HA / ET1 / Ü

$i(t) = \hat{i} \cdot e^{-\frac{t}{\tau}}$

$\hat{i} = 1\,A$

$\tau = 1\,s$

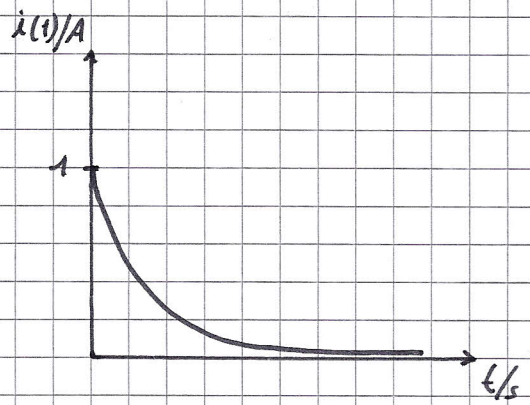
Gesucht:

b) Werte der Tabelle

a) $i(t)$ - t - Diagramm

a) $\lim_{t \to 0} \hat{i} \cdot e^{-\frac{t}{\tau}} = 1$

$\lim_{t \to \infty} \hat{i} \cdot e^{-\frac{t}{\tau}} = 0$



b)

$i(t) = \hat{i} \cdot e^{-\frac{t}{\tau}} \quad | \; i(t) = \frac{dq}{dt}$

$\frac{dq}{dt} = \hat{i} \cdot e^{-\frac{t}{\tau}} \quad | \cdot dt$

$dq = \left(\hat{i} \cdot e^{-\frac{t}{\tau}}\right) dt \quad | \int$

$\int_{t_1}^{t_2} dq = \int_{t_1}^{t_2} \left(\hat{i} \cdot e^{-\frac{t}{\tau}}\right) dt$

$q = -\tau \cdot \hat{i} \cdot e^{-\frac{t}{\tau}} \Big|_{t_1}^{t_2}$ ~~$-Q_0$~~

$t_1 = 0$

$\int_0^1 \hat{i}$

$-\tau \cdot \hat{i} \cdot e^{-\frac{t}{\tau}} \Big|_0^1$

t/s	1	2	3	10
q/As	$-0{,}37$	$-0{,}135$	$-0{,}05$	$-4{,}54 \cdot 10^{-5}$
	$0{,}63$	$0{,}86$	$0{,}95$	1