

Lösungen zu Punkt 5.)

1

1) I $3x - 2y + z = 4$

II $3x - y + 4z = 19$

III $x + 3y + z = 15$

$$\begin{array}{cc|ccc} \text{A2} & 3 & -2 & 1 & 4 \\ & 3 & -1 & 4 & 19 \\ & 1 & 3 & 1 & 15 \end{array} \quad \begin{array}{l} \downarrow + \cdot (-1) \\ \downarrow + \cdot (-3) \end{array}$$

$$\begin{array}{cc|ccc} \text{A2} & 3 & -2 & 1 & 4 \\ & 0 & 1 & 3 & 15 \\ & 0 & -11 & -2 & -41 \end{array} \quad \begin{array}{l} \downarrow \cdot 11 \\ \downarrow + \end{array}$$

$$\begin{array}{cc|ccc} & 3 & -2 & 1 & 4 \\ & 0 & 1 & 3 & 15 \\ & 0 & 0 & 31 & 124 \end{array}$$

$$\begin{array}{l} 31z = 124 \\ z = 4 \end{array}$$

$$\begin{array}{l} y + 3z = 15 \\ y + 12 = 15 \\ y = 3 \end{array}$$

$$\begin{array}{l} 3x - 2y + z = 4 \\ 3x - 6 + 4 = 4 \\ x = 2 \end{array}$$

$$\Lambda L = \{(x|y|z); (2|3|4)\}$$

2) I) $-2x + 3y - 6z = -16$

II) $x + y + z = 2$

III) $5x - y + 2z = 1$

IV) $y + x + z = 2$

V) $-y + 5x + 2z = 1$

I) $3y - 2x - 6z = -16$

$$\begin{array}{cc|ccc} \text{A2} & x & x & z & \\ & 1 & 1 & 1 & 2 \\ & -1 & 5 & 2 & 1 \\ & 3 & -2 & -6 & -16 \end{array} \quad \begin{array}{l} \downarrow + \cdot (-3) \\ \downarrow + \end{array}$$

$$\begin{array}{cc|ccc} \text{A2} & 1 & 1 & 1 & 2 \\ & 0 & 6 & 3 & 3 \\ & 0 & -5 & -9 & -22 \end{array} \quad \begin{array}{l} \downarrow \cdot 5 \\ \downarrow + \cdot 6 \end{array}$$

$$\begin{array}{cc|ccc} & 1 & 1 & 1 & 2 \\ & 0 & 6 & 3 & 3 \\ & 0 & 0 & -39 & -117 \end{array}$$

$$\begin{array}{l} -39z = -117 \\ z = 3 \end{array}$$

$$\begin{array}{l} 6x + 3z = 3 \\ 6x + 9 = 3 \\ x = -1 \end{array}$$

$$\begin{array}{l} y + x + z = 2 \\ y - 1 + 3 = 2 \\ y = 0 \end{array}$$

$$\Lambda L = \{(x|y|z); (-1|0|3)\}$$

3) I) $a - 2b + c = 9$

II) $4a + b - c = 40$

Tausche c in 1. Spalte

III) $8a - 2b - c = 77$

I) $c + a - 2b = 9$

II) $-c + 4a + b = 40$

III) $-c + 8a - 2b = 77$

	c	a	b	
A2	1	1	-2	9
	-1	4	1	40
	-1	8	-2	77

↓_r ↓_r

	1	1	-2	9
A2	0	5	-1	49
	0	9	-4	86

↓_r · 9
↓_r · (-5)

	1	1	-2	9
	0	5	-1	49
	0	0	11	11

$11b = 11$
 $b = 1$

$5a - b = 49$
 $5a - 1 = 49$
 $a = 10$

$c + a - 2b = 9$
 $c + 10 - 2 = 9$
 $c = 1$

$\Delta L = \{(a|b|c); (10|1|1)\}$

4) I $x + y + z + u = 7$

II $x + 2y + 3z - u = 6$

III $2x - 3y - 2z + 4u = 7$

IV $2x - y + z + 2u = 9$

A2	1	1	1	1	7
	1	2	3	-1	6
	2	-3	-2	4	7
	2	-1	1	2	9

↓_r · (-1) ↓_r · (-2) ↓_r · (-2)

	1	1	1	1	7
A2	0	1	2	-2	-1
	0	-5	-4	2	-7
	0	-3	-1	0	-5

↓_r · 5 ↓_r · 3

	1	1	1	1	7
	0	1	2	-2	-1
A2	0	0	6	-8	-12
	0	0	5	-6	-8

↓_r · (-5) ↓_r · 6

$\Delta L = \{(x|y|z|u); (1|1|2|3)\}$

	1	1	1	1	7
	0	1	2	-2	-1
	0	0	6	-8	-12
	0	0	0	4	12

$4u = 12$
 $u = 3$

$6z - 8u = -12$
 $6z - 24 = -12$
 $z = 2$

$y + 2z - 2u = -1$
 $y + 4 - 6 = -1$
 $y = 1$

$x + y + z + u = 7$
 $x + 1 + 2 + 3 = 7 \Rightarrow x = 1$