Lösungen – Rekfikonsübungen

1. Lineare Glg. / Gleichungssysteme / Fkt. / Opt.

1 a.) $x - \frac{2x-5}{4} = \frac{2x+15}{9} + \frac{4x-9}{12}$ | Nenner weg!

$12x - 3(2x-5) = 4\left(\frac{2x+15}{3}\right) + 4x - 9$ | $\cdot 12$ | $:3$

$36x - 9(2x-5) = 4(2x+15) + 3(4x-9)$ | TU

$36x - 18x + 45 = 8x + 60 + 12x - 27$

$18x + 45 = 20x + 33$

$12 = 2x$

$\underline{x = 6}$

b.) $2x^2 - 10x - (x^2 - 10x + 25) = x^2 - 20x + 100 + 20x - 125$

$2x^2 - 10x - x^2 + 10x - 25 = x^2 - 25$

$0 = 0$ ✓ $\underline{\mathbb{L} = \mathbb{R}}$

2 a.) $ax + 2a = 7$

$ax = 7 - 2a$

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

b.) $rx - px = -1$

$x(r-p) = -1$

$\underline{\underline{x = \frac{-1}{r-p} = \frac{1}{p-r}}}$

c) $px - 2x + p - 2 = 2px$

$p - 2 = px + 2x$

$p - 2 = x(p+2)$

$\underline{\underline{x = \frac{p-2}{p+2}}}$

3a. $x = -y$ einsetzen: $-5y - 7y + 9 = 0$

$9 = 12y \quad y = \frac{3}{4}$

$x = -\frac{3}{4}$ $\quad \underline{\mathbb{L} = \{(-\frac{3}{4} / \frac{3}{4})\}}$

b. $8x - 7y = 38$

$-(3x - 7y = 23)$ Additionsverfahren

$5x = 15$

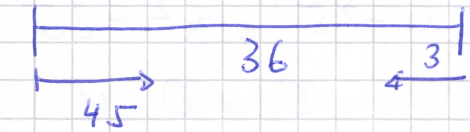
$x = 3 \qquad 7y = 8 \cdot 3 - 38 \Rightarrow y = -2$

$\underline{\mathbb{L} = \{(3 / -2)\}}$

4. $\alpha, \beta, \gamma \qquad \alpha : \beta = 2 : 3 \qquad \gamma = \frac{\alpha + \beta}{2}$

$\alpha = \frac{2}{3}\beta$

$180° = \alpha + \beta + \gamma = \frac{2}{3}\beta + \beta + \frac{\frac{2}{3}\beta + \beta}{2}$

5. 

$s = v \cdot t$

$36 = (45 + 3) \cdot t$

6. $\left| \begin{array}{l} x + y = 100 \\ x - 10 = 3(y - 10) \end{array} \right| \rightarrow \left| \begin{array}{l} x = 100 - y \\ x = 3y - 20 \end{array} \right|$

Gleichsetzen: $100 - y = 3y - 20$

$120 = 4y \qquad \underline{y = 30\,\text{J},\ x = 70\,\text{J}}$

7. $y = mx + b \qquad m = -3$

$2 = (-3)(-3) + b \Rightarrow b = -7 \qquad \underline{y = -3x - 7}$

8. parallel: dieselbe Steigung $m = 3$

$-5 = 3(-2) + b \Rightarrow b = 1 \qquad \underline{y = 3x + 1}$

$m = \tan\alpha$

$3 = \tan\alpha \Rightarrow \alpha = \tan^{-1}(3) = \underline{71{,}57°}$

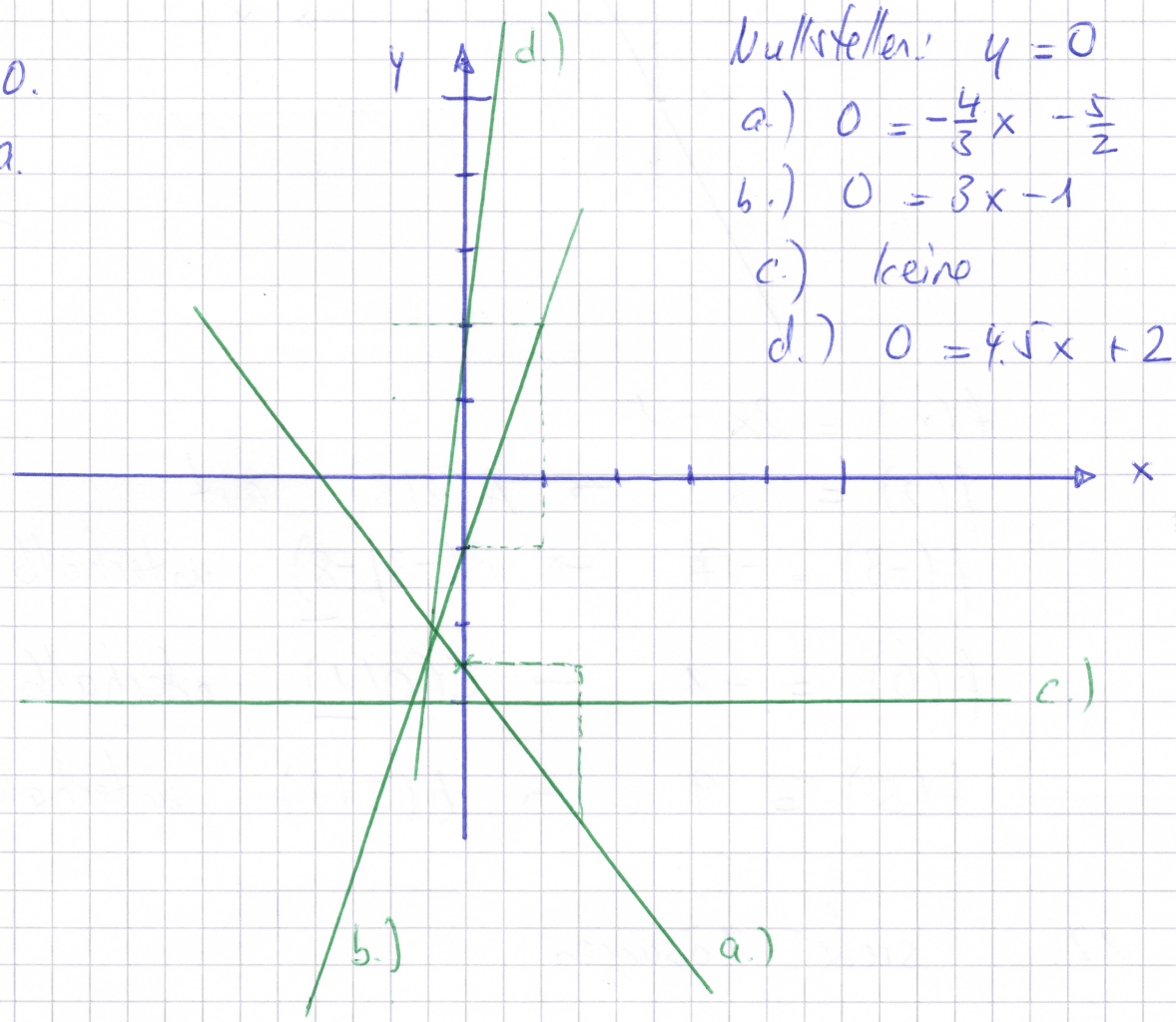
9. $m = \frac{\Delta y}{\Delta x} = \frac{-1-(-7)}{6-(-3)} = \frac{6}{9} = \frac{2}{3}$

$Q(6|-1)$: $-1 = \frac{2}{3} \cdot 6 + b \Rightarrow b = 3$

$y = \frac{2}{3}x + 3$

10.

a.



Nullstellen: $y = 0$

a.) $0 = -\frac{4}{3}x - \frac{5}{2}$

b.) $0 = 3x - 1$

c.) keine

d.) $0 = 4.5x + 2$

b. Schnittpunkt: gleichsetzen $y_1 = y_2$

$-\frac{4}{3}x - \frac{5}{2} = 4.5x + 2$

$-4.5 = 5.83x$

$x = -1.3$

$y = -3.83$ $S(-1.3|-3.83)$

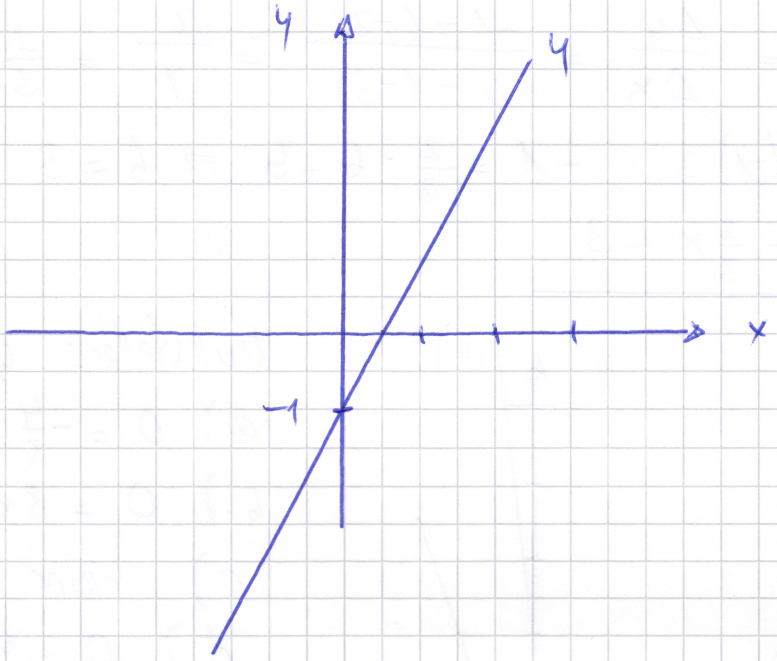
c. Schnittwinkel:

mit x-Achse $\alpha_1 = \tan^{-1}\left(-\frac{4}{3}\right) = 53.13°$

$\alpha_2 = \tan^{-1}(4.5) = 77.47°$

$\alpha = \alpha_1 + \alpha_2 = 130.6°$

11.



$f(x) = 2x - 1$

$f(2) = 3 \rightarrow A(2|3)$ auf

$f(-3) = -7 \rightarrow B(-3|\underline{-8})$ unterhalb

$f(0) = -1 \rightarrow C(0|\underline{1})$ oberhalb

$f(5) = 9 \rightarrow D(5|7)$ unterhalb

12. siehe Lösungen