

Lineare Gleichungssysteme lösen

Aufgabe 1: Einsetzungsverfahren

Löse mit dem Einsetzungsverfahren

1)
$$\begin{array}{l} -4y + 20x = -52 \\ y = -3x - 3 \end{array}$$

2)
$$\begin{array}{l} -2y + 2x = -16 \\ y = 4x + 17 \end{array}$$

3)
$$\begin{array}{l} 2y + 2x = -8 \\ y = -4x - 19 \end{array}$$

4)
$$\begin{array}{l} -4y + 16x = -56 \\ y = -3x - 7 \end{array}$$

5)
$$\begin{array}{l} -2y - 2x = 12 \\ y = -5x - 26 \end{array}$$

6)
$$\begin{array}{l} 4y + 4x = -12 \\ y = 4x + 22 \end{array}$$

Lösung:

1)
$$\begin{array}{rcl} -4 \cdot (-3x - 3) + 20x &=& -52 \\ 12x + 12 + 20x &=& -52 \\ 32x + 12 &=& -52 \\ 32x &=& -64 \\ x &=& -2 \end{array} \quad | T$$

Einsetzen in 2. Gleichung

$$\begin{array}{l} y = -3 \cdot (-2) - 3 = 3 \\ L = \{ (-2|3) \} \end{array}$$

2)
$$\begin{array}{rcl} -2 \cdot (4x + 17) + 2x &=& -16 \\ -8x - 34 + 2x &=& -16 \\ -6x - 34 &=& -16 \\ -6x &=& 18 \\ x &=& -3 \end{array} \quad | T$$

Einsetzen in 2. Gleichung

$$\begin{array}{l} y = 4 \cdot (-3) + 17 = 5 \\ L = \{ (-3|5) \} \end{array}$$

3)
$$\begin{array}{rcl} 2 \cdot (-4x - 19) + 2x &=& -8 \\ -8x - 38 + 2x &=& -8 \\ -6x - 38 &=& -8 \\ -6x &=& 30 \\ x &=& -5 \end{array} \quad | T$$

Einsetzen in 2. Gleichung

$$\begin{array}{l} y = -4 \cdot (-5) - 19 = 1 \\ L = \{ (-5|1) \} \end{array}$$

4)
$$\begin{array}{rcl} -4 \cdot (-3x - 7) + 16x &=& -56 \\ 12x + 28 + 16x &=& -56 \\ 28x + 28 &=& -56 \\ 28x &=& -84 \\ x &=& -3 \end{array} \quad | T$$

Einsetzen in 2. Gleichung

$$\begin{array}{l} y = -3 \cdot (-3) - 7 = 2 \\ L = \{ (-3|2) \} \end{array}$$

5)
$$\begin{array}{rcl} -2 \cdot (-5x - 26) - 2x &=& 12 \\ 10x + 52 - 2x &=& 12 \\ 8x + 52 &=& 12 \\ 8x &=& -40 \\ x &=& -5 \end{array} \quad | T$$

Einsetzen in 2. Gleichung

$$\begin{array}{l} y = -5 \cdot (-5) - 26 = -1 \\ L = \{ (-5|-1) \} \end{array}$$

6)
$$\begin{array}{rcl} 4 \cdot (4x + 22) + 4x &=& -12 \\ 16x + 88 + 4x &=& -12 \\ 20x + 88 &=& -12 \\ 20x &=& -100 \\ x &=& -5 \end{array} \quad | T$$

Einsetzen in 2. Gleichung

$$\begin{array}{l} y = 4 \cdot (-5) + 22 = 2 \\ L = \{ (-5|2) \} \end{array}$$