S 214 Nr. 4

b)
$$-x_1 + 7x_2 - x_3 = 5 \quad | \cdot 4 \quad | \cdot 5$$
$$4x_1 - x_2 + x_3 = 1 \quad | \cdot 1$$
$$5x_1 - 3x_2 + x_3 = -1 \quad \quad | \cdot 1$$

$$-x_1 + 7x_2 - x_3 = 5$$
$$27x_2 - 3x_3 = 21 \quad | \cdot 4$$
$$32x_2 - 4x_3 = 24 \quad | \cdot(-3) : 4$$

$\left. \begin{array}{c} :3 \end{array} \right\}$ auch ⇒ möglich $\left\{ \begin{array}{l} -x_1 + 7x_2 - x_3 = 5 \\ 9x_2 - x_3 = 7 \quad | \cdot 1 \\ 8x_2 - x_3 = 6 \quad | \cdot(-1) \end{array} \right.$

$$-x_1 + 7x_2 - x_3 = 5$$
$$9x_2 - x_3 = 7$$
$$x_2 = 1$$

$$-x_1 + 7x_2 - x_3 = 5$$
$$27x_2 - 3x_3 = 21$$
$$12x_2 = 12$$

$$x_2 = 1$$
$$27 \cdot 1 - 3x_3 = 21 \Rightarrow -3x_3 = 21 - 27 = -6 \Rightarrow x_3 = 2$$
$$-x_1 + 7 \cdot 1 - 2 = 5 \Rightarrow -x_1 = 5 + 2 - 7 = 0 \Rightarrow x_1 = 0$$

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

c)
$$0{,}6x_2 + 1{,}8x_3 = 3$$
$$0{,}3x_1 + 1{,}2x_2 = 0 \quad | \cdot 5$$
$$0{,}5x_1 + x_3 = 1 \quad | \cdot(-3)$$

$$0{,}6x_2 + 1{,}8x_3 = 3 \quad | \cdot 10$$
$$0{,}3x_1 + 1{,}2x_2 = 0$$
$$6x_2 - 3x_3 = -3 \quad | \cdot(-1)$$

$$0{,}6x_2 + 1{,}8x_3 = 3$$
$$0{,}3x_1 + 1{,}2x_2 = 0$$
$$21x_3 = 33 \quad \text{Stufenform erreicht}$$

$$x_3 = \frac{33}{21} = \frac{11}{7}$$

$$0{,}6x_2 + 1{,}8 \cdot \frac{11}{7} = 3 \Rightarrow 0{,}6x_2 = 3 - \frac{99}{35} = \frac{6}{35} \Rightarrow x_2 = \frac{2}{7}$$

$$0{,}3x_1 + 1{,}2 \cdot \frac{2}{7} = 0 \Rightarrow 0{,}3x_1 = -\frac{12}{35} \Rightarrow x_1 = -\frac{8}{7}$$

$$\mathbb{L} = \left\{ \left(-\frac{8}{7}; \frac{2}{7}; \frac{11}{7}\right) \right\}$$