

S 195

1)  $\frac{3x-2}{2-x} \leq -4$ ;  $D = x \in \mathbb{R} \setminus \{2\}$

2)  $\frac{2x^2-3}{2x+1} \geq x-1$ ;  $D = x \in \mathbb{R} \setminus \{-\frac{1}{2}\}$

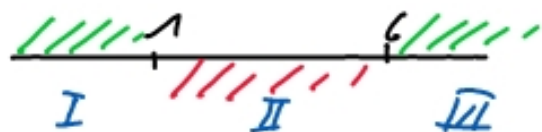
$x > 2$	$\delta^-$	$x < 2$	$\delta^+$
$3x-2 \geq -4(2-x)$		$3x-2 \leq -4(2-x)$	
$3x-2 \geq -8+4x$			
$-x \geq -6$		$-x -$	
$x \leq 6$		$x \geq 6$	
$x > 2 \wedge x \leq 6$		$x < 2 \vee x \geq 6$	
$x=3$ ✓		$x=0$	
$\frac{3 \cdot 3 - 2}{2 - 3} = -7 \leq -4$		$\frac{3 \cdot 0 - 2}{2 - 0} = -1 \leq -4$ ✗	

$$\begin{aligned} U &= \{x \in \mathbb{R} \mid x > 2 \wedge x \leq 6\} \\ &= x \in ]2; 6] \\ &= x \in (2; 6] \end{aligned}$$

$x > -\frac{1}{2}$	$\delta^+$	$x < -\frac{1}{2}$	$\delta^-$
$2x^2-3 \geq (x-1) \cdot (2x+1)$		$2x^2-3 \leq (x-1) \cdot (2x+1)$	
$2x^2-3 \geq 2x^2+x-1$		$- \parallel -$	
$-3 \geq x-1$			
$-2 \geq x$ ; $x \leq -2$		$x \geq -2$	
$x > -\frac{1}{2} \vee x \leq -2$		$x \geq -2 \wedge x < -\frac{1}{2}$	
$x=0$	✗	$x=-1$	✓
$\frac{2 \cdot 0^2 - 3}{2 \cdot 0 + 1} = -3 \geq -1$		$\frac{2(-1)^2 - 3}{2(-1) + 1} = 1 \geq -2$	

$$\begin{aligned} U &= \{x \in \mathbb{R} \mid x \geq -2 \wedge x < -\frac{1}{2}\} \\ &= x \in [-2; -\frac{1}{2}[ \\ &= x \in [-2; -\frac{1}{2}) \end{aligned}$$

$$x^2 + 6 < 7x \quad | -7x \quad x^2 - 7x + 6 = (x-6)(x-1) < 0$$



I : $x = 0$ :	$0 \cdot 0$	$> 0$	✘
II : $x = 2$ :	$0 \cdot 0$	$< 0$	✔
III : $x = 7$ :	$0 \cdot 0$	$> 0$	✘

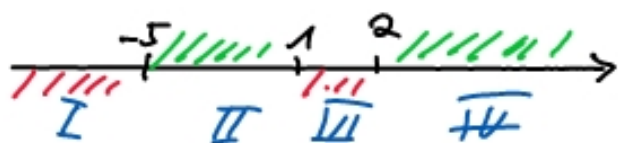
$$\mathcal{L} = x \in ]1; 6[ = x \in (1; 6)$$

$$4) \quad x \cdot (x^2 + 2x) > 13x - 10 \quad | -13x + 10$$

$$x^3 + 2x^2 - 13x + 10 > 0$$

$$(x-2)(x-1)(x+5) > 0$$

Polynomialdivision



I : $x = -6$ :	$0 \cdot 0 \cdot 0$	$< 0$	✘
II : $x = 0$ :	$0 \cdot 0 \cdot 0$	$> 0$	✔
III : $x = 1,5$ :	$0 \cdot 0 \cdot 0$	$< 0$	✘
IV : $x = 3$ :	$0 \cdot 0 \cdot 0$	$> 0$	✔

}  $\mathcal{L} = \{x \in \mathbb{R} \mid (x > 5 \wedge x < 1) \vee x > 2\}$

5)  $|\frac{1}{2}x - 3| < 5$

$x \geq 6$ $\delta^+$	$x < 6$ $\delta^-$
$\frac{1}{2}x - 3 < 5$	$-(\frac{1}{2}x - 3) < 5$
$\frac{1}{2}x < 8$	$-\frac{1}{2}x + 3 < 5$
$x < 16$	$-\frac{1}{2}x < 2$
	$x > -4$
$x \geq 6 \wedge x < 16$	$x > -4 \wedge x < 6$
$x = 10$ ✓	$x = 0$ ✓
$ \frac{1}{2} \cdot 10 - 3  = 2 < 5$	$ \frac{1}{2} \cdot 0 - 3  = 3 < 5$

$$\begin{aligned} \mathcal{L} &= \{x \in \mathbb{R} \mid x > -4 \wedge x < 16\} \\ &= x \in ]-4; 16[ \\ &= x \in (-4; 16) \end{aligned}$$

6)  $|1 - 2x| > \frac{1}{4}$

$x \geq \frac{1}{2}$ $\delta^-$	$x < \frac{1}{2}$ $\delta^+$
$-(1 - 2x) > \frac{1}{4}$	$1 - 2x > \frac{1}{4}$
$-1 + 2x > \frac{1}{4}$	$-2x > -\frac{3}{4}$
$2x > \frac{5}{4}$	$x < \frac{3}{8}$
$x > \frac{5}{8}$	
$x > \frac{5}{8}$	$x < \frac{3}{8}$
$x = 1$ ✓	$x = 0$ ✓
$ 1 - 2  = 1 > \frac{1}{4}$	$ 1 - 0  = 1 > \frac{1}{4}$

$$\begin{aligned} \mathcal{L} &= \{x \in \mathbb{R} \mid x > \frac{5}{8} \vee x < \frac{3}{8}\} \\ &= x \in \mathbb{R} \setminus [\frac{3}{8}; \frac{5}{8}] \end{aligned}$$

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

$$\Rightarrow y = -\frac{1}{2}x + 2$$

$$\Rightarrow y = 3x - 5$$

Einsatzung

$$y = 3x - 5$$

$$2y + x = 4$$

$$2 \cdot (3x - 5) + x = 4$$

$$6x - 10 + x = 4$$

$$7x = 14$$

$$x = 2$$

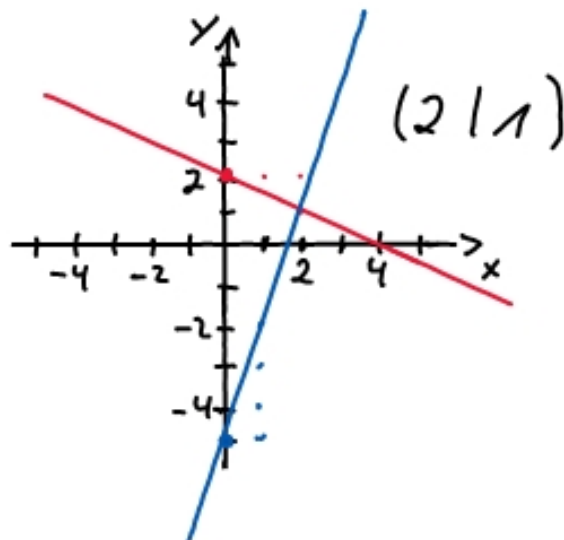
$$y = 3 \cdot 2 - 5 = 1$$

17

1+10

1·1/2

S(2|1)



Gleichung

$$-\frac{1}{2}x + 2 = 3x - 5$$

$$-\frac{7}{2}x = -7$$

$$x = 2$$

$$1 - 3x = -2$$

$$1 \cdot (-\frac{3}{4})$$

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

Addition:  $\begin{vmatrix} 2y + x = 4 \\ y + 5 = 3y \end{vmatrix} \Leftrightarrow \begin{vmatrix} x + 2y = 4 \\ -3x + y = -5 \end{vmatrix} \begin{matrix} 1.3 \\ \downarrow \end{matrix} \text{Pivot}$

$$\begin{vmatrix} x + 2y = 4 \\ 0 \quad 7y = 7 \end{vmatrix} \quad y = 1 \quad \hookrightarrow \quad \begin{matrix} x + 2 \cdot 1 = 4 & x = 2 \\ S(2|1) \end{matrix}$$

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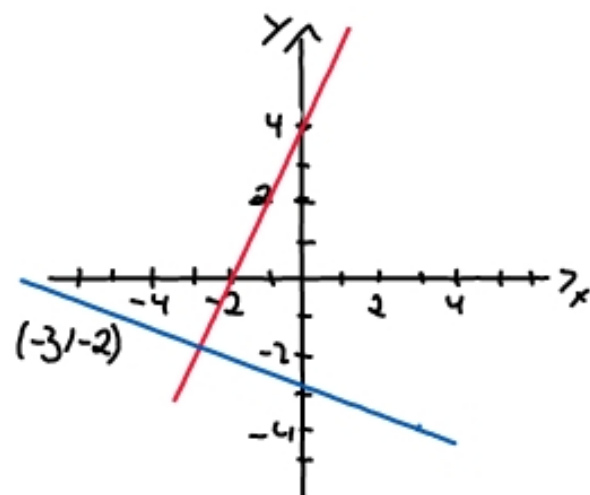

$$\begin{vmatrix} -x + 2y - z = -5 \\ x - 3y + 2z = 8 \\ 2x - y + 5z = 13 \end{vmatrix} \begin{matrix} 1.2 \\ \downarrow \end{matrix} \text{Pivot} \quad S(1|-1|2)$$

$$\begin{vmatrix} -x + 2y - z = -5 \\ 0 \quad -y + 2z = 3 \\ 0 \quad 3y + 3z = 3 \end{vmatrix} \begin{matrix} 1.3 \\ \downarrow \end{matrix} \text{Pivot}$$

$$\begin{vmatrix} -x + 2y - z = -5 \\ 0 \quad -y + 2z = 3 \\ 0 \quad 0 \quad 6z = 12 \end{vmatrix} \quad \begin{matrix} z = 2 \\ \hookrightarrow \end{matrix} \quad \begin{matrix} -x + 2 \cdot (-1) - 2 = -5 & \rightarrow & x = 1 \\ -y + 2 = 3 & \rightarrow & y = -1 \end{matrix}$$

205

$$1) \ b) \quad \begin{cases} y - 2x = 4 \\ x + 3y = -9 \end{cases} \Rightarrow \begin{cases} y = 2x + 4 \\ y = -\frac{1}{3}x - 3 \end{cases}$$

Schnittpunkt  $(-3 | -2)$ 

$$2) \ b) \quad \begin{cases} 4y - 8x = 24 \\ 3y = 6x + 12 \end{cases} \Rightarrow \begin{cases} 4y = 24 + 8x \\ y = 6 + 2x \end{cases}$$

$$3 \cdot (6 + 2x) = 18 + 6x = 6x + 12 \quad | -6x - 12$$

$$6 = 0$$

$$\Rightarrow \mathcal{L} = \{\}$$

$$\rightarrow 3y = 6x + 18 \quad \dots$$

$$0 = 0 \Rightarrow \mathcal{L} = \mathbb{R}$$

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

$$\begin{cases} 2x - y = -7 \\ 11x = -22 \end{cases} \quad x = -2 \quad \begin{array}{l} -4x - y = -7 \Rightarrow y = 3 \\ \hookrightarrow \end{array} \quad \cup (-2 | 3)$$

$$4) a) \begin{cases} -\frac{2}{3}x + \frac{3}{4}y = -\frac{7}{12} \\ 3x - y = 7 \end{cases} \quad \cdot \frac{4}{3} \quad \begin{array}{l} -\frac{1}{3}x + y = -\frac{14}{3} \\ y = -\frac{14}{3} + \frac{1}{3}x \end{array}$$

$$\rightarrow y = \frac{3}{2}x - 7$$

$$-\frac{14}{3} + \frac{1}{3}x = \frac{3}{2}x - 7 \quad | + \frac{14}{3} - \frac{3}{2}x \quad y = \frac{3}{2} \cdot 2 - 7 = -4$$

$$\frac{2}{16}x - \frac{9}{16}x = -\frac{21}{13} + \frac{14}{13}$$

$$-\frac{7}{16}x = -\frac{7}{13}$$

$$| \cdot (-\frac{64}{7})$$

$$\cup (2 | -4)$$

$$x = 2$$

$$206 \quad 6) \quad \left| \begin{array}{ccc|c} x + 3y - 2z & = & -2 \\ -2x - 5y + 2z & = & -1 \\ 3x + 2y - z & = & 2 \end{array} \right| \quad \begin{array}{l} 1 \cdot 2 \rightarrow \\ 1 \cdot (-3) \rightarrow \end{array} \quad \text{PIVOT}$$

$$\left| \begin{array}{ccc|c} x + 3y - 2z & = & -2 \\ 0 \quad y - 2z & = & -5 \\ 0 \quad -7y + 5z & = & 8 \end{array} \right| \quad 1 \cdot 7 \rightarrow \quad \text{PIVOT}$$

$$\left| \begin{array}{ccc|c} x + 3y - 2z & = & -2 \\ 0 \quad y - 2z & = & -5 \\ 0 \quad 0 \quad -9z & = & -27 \end{array} \right| \quad \begin{array}{l} x + 3 \cdot 1 - 2 \cdot 3 = -2 \\ y - 2 \cdot 3 = -5 \\ \Rightarrow z = 3 \end{array} \quad \begin{array}{l} x = 1 \\ y = 1 \end{array}$$

$$S(11113)$$