

Lineare Gleichungssysteme lösen

Aufgabe 1:

Löse das Gleichungssystem

$$1) \quad \left| \begin{array}{l} y = -3x + 4 \\ y = 4x - 10 \end{array} \right|$$

$$2) \quad \left| \begin{array}{l} -20x + 5y = -65 \\ 5x - 5y = 35 \end{array} \right|$$

$$3) \quad \left| \begin{array}{l} 5y - 20x = 65 \\ y = -2x - 5 \end{array} \right|$$

$$4) \quad \left| \begin{array}{l} 12x - 3y = -66 \\ 12x + 3y = -54 \end{array} \right|$$

$$5) \quad \left| \begin{array}{l} 4y + 20x = -76 \\ y = 3x + 5 \end{array} \right|$$

$$6) \quad \left| \begin{array}{l} -3y + 9x = -39 \\ y = -4x - 15 \end{array} \right|$$

Lösung:

$$1) \quad \begin{array}{rcl} -3x + 4 = 4x - 10 & | + 3x \\ 4 = 7x - 10 & | + 10 \\ 14 = 7x & | : 7 \\ 2 = x & \end{array}$$

Einsetzen in 1. Gleichung

$$y = 4 \cdot 2 - 10 = -2$$

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

$$2) \quad \begin{array}{rcl} \text{I} + \text{II}: & -15x = -30 & | : (-15) \\ & x = 2 & \end{array}$$

Einsetzen in 1. Gleichung

$$-20 \cdot 2 + 5y = -65 \quad | + 40$$

$$-40 + 5y = -65 \quad | + 40$$

$$5y = -25 \quad | : 5$$

$$y = -5$$

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

$$3) \quad \begin{array}{rcl} 5 \cdot (-2x - 5) - 20x = 65 & | T \\ -10x - 25 - 20x = 65 & | T \\ -30x - 25 = 65 & | + 25 \\ -30x = 90 & | : (-30) \\ x = -3 & \end{array}$$

Einsetzen in 2. Gleichung

$$y = -2 \cdot (-3) - 5 = 1$$

$$L = \{ (-3|1) \}$$

$$4) \quad \begin{array}{rcl} \text{I} + \text{II}: & 24x = -120 & | : 24 \\ & x = -5 & \end{array}$$

Einsetzen in 1. Gleichung

$$12 \cdot (-5) - 3y = -66 \quad | T$$

$$-60 - 3y = -66 \quad | + 60$$

$$-3y = -6 \quad | : (-3)$$

$$y = 2$$

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

$$5) \quad \begin{array}{rcl} 4 \cdot (3x + 5) + 20x = -76 & | T \\ 12x + 20 + 20x = -76 & | T \\ 32x + 20 = -76 & | -20 \\ 32x = -96 & | : 32 \\ x = -3 & \end{array}$$

Einsetzen in 2. Gleichung

$$y = 3 \cdot (-3) + 5 = -4$$

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

$$6) \quad \begin{array}{rcl} -3 \cdot (-4x - 15) + 9x = -39 & | T \\ 12x + 45 + 9x = -39 & | T \\ 21x + 45 = -39 & | -45 \\ 21x = -84 & | : 21 \\ x = -4 & \end{array}$$

Einsetzen in 2. Gleichung

$$y = -4 \cdot (-4) - 15 = 1$$

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