1; 1; 1)\}$$

4 b)

$$I \quad \begin{cases} -x_1 + 7x_2 - x_3 = 5 \end{cases}$$

$$II \quad \begin{cases} 4x_1 - x_2 + x_3 = 1 \end{cases}$$

$$III \quad \begin{cases} 5x_1 - 3x_2 + x_3 = -1 \end{cases}$$

$$I \quad \begin{cases} -x_1 + 7x_2 - x_3 = 5 \end{cases}$$

$$II_a \quad \begin{cases} 3x_1 + 6x_2 = 6 \end{cases}$$

$$III_a \quad \begin{cases} 4x_1 + 4x_2 = 4 \end{cases}$$

$$II_a = I + II$$

$$III_a = I + III$$

$$I \quad \begin{cases} -x_1 + 7x_2 - x_3 = 5 \end{cases}$$

$$II_a \quad \begin{cases} 3x_1 + 6x_2 = 6 \end{cases}$$

$$III_b \quad \begin{cases} 12x_2 = 12 \end{cases}$$

$$III_b = 4 \cdot II - 3 \cdot III$$

$$x_2 = 1 \quad \text{in } II_a: 3x_1 = 0$$

$$\text{in } I: -x_3 = 5 - 7 + 0, x_3 = 2$$

$$L = \{(0; 1; 2)\}$$