

Lösungen

Nr. 2

$$a) \begin{cases} y = 3x - 4 \\ y = 2x + 1 \end{cases}$$

Gleichsetzen:

$$\begin{aligned} 3x - 4 &= 2x + 1 & | -1 \\ \Leftrightarrow 3x - 5 &= 2x & | -3x \\ \Leftrightarrow -5 &= -x & | \cdot (-1) \\ \Leftrightarrow \underline{\underline{5}} &= x \end{aligned}$$

Einsetzen \rightarrow

$$\begin{aligned} y &= 3 \cdot 5 - 4 \\ y &= 15 - 4 = 11 \\ \underline{\underline{y}} & \\ \mathbb{L} &= \{5; 11\} \end{aligned}$$

$$b) \begin{cases} x = y + 5 \\ x = 2y + 3 \end{cases}$$

$$\begin{aligned} y + 5 &= 2y + 3 & | -y \\ 5 &= y + 3 & | -3 \\ \underline{\underline{2}} &= y \end{aligned}$$

Einsetzen \downarrow

$$\begin{aligned} x &= 2 + 5 = 7 \\ \underline{\underline{x}} & \\ \mathbb{L} &= \{7; 2\} \end{aligned}$$

$$c) \begin{cases} 5x + 4 = 2y \\ 6x - 1 = 2y \end{cases}$$

$$\begin{aligned} 5x + 4 &= 6x - 1 & | -5x \\ 4 &= x - 1 & | +1 \\ \underline{\underline{5}} &= x \end{aligned}$$

\downarrow

$$\begin{aligned} 5 \cdot 5 + 4 &= 2y \\ 29 &= 2y & | :2 \\ \underline{\underline{14,5}} &= y \\ \mathbb{L} &= \{5; 14,5\} \end{aligned}$$

$$d) \begin{cases} y = 4x + 2 \\ 5x - 1 = y \end{cases}$$

$$\Rightarrow 4x + 2 = 5x - 1 \quad | -4x$$

$$\Leftrightarrow 2 = x - 1 \quad | +1$$

$$\Leftrightarrow \underline{\underline{3 = x}}$$

$$y = 4 \cdot 3 + 2$$

$$\underline{\underline{y = 14}}$$

$$\mathbb{L} = \{3; 14\}$$

$$e) \begin{cases} 5y = 2x - 1 \\ 4x + 3 = 5y \end{cases}$$

$$\Rightarrow 2x - 1 = 4x + 3 \quad | -2x$$

$$\Leftrightarrow -1 = 2x + 3 \quad | -3$$

$$\Leftrightarrow -4 = 2x \quad | :2$$

$$\Leftrightarrow \underline{\underline{-2 = x}}$$

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

$$5y = -4 - 1$$

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

$$\underline{\underline{y = -1}}$$

$$\mathbb{L} = \{-2; -1\}$$

$$f) \begin{cases} 12y + 12 = 6x \\ 6x = 25y - 1 \end{cases}$$

$$\Rightarrow 12y + 12 = 25y - 1 \quad | +1$$

$$\Leftrightarrow 12y + 13 = 25y \quad | -12y$$

$$\Leftrightarrow 13 = 13y \quad | :13$$

$$\Leftrightarrow \underline{\underline{1 = y}}$$

$$6x = 25 \cdot 1 - 1$$

$$6x = 24 \quad | :6$$

$$\underline{\underline{x = 4}}$$

$$\mathbb{L} = \{4; 1\}$$

Nr. 3

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

$$\Leftrightarrow \begin{array}{l} |x = 3 - 2y| \\ |x = 4 - 3y| \end{array}$$

Umformen zu einer Variablen,
in diesem Falle x .

$$3 - 2y = 4 - 3y \quad | -3$$

$$\Leftrightarrow -2y = 1 - 3y \quad | +3y$$

$$\Leftrightarrow \underline{\underline{y = 1}}$$

$$x = 3 - 2 \cdot 1$$

$$\underline{\underline{x = 1}}$$

$$\mathcal{L} = \{1; 1\}$$

$$b) \begin{array}{l} |2x + y = 5| -2x \\ |5x + y = 11| -5x \end{array}$$

$$\Leftrightarrow \begin{array}{l} |y = 5 - 2x| \\ |y = 11 - 5x| \end{array}$$

$$\Rightarrow 5 - 2x = 11 - 5x \quad | +5x$$

$$\Leftrightarrow 5 + 3x = 11 \quad | -5$$

$$\Leftrightarrow 3x = 6 \quad | :3$$

$$\Leftrightarrow \underline{\underline{x = 2}}$$

$$y = 5 - 2 \cdot 2$$

$$\underline{\underline{y = 1}}$$

$$\mathcal{L} = \{2; 1\}$$

Seite 3

c)
$$\begin{cases} 12x - y - 15 = 0 \\ 8x - y + 1 = 0 \end{cases}$$
 hier bietet es sich an nach $-y$ aufzulösen und dann gleichzusetzen.

$$\Rightarrow \begin{cases} -y = 15 - 12x \\ -y = -1 - 8x \end{cases}$$

Jetzt Gleichsetzung:

$$\begin{aligned} 15 - 12x &= -1 - 8x \quad | +12x & -y &= -1 - 8 \cdot 4 \\ \Leftrightarrow 15 &= -1 + 4x \quad | +1 & \Leftrightarrow -y &= -1 - 32 \\ \Leftrightarrow 16 &= 4x \quad | :4 & \Leftrightarrow -y &= -33 \quad | \cdot (-1) \\ \Leftrightarrow \underline{4} &= x & \Leftrightarrow \underline{y} &= 33 \end{aligned}$$

$$\mathbb{L} = \{4; 33\}$$

d)
$$\begin{cases} 2y - 3x = 9 \\ 3x + y = 10 \end{cases} \cdot 2$$

Ich möchte nach dy auflösen, also verdopple ich beider d. Gleichung alle Summanden und löse nach dy auf.

$$\begin{cases} 2y = 9 + 3x \\ 2y = 39 - 6x \end{cases}$$

Jetzt Gleichsetzung:

$$\begin{aligned} 9 + 3x &= 39 - 6x \quad | + 6x \\ \Leftrightarrow 9 + 9x &= 39 & | -9 \\ \Leftrightarrow 9x &= 30 & | :9 \\ \Leftrightarrow x &= \frac{30}{9} \\ \underline{\underline{x}} &= \frac{10}{3} = 3\frac{1}{3} \end{aligned}$$

$$\begin{aligned} \Rightarrow 2y &= 9 + 3 \cdot \frac{10}{3} \\ \Leftrightarrow 2y &= 9 + 10 \\ 2y &= 19 \quad | :2 \\ \underline{y} &= 8,5 \\ \mathbb{L} &= \left\{ 3\frac{1}{3}; 8\frac{1}{2} \right\} \end{aligned}$$

Seite 4

Wor. 4

$$a) \begin{cases} 3x - 2y = 3 \\ 3x - y = 5 \end{cases}$$

hier bietet es sich an nach $3x$ aufzulösen

$$\begin{cases} 3x = 3 + 2y \\ 3x = 5 + y \end{cases}$$

$$\begin{aligned} \Rightarrow 3 + 2y &= 5 + y & | -y \\ \Leftrightarrow 3 + y &= 5 & | -3 \\ \Leftrightarrow \underline{y} &= 2 \end{aligned}$$

$$\begin{aligned} 3x &= 3 + 2 \cdot 2 \\ \Leftrightarrow 3x &= 7 & | :3 \\ \Leftrightarrow \underline{x} &= \frac{7}{3} = 2\frac{1}{3} \end{aligned}$$

$$L = \left\{ 2\frac{1}{3}; 2 \right\}$$

$$b) \begin{cases} 2x + 4y = 2 \\ 3x + 4y = 5 \end{cases}$$

hier bietet sich das Auflösen nach $4y$ an,

$$\begin{cases} 4y = 2 - 2x \\ 4y = 5 - 3x \end{cases}$$

$$\begin{aligned} \Rightarrow 2 - 2x &= 5 - 3x & | +2x \\ \Leftrightarrow 2 &= 5 - x & | -5 \\ \Leftrightarrow -3 &= -x & | \cdot (-1) \\ \Leftrightarrow \underline{3} &= x \end{aligned}$$

$$\begin{aligned} 4y &= 2 - 2 \cdot 3 \\ \Leftrightarrow 4y &= 2 - 6 \\ \Leftrightarrow 4y &= -4 & | :4 \\ \Leftrightarrow \underline{y} &= -1 \end{aligned}$$

$$L = \{3; -1\}$$

$$c) \begin{cases} 2x - 5y = 7 \\ 3y = 2x + 3 \end{cases}$$

$$\begin{cases} 2x = 7 + 5y \\ 2x = 3y - 3 \end{cases}$$

$$\begin{aligned} 7 + 5y &= 3y - 3 & | -3y \\ \Leftrightarrow 7 + 2y &= -3 & | -7 \\ \Leftrightarrow 2y &= -10 & | :2 \\ \Leftrightarrow \underline{y} &= -5 \end{aligned}$$

Seite 5

$$\begin{aligned} \Leftrightarrow 2x &= 3 + (-5) - 3 & \Leftrightarrow \underline{x} = -9 \\ \Leftrightarrow 2x &= -15 - 3 \\ \Leftrightarrow 2x &= -18 & | :2 \end{aligned}$$

$$L = \{-9; -5\}$$

$$d) \begin{cases} 5x + 3y = 30 \\ 4x = 3y - 3 \end{cases}$$

$$\Rightarrow \begin{cases} 3y = 30 - 5x \\ 3y = 4x + 3 \end{cases}$$

$$30 - 5x = 4x + 3 \quad | +5x$$

$$\Leftrightarrow 30 = 9x + 3 \quad | -3$$

$$\Leftrightarrow 27 = 9x \quad | :9$$

$$\Leftrightarrow \underline{\underline{3}} = x$$

$$3y = 30 - 5 \cdot 3$$

$$\Leftrightarrow 3y = 30 - 15$$

$$\Leftrightarrow 3y = 15 \quad | :3$$

$$y = \underline{\underline{5}} \quad \mathbb{L} = \{3; 5\}$$

$$e) \begin{cases} 5x = y + 6 \\ 5x - 12 = 2y \end{cases}$$

$$\begin{cases} 5x = y + 6 \\ 5x = 2y + 12 \end{cases}$$

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

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

$$\Leftrightarrow -y = 6 \quad | \cdot (-1)$$

$$\Leftrightarrow \underline{\underline{y = -6}}$$

$$5x = -6 + 6$$

$$5x = 0 \quad | :5$$

$$\underline{\underline{x = 0}}$$

$$\mathbb{L} = \{0; -6\}$$

$$f) \begin{cases} 5x + 2y = 3 \\ 3x - 2y = 11 \end{cases}$$

$$\begin{cases} 2y = 3 - 5x \\ 2y = 3x - 11 \end{cases}$$

$$3 - 5x = 3x - 11 \quad | +5x$$

$$\Leftrightarrow 3 = 8x - 11 \quad | +11$$

$$\Leftrightarrow 14 = 8x \quad | :8$$

$$x = \frac{14}{8} = 1\frac{7}{4}$$

$$\underline{\underline{x = 1\frac{7}{4}}}$$

$$2y = 3 - 5 \cdot 1\frac{7}{4} \quad \mathbb{L} = \{1\frac{7}{4};$$

$$2y = 3 - 8\frac{3}{4}$$

$$2y = -5,75 \quad | :2$$

$$y = -2,875$$

Sub 6

Nr. 8

$$a) \begin{cases} 2x + 3y - 4 = 3x + 6y - 5 \\ 5x + 2y + 7 = 4x - 5y + 12 \end{cases}$$

Hier musst du erst
alles zusammen fassen

$$\begin{cases} 2x + 3y - 4 = 3x + 6y - 5 \\ 5x + 2y + 7 = 4x - 5y + 12 \end{cases} \begin{array}{l} -2x \\ -4x \end{array}$$

$$\Leftrightarrow \begin{cases} 3y - 4 = x + 6y - 5 \\ x + 2y + 7 = -5y + 12 \end{cases} \begin{array}{l} +5 \\ +5y \end{array}$$

$$\Leftrightarrow \begin{cases} 3y + 1 = x + 6y \\ x + 7y + 7 = 12 \end{cases} \begin{array}{l} -3y \\ -7 \end{array}$$

$$\Leftrightarrow \begin{cases} 1 = x + 3y \\ x + 7y = 5 \end{cases} \text{ Jetzt Auflösen nach } x$$

$$\Leftrightarrow \begin{cases} x = 1 - 3y \\ x = 5 - 7y \end{cases}$$

$$1 - 3y = 5 - 7y \quad | -1$$

$$\Leftrightarrow -3y = 4 - 7y \quad | +7y$$

$$\Leftrightarrow 4y = 4 \quad | :4$$

$$\Leftrightarrow \underline{\underline{y = 1}}$$

$$x = 1 - 3 \cdot 1$$

$$x = 1 - 3$$

$$\underline{\underline{x = -2}}$$

$$\Downarrow \{ -2; 1 \}$$

Suite 7

$$b) \begin{cases} x + 5y + 2 = 6x + 4y - 12 & | -4y \\ 6x + 3y - 4 = 2x + 2y + 9 & | -2y \end{cases}$$

$$\Leftrightarrow \begin{cases} x + y + 2 = 6x - 12 & | -x \\ 6x + y - 4 = 2x + 9 & | -2x \end{cases}$$

$$\Leftrightarrow \begin{cases} y + 2 = 5x - 12 & | -2 \\ 4x + y - 4 = 9 & | +4 \end{cases}$$

$$\Leftrightarrow \begin{cases} y = 5x - 14 & | \\ 4x + y = 13 & | -4x \end{cases}$$

$$\Leftrightarrow \begin{cases} y = 5x - 14 & | \\ y = 13 - 4x & | \end{cases}$$

$$\Rightarrow 5x - 14 = 13 - 4x \quad | +4x$$

$$\Leftrightarrow 9x - 14 = 13 \quad | +14$$

$$\Leftrightarrow 9x = 27 \quad | :9$$

$$\Leftrightarrow \underline{\underline{x = 3}}$$

$$y = 5 \cdot 3 - 14$$

$$y = 15 - 14$$

$$\underline{\underline{y = 1}}$$

$$L = \{3; 1\}$$

$$c) \begin{cases} 2(x+3) + 4y = 3(x-2) + 7y \\ 5x - 2(y+3) = 4x + 8(y-2,5) \end{cases} \quad \begin{array}{l} \text{hier musst} \\ \text{du zuerst} \\ \text{Klammern} \\ \text{auflösen} \end{array}$$

$$\Leftrightarrow \begin{cases} 2x + 6 + 4y = 3x - 6 + 7y \\ 5x - 2y - 6 = 4x + 8y - 20 \end{cases} \quad \begin{array}{l} \text{jetzt zusammenfassen} \\ \begin{array}{l} -4y \\ +2y \end{array} \end{array}$$

$$\Leftrightarrow \begin{cases} 2x + 6 = 3x - 6 + 3y \\ 5x - 6 = 4x + 10y - 20 \end{cases} \quad \begin{array}{l} -3x \\ -5x \end{array}$$

$$\Leftrightarrow \begin{cases} -x + 6 = -6 + 3y \\ -6 = -x + 10y - 20 \end{cases} \quad \begin{array}{l} -6 \\ +20 \end{array}$$

$$\Leftrightarrow \begin{cases} -x = -12 + 3y \\ 14 = -x + 10y \end{cases}$$

$$\Leftrightarrow \begin{cases} -x = -12 + 3y \\ -x = 14 - 10y \end{cases}$$

$$\Rightarrow -12 + 3y = 14 - 10y \quad | +10y$$

$$\Leftrightarrow -12 + 13y = 14$$

$$\Leftrightarrow 13y = 26$$

$$\Leftrightarrow \underline{\underline{y = 2}}$$

$$\begin{array}{l} (+12 \\ |:13 \end{array}$$

$$-x = -12 + 3 \cdot 2$$

$$-x = -12 + 6$$

$$-x = -6 \quad | \cdot (-1)$$

$$\underline{\underline{x = 6}}$$

$$L = \{6; 2\}$$