Lineare Gleichungssysteme lösen

Aufgabe 1: Löse das lin. Gleichungssystem

1) $\left|\begin{array}{l} -2x + 4y = 2 \\ 5x - 1y = -23 \end{array}\right|$

2) $\left|\begin{array}{l} -3x - 2y = -6 \\ -3x - 1y = -9 \end{array}\right|$

3) $\left|\begin{array}{l} 2x + 3y = -11 \\ 4x + 2y = -18 \end{array}\right|$

4) $\left|\begin{array}{l} 4x + 4y = -28 \\ 5x + 5y = -35 \end{array}\right|$

Lösung:

1) $\left|\begin{array}{l} -2x + 4y = 2 \\ 5x - 1y = -23 \end{array}\right|$ $\left|\begin{array}{l} \cdot 1 \\ \cdot 4 \end{array}\right.$

$\left|\begin{array}{l} -2x + 4y = 2 \\ 20x - 4y = -92 \end{array}\right|$ 1. und 2. Gl. addieren

$18x = -90 \quad | :18$

x = -5

In 1. Gleichung einsetzen:

$-2 \cdot (-5) + 4y = 2 \quad |T$

$10 + 4y = 2 \quad | -10$

$4y = -8 \quad | :4$

y = -2

L = { (-5\|-2) }

2) $\left|\begin{array}{l} -3x - 2y = -6 \\ -3x - 1y = -9 \end{array}\right|$ $\left|\begin{array}{l} \cdot (-1) \\ \cdot 2 \end{array}\right.$

$\left|\begin{array}{l} 3x + 2y = 6 \\ -6x - 2y = -18 \end{array}\right|$ 1. und 2. Gl. addieren

$-3x = -12 \quad | :(-3)$

x = 4

In 1. Gleichung einsetzen:

$-3 \cdot 4 - 2y = -6 \quad |T$

$-12 - 2y = -6 \quad | +12$

$-2y = 6 \quad | :(-2)$

y = -3

L = { (4\|-3) }

3) $\left|\begin{array}{l} 2x + 3y = -11 \\ 4x + 2y = -18 \end{array}\right|$ $\left|\begin{array}{l} \cdot (-2) \\ \cdot 1 \end{array}\right.$

$\left|\begin{array}{l} -4x - 6y = 22 \\ 4x + 2y = -18 \end{array}\right|$ 1. und 2. Gl. addieren

$-4y = 4 \quad | : (-4)$

y = -1

In 1. Gleichung einsetzen:

$2x + 3 \cdot (-1) = -11 \quad |T$

$2x - 3 = -11 \quad | +3$

$2x = -8 \quad | :2$

x = -4

L = { (-4\|-1) }

4) $\left|\begin{array}{l} 4x + 4y = -28 \\ 5x + 5y = -35 \end{array}\right|$ $\left|\begin{array}{l} \cdot (-5) \\ \cdot 4 \end{array}\right.$

$\left|\begin{array}{l} -20x - 20y = 140 \\ 20x + 20y = -140 \end{array}\right|$ 1. und 2. Gl. addieren

$0y = 0 \quad | : 0$

y = -4

In 1. Gleichung einsetzen:

$4x + 4 \cdot (-4) = -28 \quad |T$

$4x - 16 = -28 \quad | +16$

$4x = -12 \quad | :4$

x = -3

L = { (-3\|-4) }