Aufg. 4

(1) $C(t) = 5.0\ \text{mg/l} \cdot 2^{-\frac{t}{8\,\text{h}}}$ ← $t_0 = 0$

$C(t) = 0.1\ \text{mg/l}$

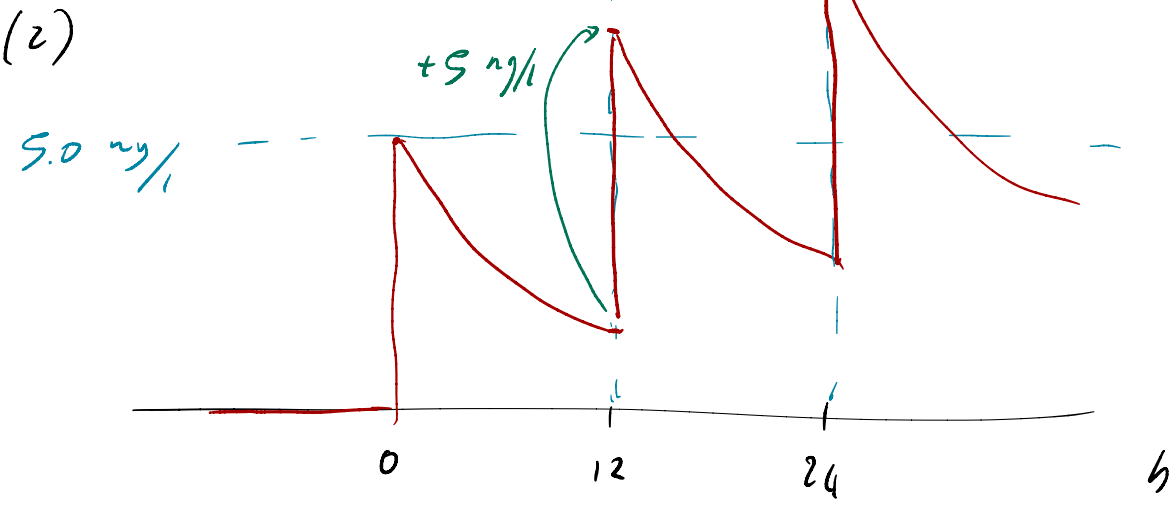
$0.1\ \text{mg/l} = 5.0\ \text{mg/l} \cdot 2^{-\frac{t}{8\,\text{h}}}$

$2^{\frac{t}{8\,\text{h}}} = \frac{5.0}{0.1}$ ← 50

$t = 8\,\text{h} \cdot \log_2 50 = 45.1508\ldots\ \text{h}$

$= 45\ \text{h}$

(2)

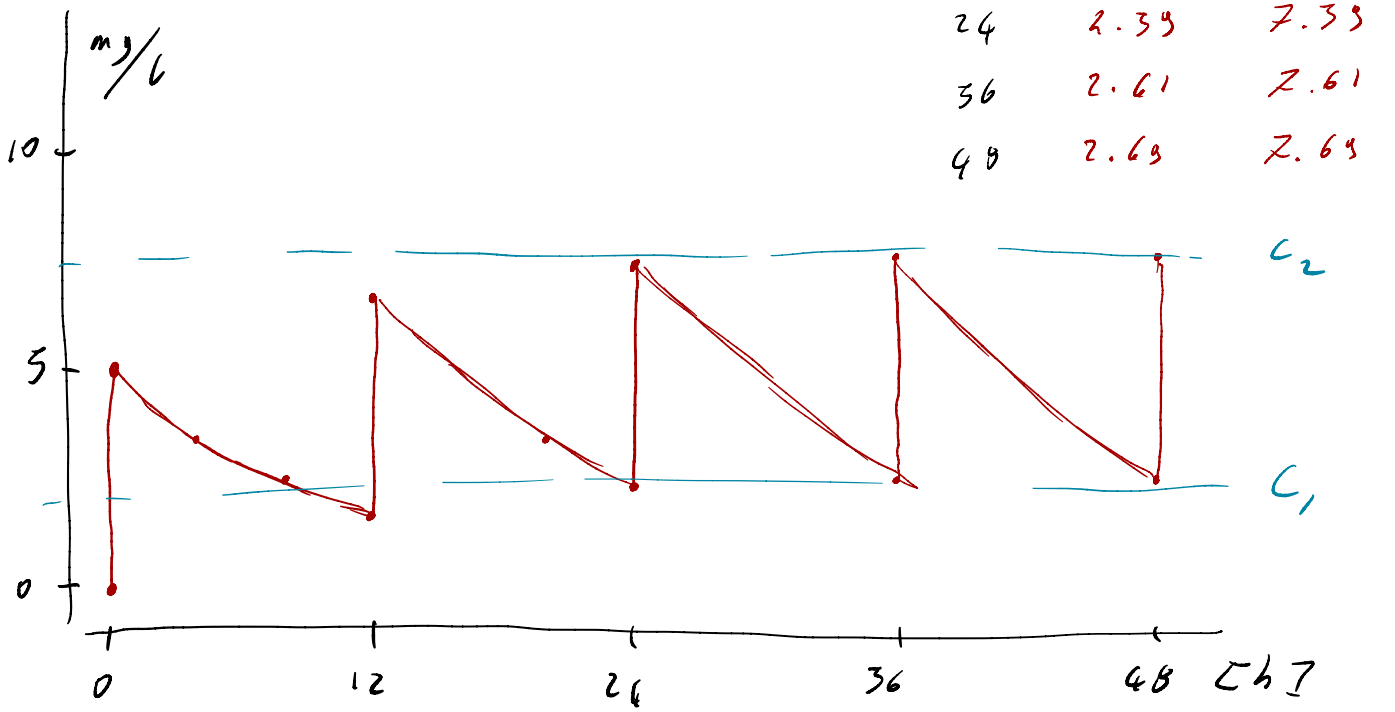


t [h]	prima [mg/L]		dopo la sonni [mg/L]
0	0	+5 →	5.0
12	1.77	·2 ← −1.5	6.77
24	2.39	+5 →	7.39
36	2.61	·2 ←	7.61
48	2.69		7.69

$5.0\ mg/L \xrightarrow{12\ h} 5.0\ mg/L \cdot 2 \cdot e^{-\frac{12\ h}{8\ h}}$

$e^{-\frac{12\ h}{8\ h}} = 0.3536..$

0	0	5.0
12	1.77	6.77
24	2.39	7.39
36	2.61	7.61
48	2.69	7.69



15) $\begin{cases} C_2 = C_1 + 5.0 \text{ mg/L} \\ C_1 = C_2 \cdot 2^{-1.5} \end{cases}$

$$C_2 = C_2 \cdot 2^{-1.5} + 5.0 \text{ mg/L}$$

$$C_2 = \frac{5.0}{1 - 2^{-1.5}} \text{ mg/L} = \underline{7.73 \text{ mg/L}}$$

$$C_1 = C_2 - 5 \text{ mg/L} = \underline{2.73 \text{ mg/L}}$$

$$[NaOH] = \frac{(40.0 \pm 0.5 \text{ ml}) \cdot (0.450 \pm 0.005 \text{ mol/L})}{(60.0 \pm 0.5 \text{ ml})}$$

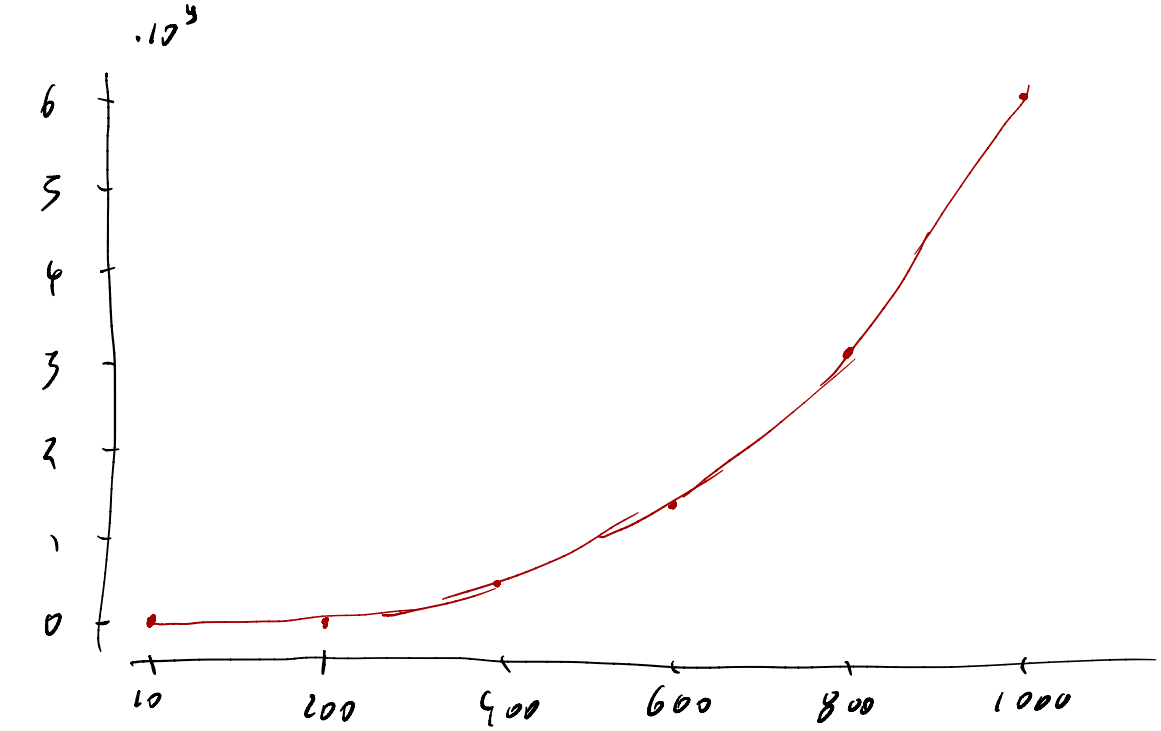
($\pm 1.25\%$, 1.11%, 0.83%)

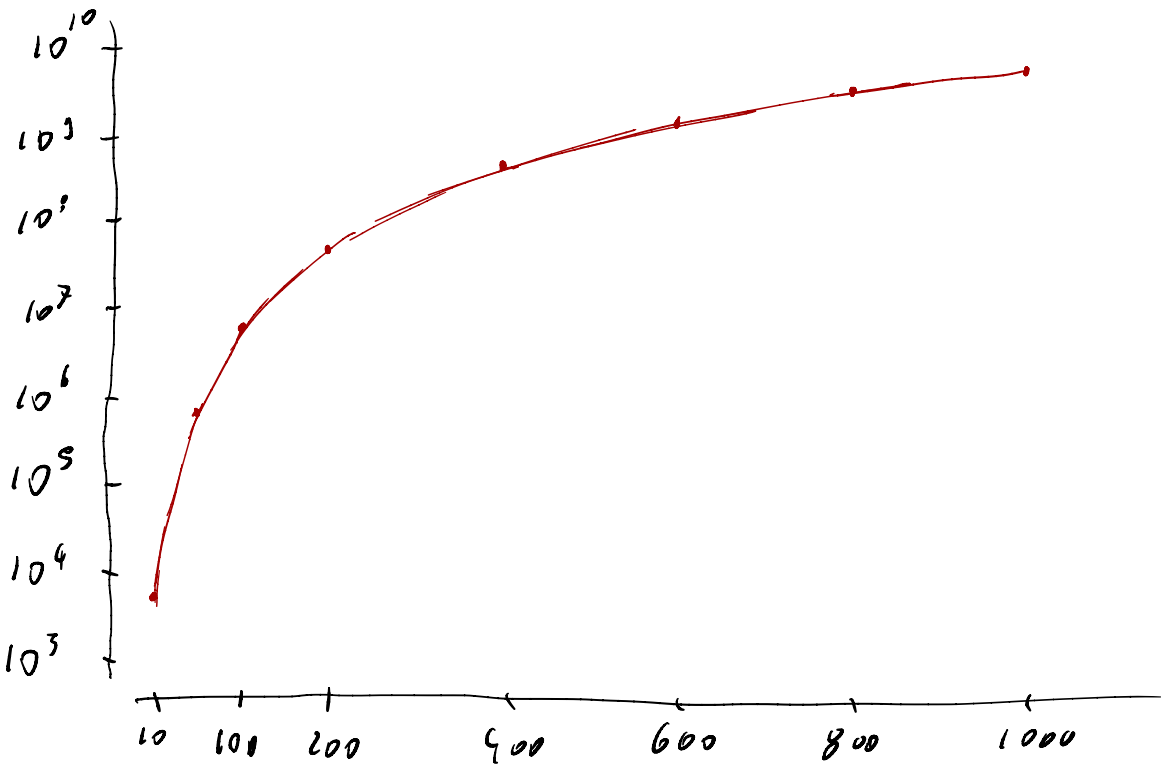
$$= 0.300 \pm 0.0319\% = \boxed{0.300 \pm 0.010}$$

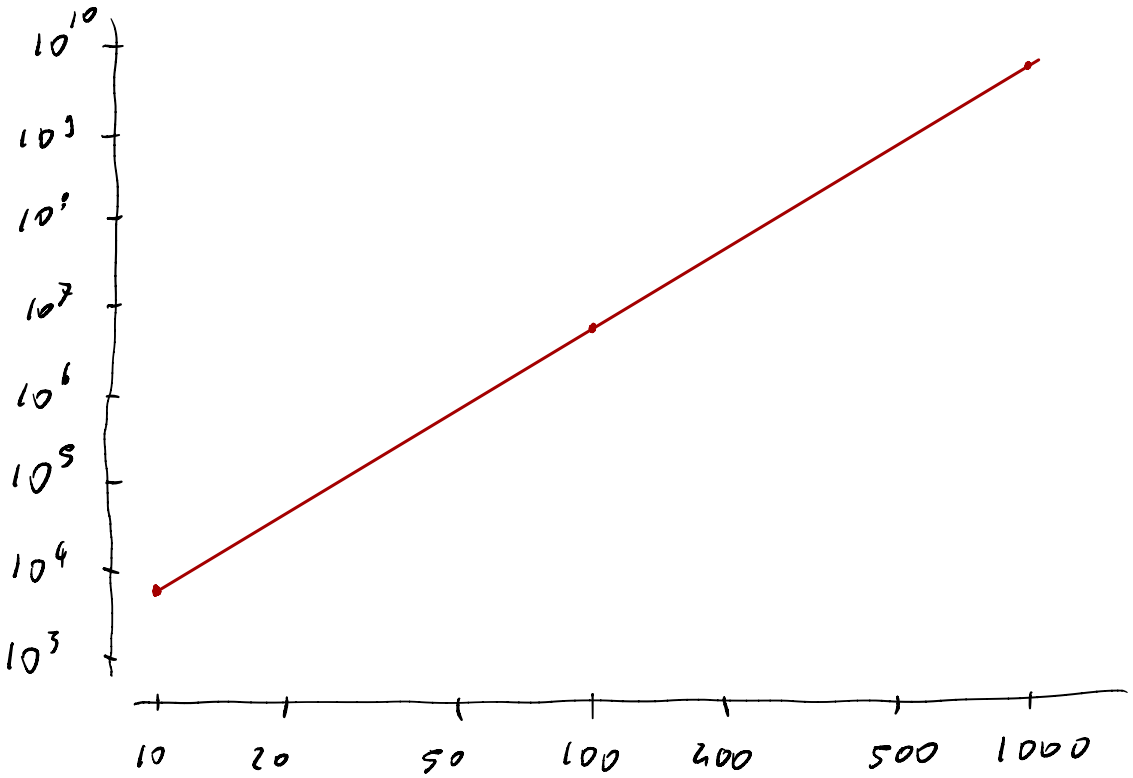
(0.00958)

(c)

x	10	200	400	600	800	1000
f(x)	6003	$0.05 \cdot 10^3$	$0.38 \cdot 10^3$	$1.30 \cdot 10^3$	$3.07 \cdot 10^3$	$6 \cdot 10^3$







(2) $f(x) = a \cdot x^{b}$

$a \cdot 10^{b} = f(10) \longrightarrow a = 6$

$a \cdot 1000^{b} = f(1000)$

$100^{b} = \dfrac{f(1000)}{f(10)}$

$b = \log_{100}\left(\dfrac{f(1000)}{f(10)}\right) \approx 3$

$f(x) \approx 6 \cdot x^{3}$

(c) $\mu = \frac{x_1 + x_2 + \dots}{100} = \frac{15482}{100} = 154.82$

$\sigma^2 = \frac{x_1^2 + x_2^2 + x_3^2 + \dots}{100} - \mu^2 =$

$= \frac{2428902}{100} - 154.82^2 = 319.7876$

$\sigma = \sqrt{\sigma^2} = 17.88$