

TBM 4, 16.4.13

①

a) $4x + 14y - 5 = 0$

$$14y = -4x + 5$$

$$y = -\frac{2}{7}x + \frac{5}{14}$$

$$\mathbb{L} = \left\{ (x \mid -\frac{2}{7}x + \frac{5}{14}) \right\}$$

$$\frac{-(4x-5)}{14}$$

b)

$$3a - 5b + 7c = 13$$

$$7c = -3a + 5b + 13$$

$$c = -\frac{3}{7}a + \frac{5}{7}b + \frac{13}{7}$$

$$\mathbb{L} = \left\{ (a \mid b \mid -\frac{3}{7}a + \frac{5}{7}b + \frac{13}{7}) \right\}$$

$$\frac{-(3a-5b-13)}{7}$$

c)

$$\begin{array}{|l} x - y + z - 3 = 0 \\ x + y - 3z + 9 = 0 \end{array}$$

$$2x + 2z + 6 = 0 \quad | :2$$

$$2y - 4z + 12 = 0$$

$$\underline{x - z + 3 = 0} \Rightarrow z = x + 3$$

$$x - y + z - 3 = 0$$

$$x - y + x + 3 - 3 = 0$$

$$2x - y = 0$$

$$y = 2x$$

$$y = 2x; x = \frac{y}{2}$$

$$\left\{ \left(\frac{y}{2} \mid y \mid \frac{y+6}{2} \right) \right\}$$

$$\mathbb{L} = \left\{ (x \mid 2x \mid x+3) \right\}$$

$$\{(2-3, 2z-6, z)\}$$

②

Zahl: xy ; x, y sind Ziffern $0, 1, \dots, 9$

$$10x + y = 10y + x + 63$$

$$9x - 9y = 63 \quad | : 9$$

$$\underline{x - y = 7} \quad \longrightarrow \quad y = x - 7$$

$$\frac{10x + y}{10y + x} = 4 \text{ R } 9$$

$$10x + y = 4(10y + x) + 9$$

$$10x + y = 40y + 4x + 9$$

$$\underline{6x - 39y = 9}$$

$$6x - 39(x - 7) = 9$$

$$6x - 39x + 273 = 9$$

$$264 = 33x$$

$$x = 8, y = 1$$

Zahl: 81 resp. 18

③

$$x \cdot 45 + y \cdot 85 = 10 \cdot 60$$

$$x + y = 10$$

$$x = \frac{25}{4} = \underline{\underline{6.25 \text{ L}}} \quad (45\%)$$

$$y = \frac{15}{4} = \underline{\underline{3.75 \text{ L}}} \quad (85\%)$$

④

A, B, C : Pumpleistung in "Becken pro Zeit";

Bsp.: Füllzeit 10h \Rightarrow $\frac{1}{10}$ Becken pro Stunde

$$4A + 4B = 1$$

$$3A + 3C = 1$$

$$\frac{12}{5}B + \frac{12}{5}C = 1$$

$$\frac{24}{60} = \frac{2}{5}$$

$$\frac{12}{5} \text{ h}$$

$$A + B = \frac{1}{4}$$

$$A + C = \frac{1}{3}$$

$$B + C = \frac{5}{12}$$

$$A = \frac{1}{12} \rightarrow 12 \text{ h}$$

$$B = \frac{1}{6} \rightarrow 6 \text{ h}$$

$$C = \frac{1}{4} \rightarrow 4 \text{ h}$$

5 Halbe Dist.: 1.25 km Rückstand

Ziel: doppelt so viel, also 2.5 km

Diese läuft er in 10 Minuten

$$\Rightarrow \frac{2.5 \text{ km}}{1/6 \text{ h}} = \underline{\underline{15 \text{ km/h}}}$$

$$\text{Zeit: } \frac{40}{15} = \frac{8}{3} \rightarrow 2 \text{ h } 40'$$

d.h. der schnellere hat 2h 30' für 40 km

$$V = \frac{40}{2.5} = \frac{80}{5} = \frac{160}{10} = \underline{\underline{16 \text{ km/h}}}$$

6 Konzentrationen: x, y , wobei $y = 2x$

$$0.6 \cdot x + 0.4 \cdot y = 1.28$$

$$2x - y = 0$$

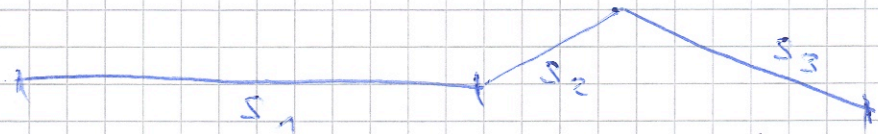
$$\underline{\underline{x: 20\% \quad y: 40\%}}$$

⑦ auf: 15 km/h
 gerade: 20 km/h
 ab: 40 km/h

$$S = v \cdot t$$

$$t = \frac{S}{v}$$

Strecken S_1, S_2, S_3 ; $S_1 + S_2 + S_3 = 100$



$$\begin{cases} \frac{S_1}{20} + \frac{S_2}{15} + \frac{S_3}{40} = \frac{31}{6} \\ \frac{S_1}{20} + \frac{S_2}{40} + \frac{S_3}{15} = 4.5 \\ S_1 + S_2 + S_3 = 100 \end{cases}$$

$S_1 = 60 \text{ km}, S_2 = 28 \text{ km}, S_3 = 12 \text{ km}$

⑧ V_S, V_L, V_R V für schwimmen, laufen, radfahren

3.8 km schwimmen, 42.2 km laufen, 180 km radeln

$$V_R = 10 \cdot V_S$$

$$V_L = 3.5 \cdot V_S$$

$$\frac{3.8}{V_S} + \frac{42.2}{V_L} + \frac{180}{V_R} = 10$$

$$\frac{3.8}{V_S} + \frac{42.2}{3.5 V_S} + \frac{180}{10 V_S} = 10 \quad | \cdot V_S$$

$$3.8 + \frac{42.2}{3.5} + 18 = 10 V_S$$

$$V_L = 11.85 \text{ km/h}, V_R = 33.86 / V_S = 3.3857 \text{ km/h}$$

7

9

$$A = l \cdot b$$

$$(l+4)(b+4) = A+70$$

$$l(b+4) = A+34$$

$$lb + 4l + 4b + 16 = A + 70 ; lb = A$$

$$A + 4l + 4b + 16 = A + 70$$

$$4l + 4b = 54$$

$$l + b = 13.5$$

$$lb + 4l = A + 34 ; A = lb$$

$$A + 4l = A + 34$$

$$4l = 34$$

$$l = 8.5, b = 5$$

$$L = \{(8.5\text{cm}/5\text{cm})\}$$