1) a) I $3x - 8y - 5z = 0$

II $2x - 2y + z = -1$ | II · 1,5 − I

III $1x + 4y + 7z = 2$ | III · 3 − I

$3x - 8y - 5z = 0$

$5y + 6,5z = -1,5$

$20y + 26z = 6$ | III − 4 · II

$3x - 8y - 5z = 0$

$5y + 6,5z = -1,5$

$0z = 12 \Rightarrow$ Widerspruch

keine Lösung

b) I $2x - 2y - 3z = -1$

II $-2y + 1z = -3$

III $-x - y - 3z = -4$ | III · 2 + I

I $2x - 2y - 3z = -1$

II $-2y + z = -3$

III $-4y - 9z = -4$ | III · $(-\frac{1}{2})$ + II

$2x - 2y - 3z = -1 \Rightarrow x = 1y + 1,5z - 0,5 = \frac{17}{11}$

$-2y + z = -3 \Rightarrow y = 0,5z + 1,5 = \frac{18}{11}$

$5,5z = 7,5 \Rightarrow z = \frac{3}{11}$

c) I $4x - y + 2z = 6$

II $x + 2y - z = 6$ $\quad |\text{II} \cdot 4 - \text{I}$

III $6x + 3y = 18$ $\quad |\text{III} \cdot \frac{2}{3} - \text{I}$

$4x - y + 2z = 6$

$9y - 6z = 18$

$3y - 2z = 6$ $\quad |\text{III} \cdot 3 - \text{I}$

$4x - y + 2z = 6 \Rightarrow x = \frac{1}{4}y - \frac{1}{2}z + 1{,}5 = \left(\frac{1}{4}\left(\frac{2}{3}t + 2\right)\right) - \left(\frac{1}{2}(t)\right) + 1{,}5 = -\frac{1}{3}t + 2$

$9y - 6z = 18 \Rightarrow y = \frac{2}{3}z + 2 = \frac{2}{3}t + 2$

$0 = 0 \Rightarrow z = t$

$L = \{(x, y, z) \mid x = -\frac{1}{3}t + 2,\ y = \frac{2}{3}t + 2,\ z = t \text{ und } t \in \mathbb{R}\}$

2) M: $U_1 + U_2 = U_0$

N: $U_3 - U_2 = 0V$

I) $I_1 - I_2 - I_3 = 0$

II) $50 I_1 + 150 I_2 + 0 = 220V \quad | \text{II}/50 - \text{I}$

III) $0 - 150 I_2 + 100 I_3 = 0V$

$I_1 - I_2 - I_3 = 0V$

$4 I_2 + I_3 = \frac{22}{5}$

$-150 I_2 + 100 I_3 = 0V \quad | \text{III} \cdot \frac{4}{150} + \text{II}$

$I_1 - I_2 - I_3 = 0V \Rightarrow I_1 = I_2 + I_3 = 2A$

$4 I_2 + I_3 = \frac{22}{5} \Rightarrow I_2 = \frac{\left(\frac{22}{5} - I_3\right)}{4} = \frac{4}{5} A$

$\frac{11}{3} I_3 = \frac{22}{5} \Rightarrow I_3 = \frac{6}{5} A$

$$\left(\begin{array}{ccccc|c} 1 & 3 & 2 & 8 & 5 & 95 \\ 2 & 5 & 3 & 9 & 4 & 112 \\ 3 & 5 & 7 & 6 & 4 & 116 \\ 7 & 6 & 4 & 5 & 3 & 128 \\ 9 & 7 & 3 & 2 & 5 & 140 \end{array}\right) \begin{array}{l} \\ \cdot(-2) \\ \cdot(-3) \\ \cdot(-7) \\ \cdot(-9) \end{array}$$

$$\left(\begin{array}{ccccc|c} 1 & 3 & 2 & 8 & 5 & 95 \\ 0 & -1 & -1 & -7 & -6 & -78 \\ 0 & -4 & 1 & -18 & -11 & -169 \\ 0 & -15 & -10 & -51 & -32 & -537 \\ 0 & -20 & -15 & -70 & -40 & -715 \end{array}\right) \begin{array}{l} \\ \cdot(-4) \\ \cdot(-15) \\ \cdot(-20) \end{array}$$

$$\left(\begin{array}{ccccc|c} 1 & 3 & 2 & 8 & 5 & 95 \\ 0 & -1 & -1 & -7 & -6 & -78 \\ 0 & 0 & 5 & 10 & 13 & 143 \\ 0 & 0 & 5 & 54 & 58 & 633 \\ 0 & 0 & 5 & 70 & 80 & 845 \end{array}\right) \begin{array}{l} \\ \\ \cdot(-1) \\ \cdot(-1) \end{array}$$

$$\left(\begin{array}{ccccc|c} 1 & 3 & 2 & 8 & 5 & 95 \\ 0 & -1 & -1 & -7 & -6 & -78 \\ 0 & 0 & 5 & 10 & 13 & 143 \\ 0 & 0 & 0 & 44 & 45 & 490 \\ 0 & 0 & 0 & 60 & 67 & 702 \end{array}\right) \begin{array}{l} \\ \\ \\ \\ \cdot\left(-\frac{15}{11}\right) \end{array}$$

1	3	2	8	5	95
0	-1	-1	-7	-6	-78
0	0	5	10	13	143
0	0	0	44	45	490
0	0	0	0	$\frac{62}{11}$	$\frac{372}{11}$

$\frac{62}{11}v = \frac{372}{11}$

$v = 6$

$44u + 45v = 490$

$u = 5$

$5z + 10u + 13v = 143$

$z = 3$

$-y - z - 7u - 6v = -78$

$y = 4$

$x + 3y + 2z + 8u + 5v = 95$

$x = 7$

$$L = \begin{pmatrix} 7 \\ 4 \\ 3 \\ 5 \\ 6 \end{pmatrix}$$