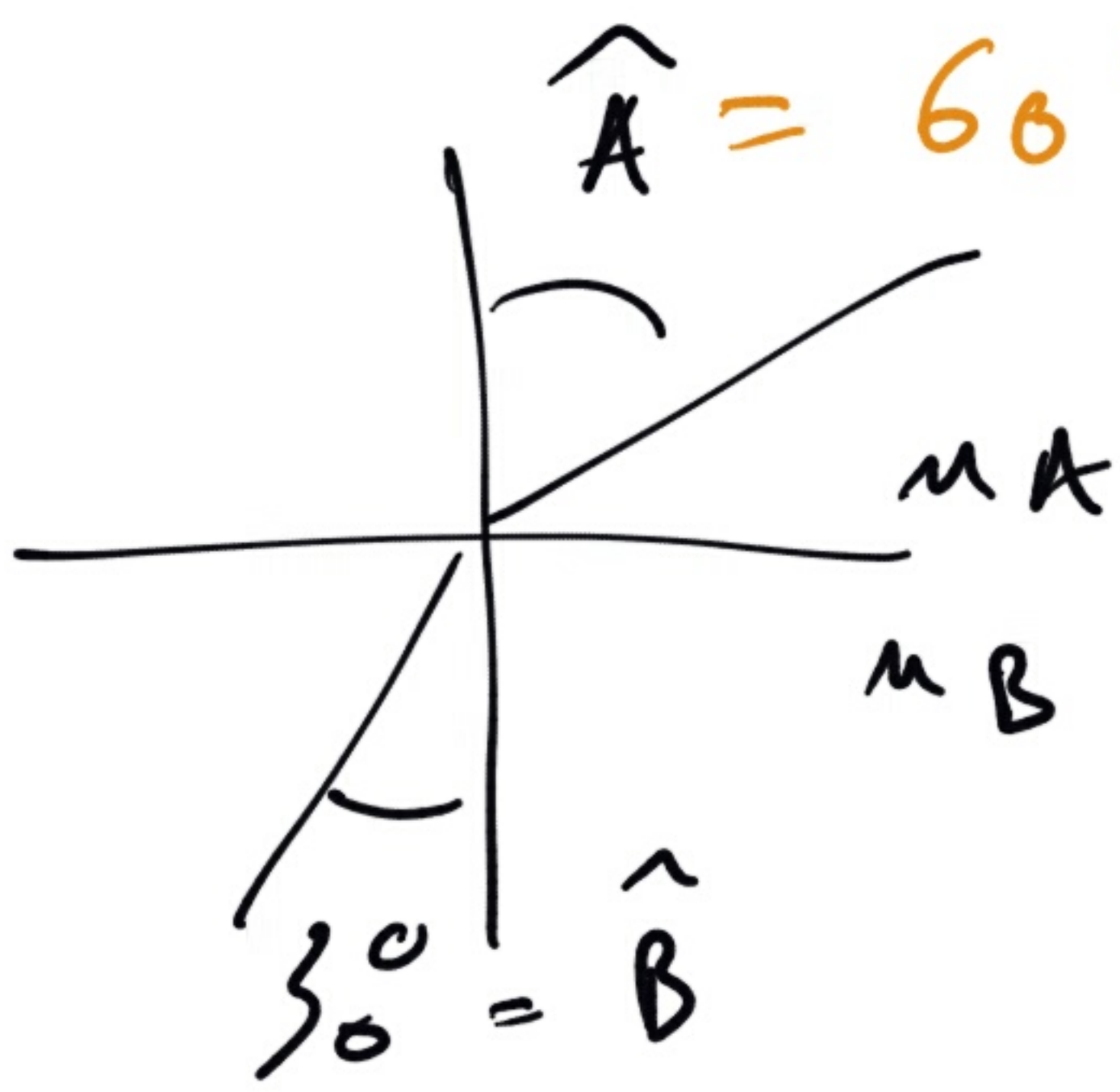


①



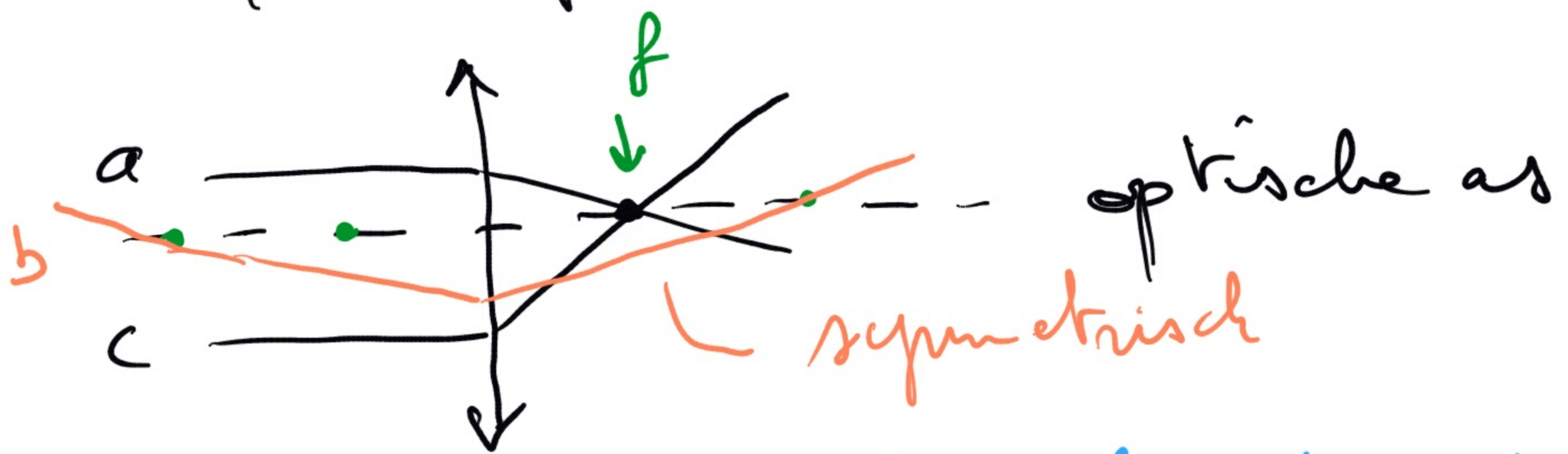
$$\mu_A \cdot \sin \hat{A} = \mu_B \cdot \sin \hat{B}$$

$$1 \cdot \sin \hat{A} = \sqrt{3} \cdot \frac{1}{2}$$

$$\Rightarrow \hat{A} = 60^\circ$$

C

② a en c \Rightarrow vallen in evenwijdig en gaan bijgevolg door het brandpunt f



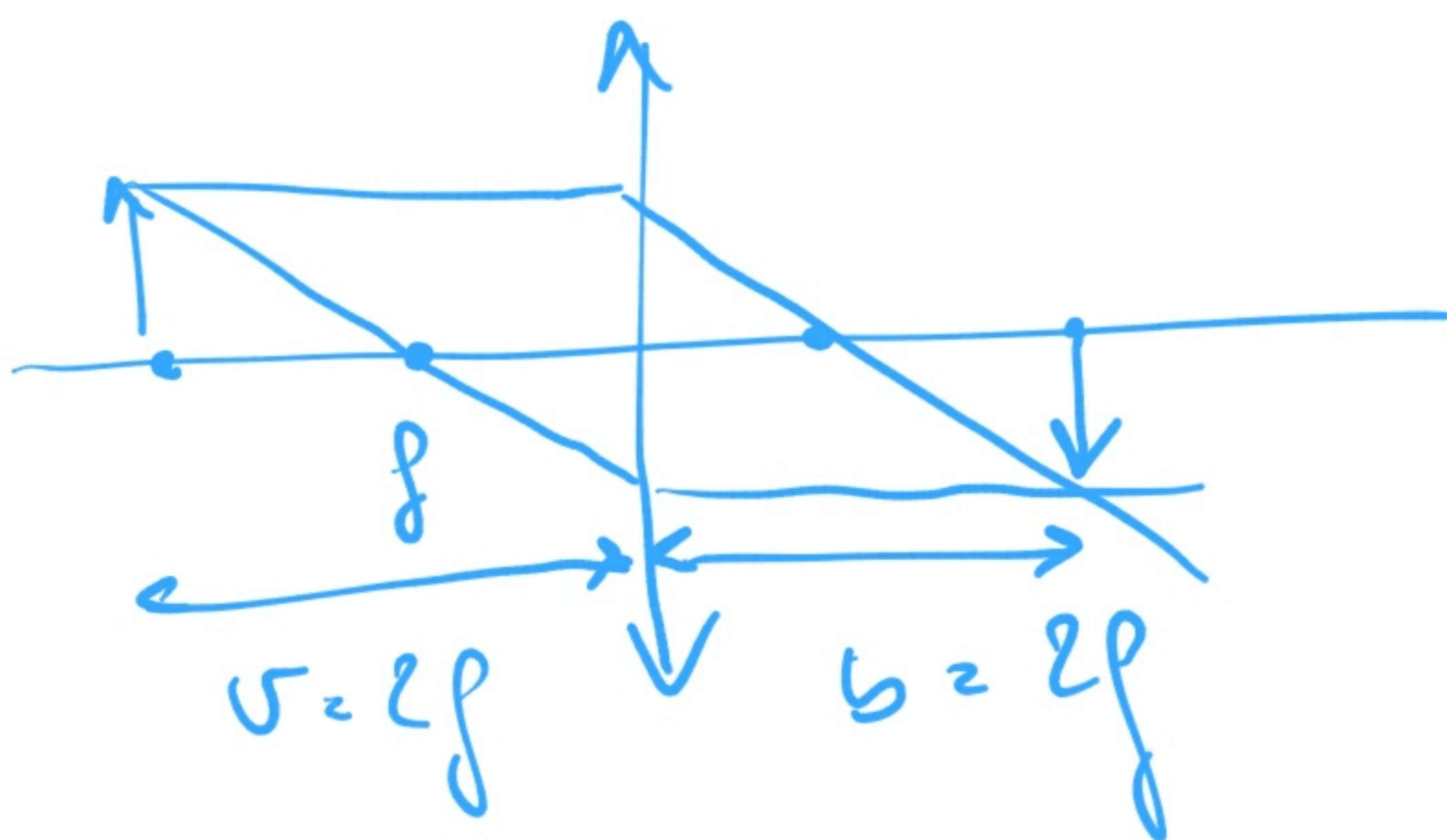
lensmakers formule: $\frac{1}{v} + \frac{1}{b} = \frac{1}{f}$

\Rightarrow Straal b start ongeveer op $2 \cdot f$ op de tekening: $v = 2f$

$$\frac{1}{2f} + \frac{1}{b} = \frac{1}{f} \Rightarrow \frac{1}{b} = \frac{1}{f} - \frac{1}{2f} = \frac{1}{2f}$$

of afstand $b = 2f$

(R)



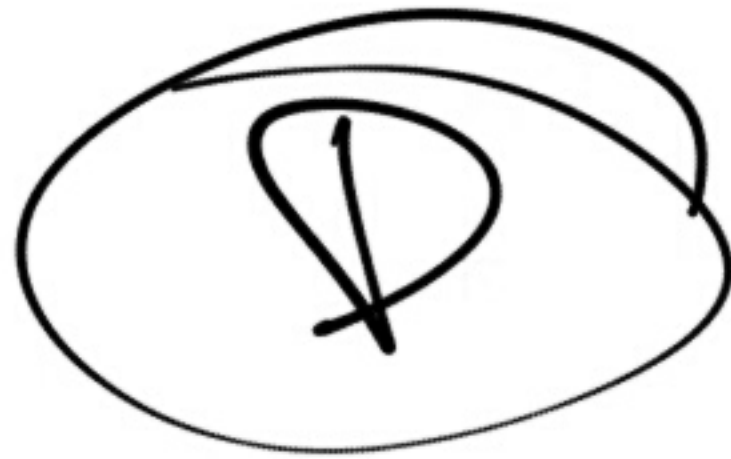
③ Wassertiefe ($q = 10^4 \text{ N/m}^2$, $\rho_{\text{H}_2\text{O}} = 1000 \text{ kg/m}^3$)

$$= \rho \cdot q \cdot h = 1000 \cdot 10 \cdot (40 + 10) \cdot 10^{-2}$$

$$= 10^3 \cdot 500 \cdot 10^{-2} = 5000 \text{ Pa} = 5 \text{ bar}$$

Luftdruck = 100 bar

$$\text{Summe: } 100 + 5 = 105 \text{ bar}$$



④

$$\frac{p_1 V_1}{T_1} = \frac{p_2 V_2}{T_2}$$

$$\Rightarrow T_2 = \frac{p_2 V_2}{p_1 V_1} \cdot T_1$$

grafiek bij $V = 100$

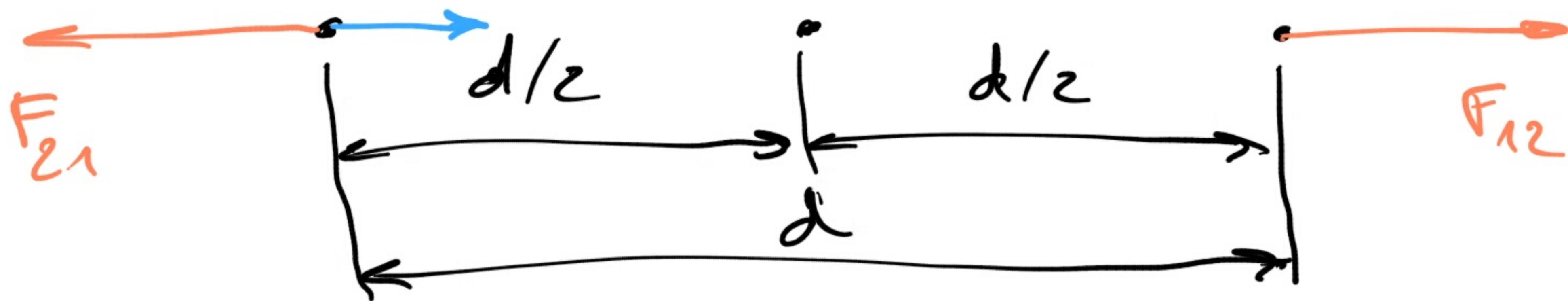
$$T_2 = \frac{100 \cdot 400}{100 \cdot 200} \cdot 293$$

$$= 2 \cdot 293 = 586 \text{ K}$$

C

5

$$Q_1 \quad F_{31} = \frac{1}{2} F_{21} \quad Q_3$$



$$F_{31} = -\frac{1}{2} F_{21} \quad \text{want } Q = \frac{1}{2} F_{21}$$

$$F_{21} = \frac{Q_1 Q_2}{4\pi\epsilon_0 d^2}$$

$$F_{31} = \frac{Q_1 Q_3}{4\pi\epsilon_0 \left(\frac{d}{2}\right)^2}$$

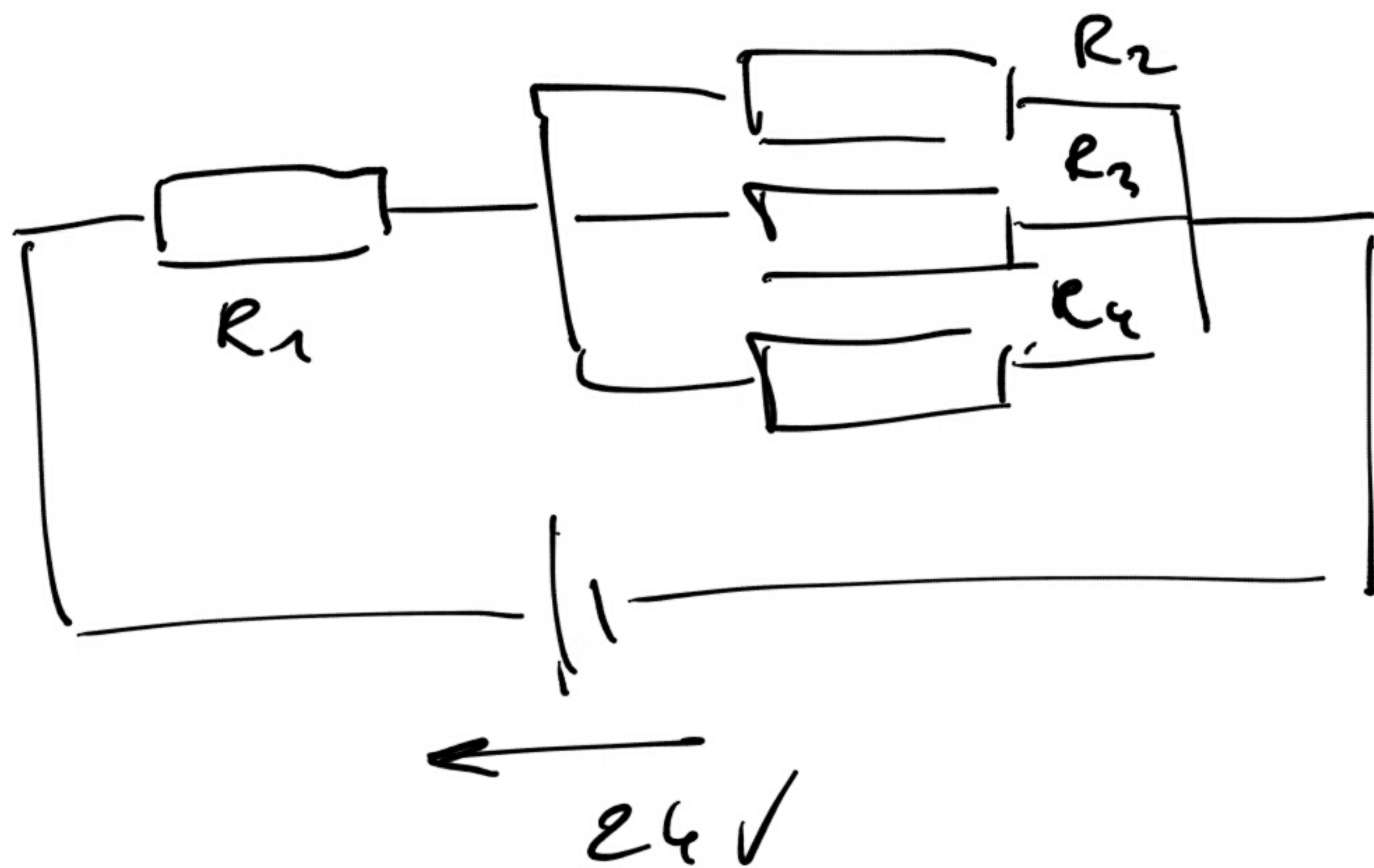
$$\frac{F_{31}}{F_{21}} = \frac{\frac{Q_1 Q_3}{4\pi\epsilon_0 \left(\frac{d}{2}\right)^2}}{\frac{Q_1 Q_2}{4\pi\epsilon_0 d^2}} = -\frac{1}{2}$$

$$\frac{\frac{Q_3}{1/4}}{Q_2} = \frac{4Q_3}{Q_2} = -\frac{1}{2}$$

$$\Rightarrow Q_3 = -\frac{Q_2}{8} = \frac{|Q|}{8}$$

D

⑥ $R = 200 \Omega$ (alle R), $U = 24V$



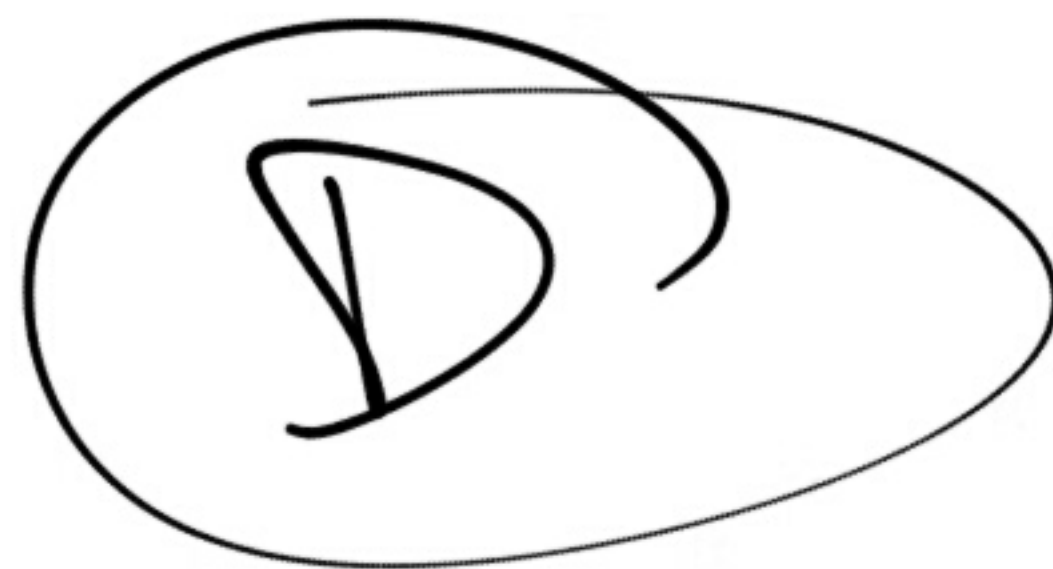
$$I = I_1 \quad I_4 = \frac{1}{3} I_1$$

$$R_{234} = \frac{1}{\frac{1}{200} + \frac{1}{200} + \frac{1}{200}} = \frac{200}{3} \Omega$$

$$U_{234} = I \cdot R_{234} = \frac{200}{3} \cdot I_1 = U_4$$

$$\frac{P_1}{P_4} = \frac{U_1 \cdot I_1}{U_4 \cdot I_4} = \frac{(\cancel{200} \cdot \cancel{I_1}) \cdot \cancel{I_1}}{(\frac{\cancel{200}}{3} \cdot \cancel{I_1}) \cdot \frac{\cancel{I_1}}{3}} = \frac{1}{\frac{1}{9}}$$

$$\frac{P_1}{P_4} = 9$$



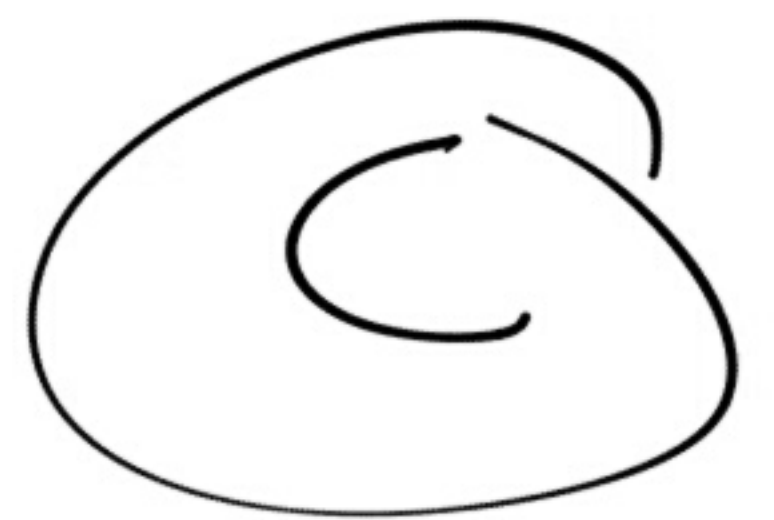
$$\textcircled{7} \quad \mu = 4\pi \cdot 10^{-7}$$

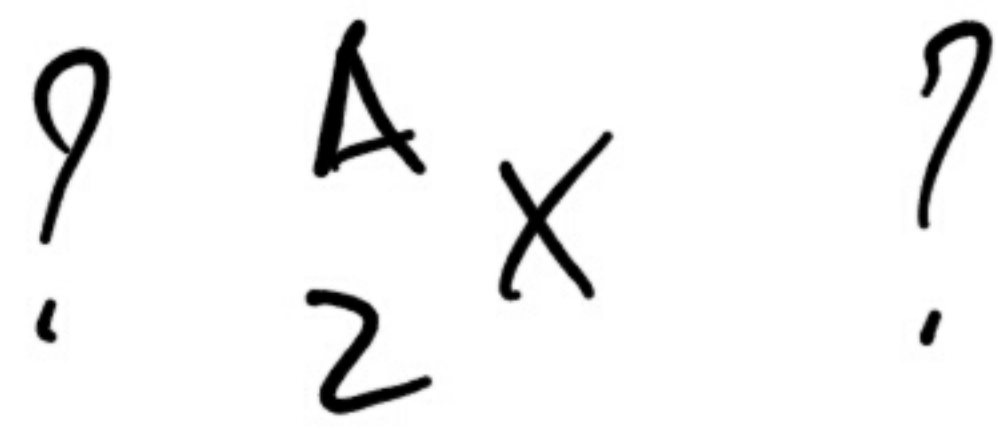
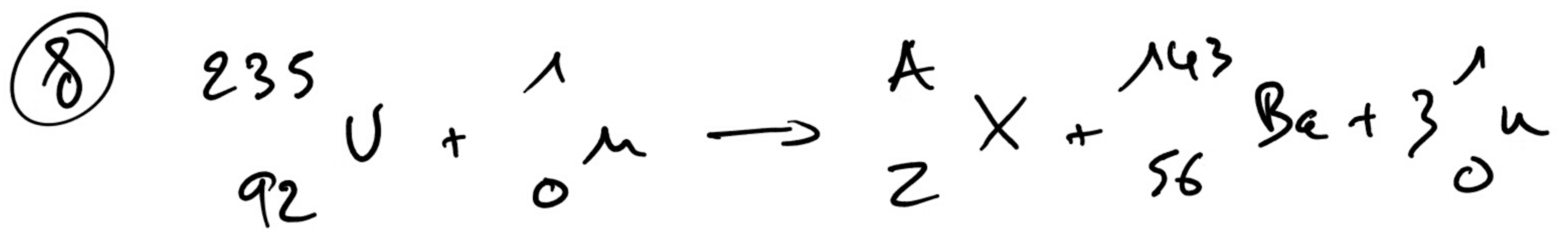
Wir gegeben $\rightarrow I = 4A$
 $B = 16\pi \cdot 10^{-3} T$

$$B = \mu \frac{N \cdot I}{l} \Rightarrow N = \frac{B \cdot l}{\mu \cdot I}$$

$$N = \frac{\cancel{16\pi} \cdot 10^{-3} \cdot 10 \cdot 10^{-2}}{\cancel{4\pi} \cdot 10^{-7} \cdot \cancel{4}} = \frac{10^{-3} \cdot 10^{-1}}{10^{-7}}$$

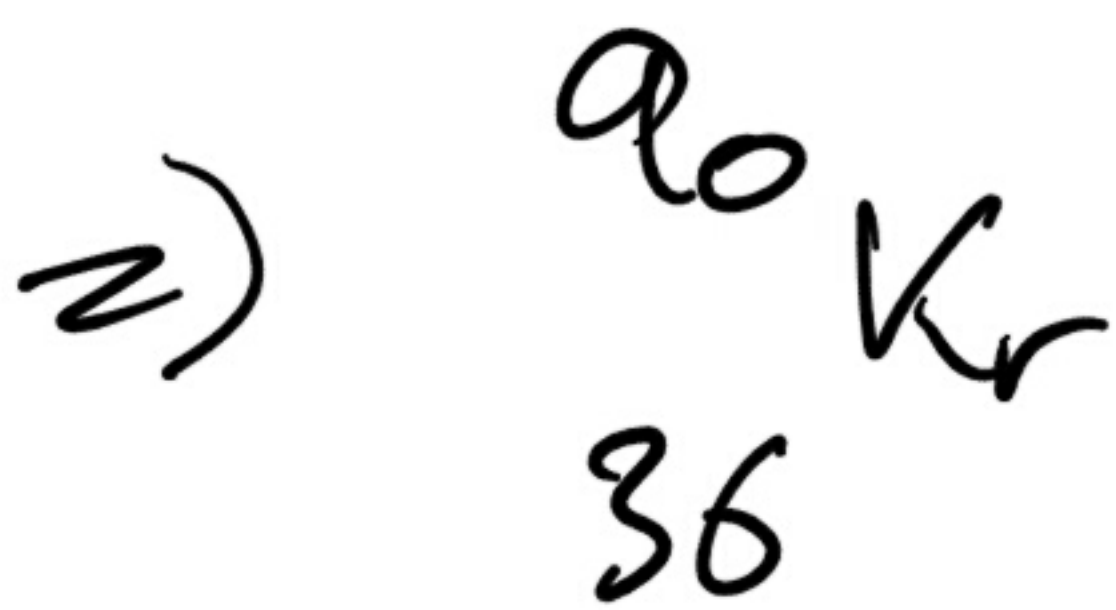
$$= \frac{1}{10^{-3}} = 10^3 = 1000$$





$$235 + 1 = A + 143 + 3 \cdot 1 \Rightarrow A = 90$$

$$92 + 0 = Z + 56 + 3 \cdot 0 \Rightarrow Z = 36$$



\textcircled{D}

⑨ Een paard verandert zijn rechtlijnige beweging.

$a = \text{constant}$

$$v = v_0 + a \cdot t$$

$$\Delta s - \Delta_0 = \int_0^t v dt = \int_0^t (v_0 + at) dt$$

\nearrow
 $= 0$

$$= v_0 \cdot t + \frac{1}{2} at^2$$

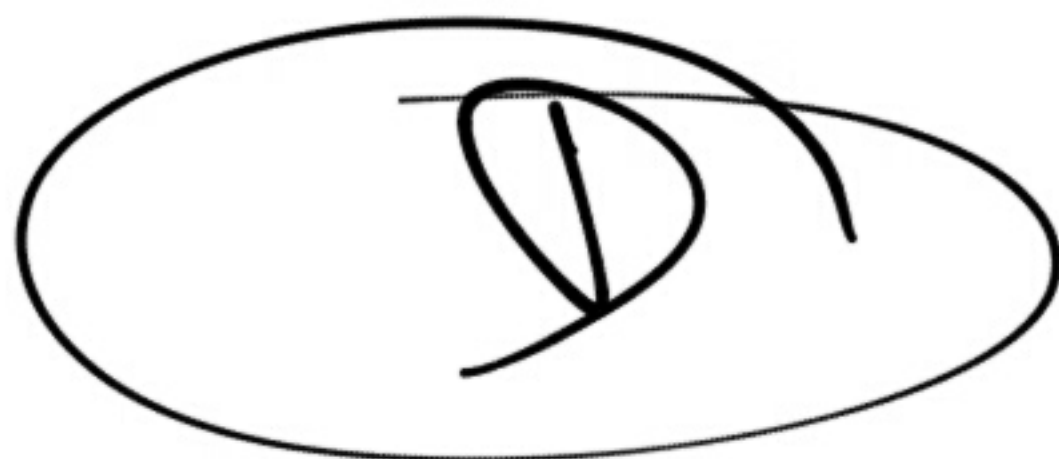
\nearrow
 $= 0$

$$\Delta = \frac{1}{2} at^2 \quad \text{na } 1s \Rightarrow 0,2 = \frac{1}{2} \cdot a \cdot 1^2$$
$$\Rightarrow a = 0,4 \text{ m/s}^2$$

$$\text{na } 3s \Rightarrow s = \frac{1}{2} \cdot 0,4 \cdot 3^2$$

$$= 0,2 \cdot 9$$

$$= 1,8 \text{ m}$$



10 $y(x, t) \rightarrow$ rechtslopend

$$v = 20 \text{ m/s}$$

$$T = \frac{\lambda}{v}$$

$$A \text{ en } B \rightarrow \lambda = 4 \text{ m} \rightarrow T = \frac{4}{20} = 0,2 \text{ s} \leftarrow$$

$$C \text{ en } D \rightarrow \lambda = 0,4 \text{ m} \rightarrow T = \frac{0,4}{20} = 0,02 \text{ s}$$

De golf verschuift naar rechts:

$$\text{per } 0,1 \text{ s} \rightarrow 2 \text{ m}$$

$$\text{per } 0,05 \text{ s} \rightarrow 1 \text{ m}$$

$$\text{na } 0,05 \text{ s} \rightarrow y = -1$$

B