

Langfristige HA - Lineare Gleichungssysteme

Lösungen

1. a) I $x = y + 2$
II $3x - 2y = 9$

I in II: $3(y+2) - 2y = 9$
 $3y + 6 - 2y = 9$
 $y + 6 = 9$
 $y = 3$
 $x = y + 2$
 $x = 5$
 $L = \{(5; 3)\}$

b) I $3x + 7y = 4$
II $5x - 7y = 44$

$$8x = 48$$
$$x = 6$$
$$3x + 7y = 4$$
$$3 \cdot 6 + 7y = 4$$
$$7y = -14$$
$$y = -2$$
 $L = \{(6; -2)\}$

c) I $y = 9x - 13$
II $y = 8x - 11$

I=II: $9x - 13 = 8x - 11$
 $x = 2$
 $y = 9x - 13$
 $y = 18 - 13$
 $y = 5$
 $L = \{(2; 5)\}$

d) I $y = 11 - 2x$
II $5x - 4y = 8$

I in II: $5x - 4(11 - 2x) = 8$
 $5x - 44 + 8x = 8$
 $13x = 52$
 $x = 4$
 $y = 11 - 2x$
 $y = 3$
 $L = \{(4; 3)\}$

e) I $-3x + 9y = 36$
II $3x + 2y = 30$

$$11y = 66$$
$$y = 6$$
$$3x + 2y = 30$$
$$3x = 18$$
$$x = 6$$
 $L = \{(6; 6)\}$

f) I $5x - 2y = -8$
II $6x - 7y = 41$

I' $5x - 2y = -8$
 $5x = 2y - 8 \quad | :5$
 $x = 0,4y - 1,6$
 $6(0,4y - 1,6) - 7y = 41$
 $2,4y - 9,6 - 7y = 41$
 $-4,6y = 50,6$
 $y = -11$
 $x = -6$
 $L = \{(-6; -11)\}$

$$\begin{array}{l}
 \text{g) I} \quad x + 6y = 13 \\
 \text{II} \quad x + 5y = 12 \\
 \hline
 \quad \quad y = 1 \\
 \quad \quad x + 6 \cdot 1 = 13 \\
 \quad \quad \quad \quad x = 7 \\
 \underline{\underline{L = \{(7; 1)\}}}
 \end{array}$$

$$\begin{array}{l}
 \text{h) I} \quad 3x + y = 15 \rightarrow y = 15 - 3x \\
 \text{II} \quad 4x + 7y = 71 \\
 \quad \quad 4x + 7(15 - 3x) = 71 \\
 \quad \quad 4x + 105 - 21x = 71 \\
 \quad \quad \quad \quad -17x = -34 \\
 \quad \quad \quad \quad \quad \quad \quad \quad x = 2 \\
 \underline{\underline{L = \{(2; 9)\}}} \quad \underline{\underline{y = 9}}
 \end{array}$$

$$\begin{array}{l}
 \text{i) I} \quad 7x + 4y = 67 \\
 \text{II} \quad -2x - 4y = -42 \\
 \hline
 \quad \quad 5x = 25 \\
 \quad \quad \quad \quad x = 5 \\
 \quad \quad 7 \cdot 5 + 4y = 67 \\
 \quad \quad \quad \quad 4y = 32 \\
 \underline{\underline{L = \{(5; 8)\}}} \quad \underline{\underline{y = 8}}
 \end{array}$$

$$\begin{array}{l}
 \text{j) I} \quad 8x + y = 17 \\
 \text{II} \quad 2x + y = 5 \\
 \hline
 \quad \quad 6x = 12 \\
 \quad \quad \quad \quad x = 2 \\
 \quad \quad 8 \cdot 2 + y = 17 \\
 \quad \quad \quad \quad y = 1 \\
 \underline{\underline{L = \{(2; 1)\}}}
 \end{array}$$

$$\begin{array}{l}
 \text{2. a) I} \quad y = x - 1 \\
 \text{II} \quad y = -x + 3 \\
 \underline{\underline{L = \{(2; 1)\}}}
 \end{array}$$

$$\begin{array}{l}
 \text{b) I} \quad y = 2x + 2 \\
 \text{II} \quad y = \frac{1}{2}x - 1 \\
 \underline{\underline{L = \{(-2; -2)\}}}
 \end{array}$$

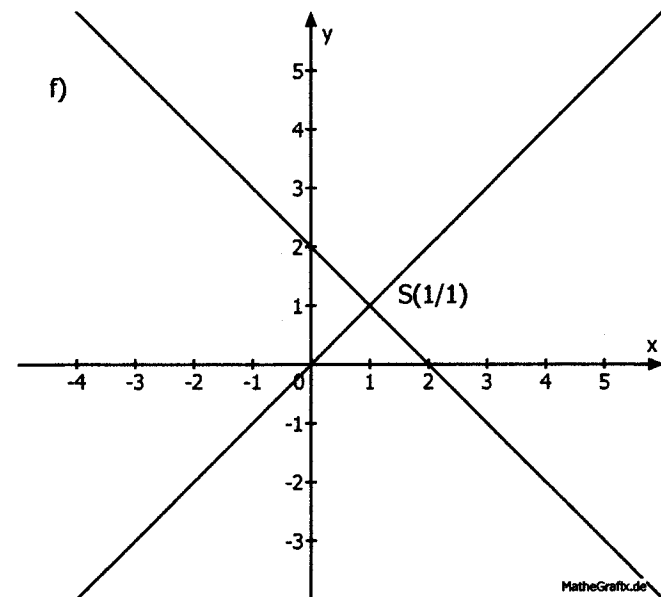
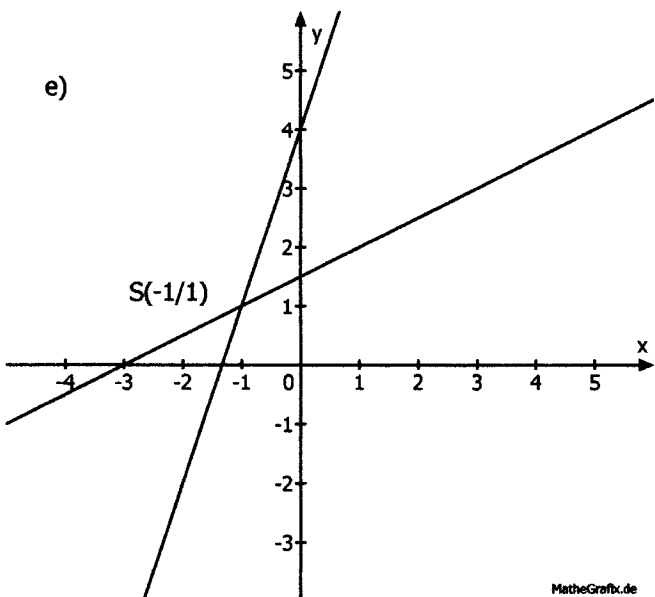
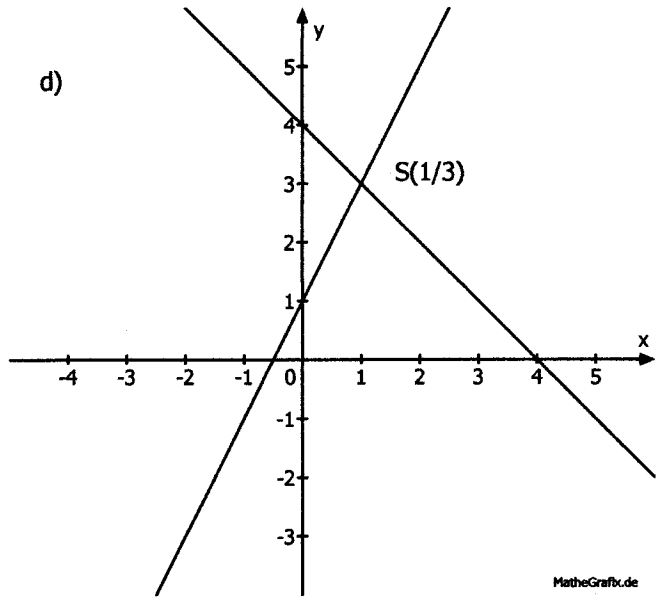
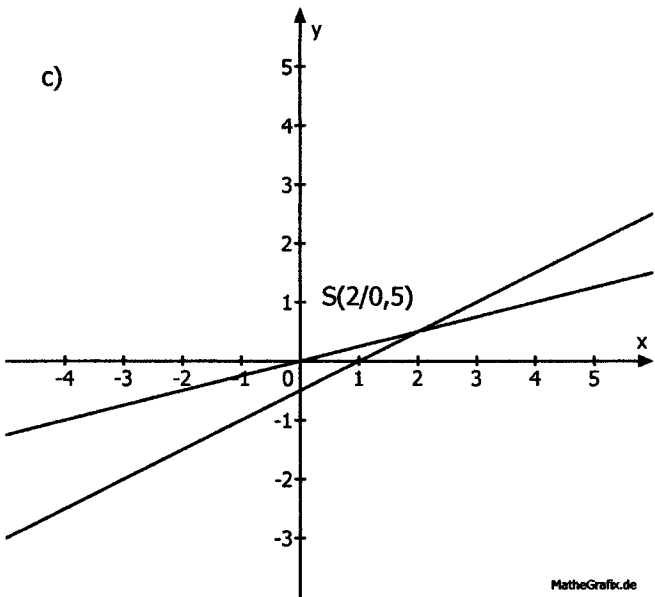
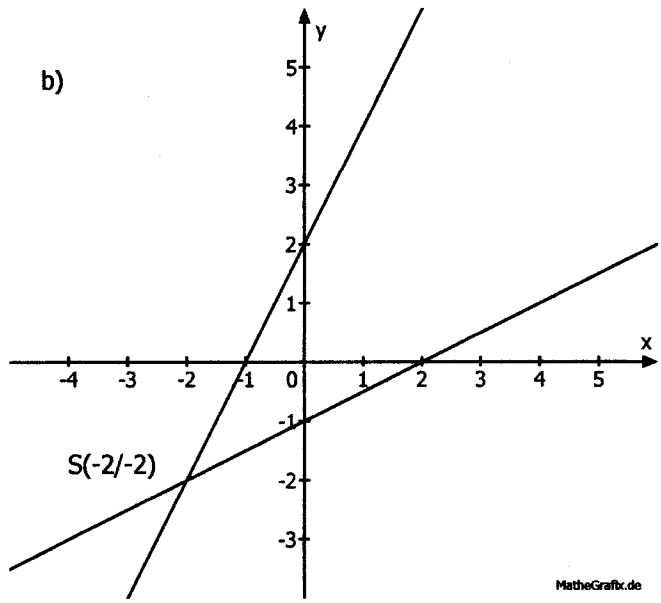
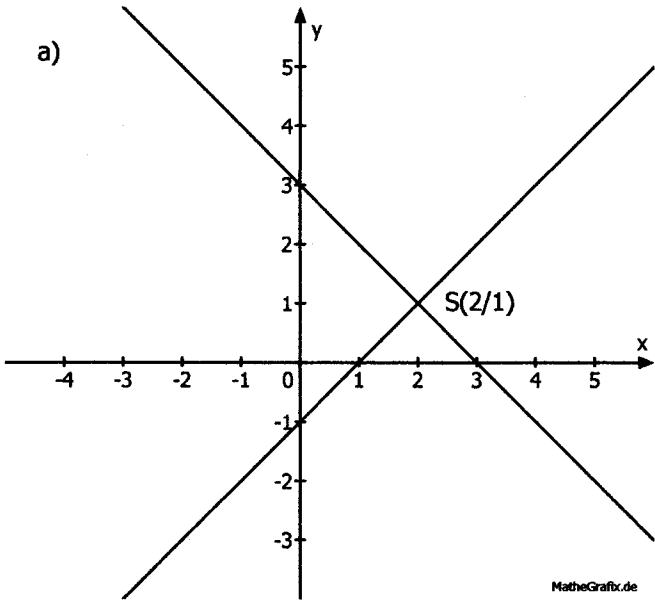
$$\begin{array}{l}
 \text{c) I} \quad y = 0,5x - 0,5 \\
 \text{II} \quad y = -\frac{1}{4}x + 1 \\
 \underline{\underline{L = \{(2; 0,5)\}}}
 \end{array}$$

$$\begin{array}{l}
 \text{d) I} \quad y = -x + 4 \\
 \text{II} \quad y = 2x + 1 \\
 \underline{\underline{L = \{(1; 3)\}}}
 \end{array}$$

$$\begin{array}{l}
 \text{e) I} \quad y = 3x + 4 \\
 \text{II} \quad y = \frac{1}{2}x + 1,5 \\
 \underline{\underline{L = \{(-1; 1)\}}}
 \end{array}$$

$$\begin{array}{l}
 \text{f) I} \quad y = x \\
 \text{II} \quad y = -x + 2 \\
 \underline{\underline{L = \{(1; 1)\}}}
 \end{array}$$

Zu 2.



$$3. \quad \text{I} \quad x + y = 12$$

$$\text{II} \quad x - y = 20$$

$$2x = 32$$

$$16 + y = 12$$

$$\underline{\underline{x = 16}}$$

$$\underline{\underline{y = -4}}$$

Die Zahlen heißen 16 und -4.

$$4. \quad \text{I} \quad x + y = 18 \quad \rightarrow \quad y = 18 - x$$

$$\text{II} \quad 0,5x + 0,4y = 8$$

$$\text{I in II: } 0,5x + 0,4(18 - x) = 8$$

$$0,5x + 7,2 - 0,4x = 8$$

$$y = 18 - x$$

$$0,1x = 0,8$$

$$y = 18 - 8$$

$$\underline{\underline{x = 8}}$$

$$\underline{\underline{y = 10}}$$

Es befinden sich 8 Kisten zu 0,5t und 10 Kisten zu 0,4t auf dem LKW.

$$5. \quad \text{I} \quad x + y = 6 \quad \rightarrow \quad y = 6 - x$$

$$\text{II} \quad 4x - 2y = 12$$

$$\text{I in II: } 4x - 2(6 - x) = 12$$

$$4x - 12 + 2x = 12$$

$$y = 6 - x$$

$$6x = 24$$

$$y = 6 - 4$$

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

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

Die Zahlen heißen 4 und 2.

$$\text{Pr.: } \text{I} \quad 4 + 2 = 6$$

$$6 = 6$$

$$\text{II} \quad 4 \cdot 4 - 2 \cdot 2 = 12$$

$$16 - 4 = 12$$

$$12 = 12$$

$$6. \quad \text{I} \quad x + y = 32 \quad \rightarrow \quad y = 32 - x$$

$$\text{II} \quad 24x + 30y = 840$$

$$\text{I in II: } 24x + 30(32 - x) = 840$$

$$24x + 960 - 30x = 840$$

$$-6x = -120$$

$$\underline{\underline{x = 20}}$$

$$y = 32 - x$$

$$y = 32 - 20$$

$$\underline{\underline{y = 12}}$$

Es sind 20 Waggons zu 24t und 12 Waggons zu 30t.

$$\text{Pr.: } \text{I} \quad 20 + 12 = 32$$

$$32 = 32$$

$$\text{II} \quad 24 \cdot 20 + 30 \cdot 12 = 840$$

$$480 + 360 = 840$$

$$840 = 840$$

$$7. \quad \text{I} \quad x + y = 12 \quad \rightarrow \quad y = 12 - x$$

$$\text{II} \quad 4x + 6y = 58$$

$$\text{I in II: } 4x + 6(12 - x) = 58$$

$$4x + 72 - 6x = 58$$

$$-2x = -14$$

$$\underline{\underline{x = 7}}$$

$$y = 12 - x$$

$$y = 12 - 7$$

$$\underline{\underline{y = 5}}$$

Es sind 7 Vierertische und 5 Sechsertische.

$$\text{Pr.: } \text{I} \quad 7 + 5 = 12$$

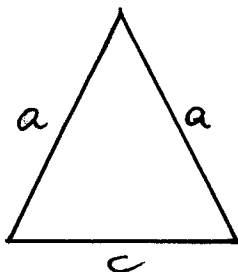
$$12 = 12$$

$$\text{II} \quad 4 \cdot 7 + 6 \cdot 5 = 58$$

$$28 + 30 = 58$$

$$58 = 58$$

8.



$$\text{I} \quad 2a + c = 32$$

$$\text{II} \quad a = c + 4$$

$$\text{II in I: } 2(c + 4) + c = 32$$

$$2c + 8 + c = 32$$

$$3c = 24$$

$$\underline{\underline{c = 8}}$$

$$a = c + 4$$

$$\underline{\underline{a = 12}}$$

Die Schenkel sind 12cm lang
und die Basis 8cm.

$$9. \quad \text{I} \quad x - y = 9 \quad \Rightarrow \quad x = 9 + y$$

$$\text{II} \quad 2x + 5y = 39$$

$$\text{I in II:} \quad 2(9+y) + 5y = 39$$

$$18 + 2y + 5y = 39$$

$$7y = 21$$

$$\underline{y = 3}$$

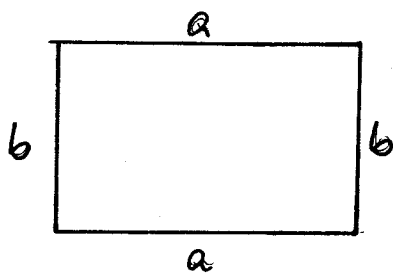
$$x = 9 + y$$

$$x = 9 + 3$$

$$\underline{x = 12}$$

Die Zahlen heißen 12 und 3.

10.



$$\text{I} \quad 2a + 2b = 40$$

$$\text{II} \quad 4a + 2b = 64$$

$$-2a \quad = -24$$

$$\underline{a = 12}$$

$$2 \cdot 12 + 2b = 40$$

$$2b = 16$$

$$\underline{b = 8}$$

Das alte Rechteck war
12 cm lang und 8 cm
breit.