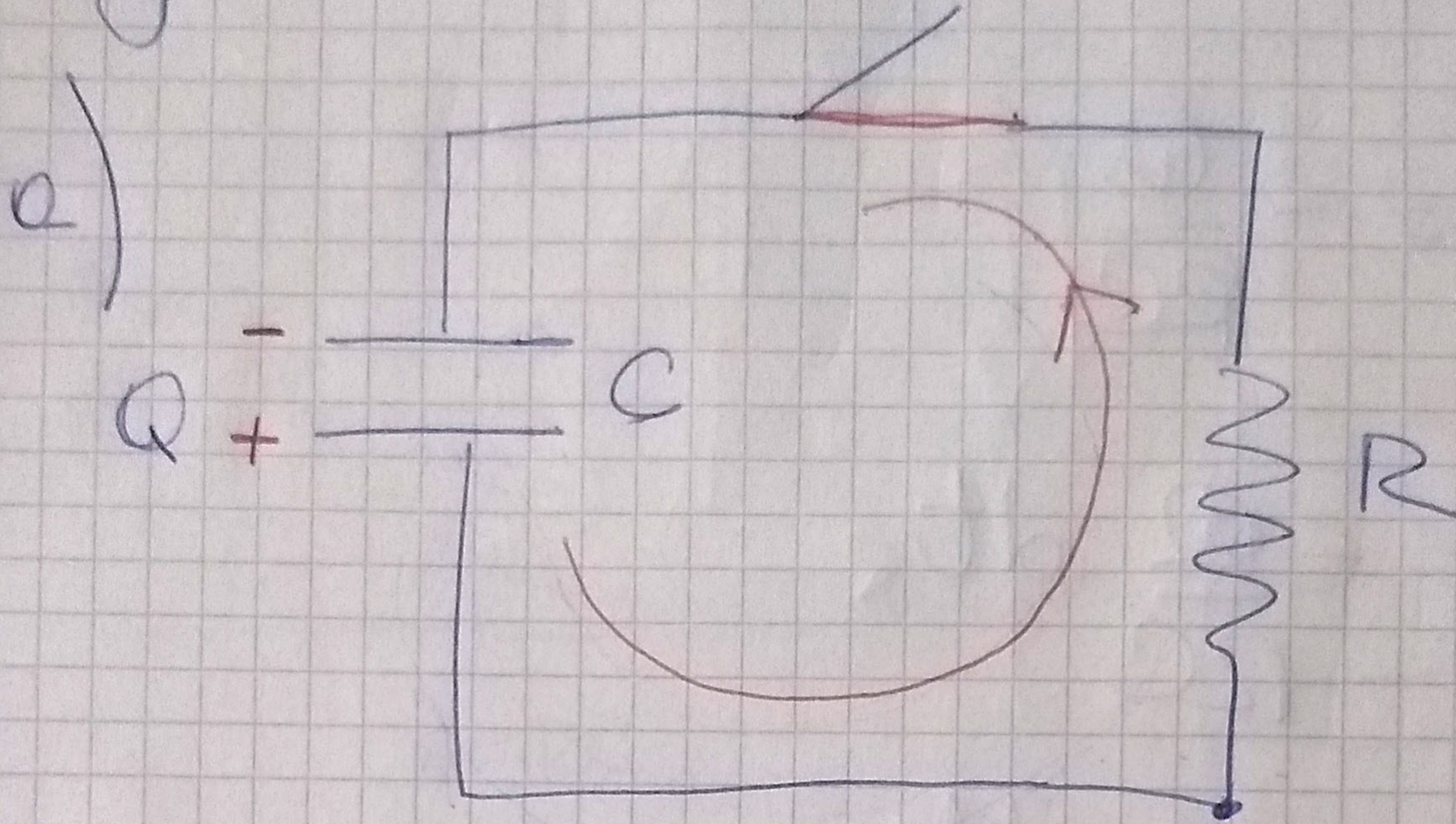


Ejerc 12



$$Q = eV$$

$$-IR + V_c = 0$$

$$-IR + \frac{Q}{C} = 0$$

$$I = -\frac{dQ}{dt}$$

$$R \frac{dQ}{dt} + \frac{Q}{C} = 0$$

$$\frac{dQ}{dt} + \frac{Q}{RC} = 0$$

$$\frac{dQ}{dt} + \frac{Q}{RC} = 0$$

$$\frac{dQ}{dt} = -\frac{Q}{RC}$$

$$dQ = -\frac{Q}{RC} dt$$

$$\frac{dQ}{Q} = -\frac{1}{RC} dt$$

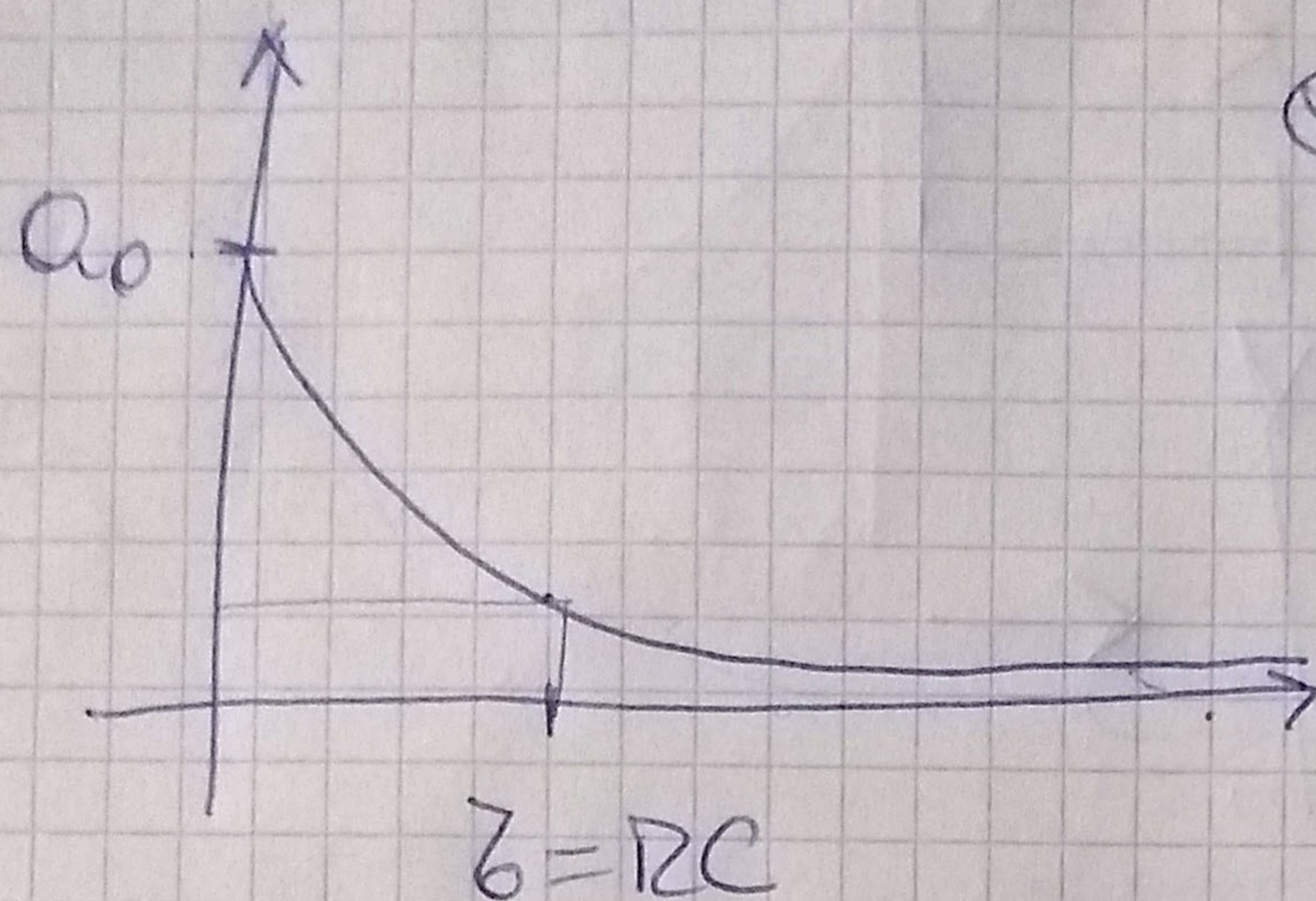
$$\int_{Q(0)}^{Q(t)} \frac{dQ}{Q} = -\frac{1}{RC} \int_0^t dt$$

$$\ln Q \Big|_{Q(0)}^{Q(t)} = -\frac{t}{RC}$$

$$\ln Q(t) - \ln(Q(0)) = -\frac{t}{RC}$$

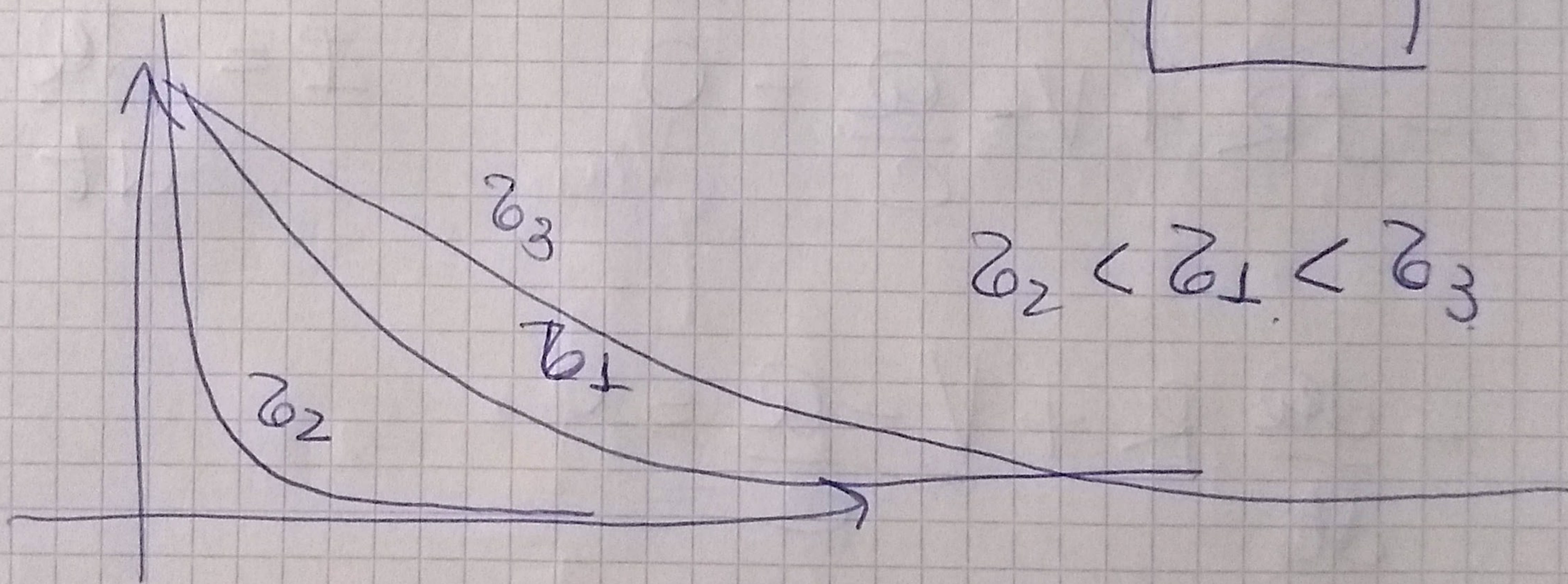
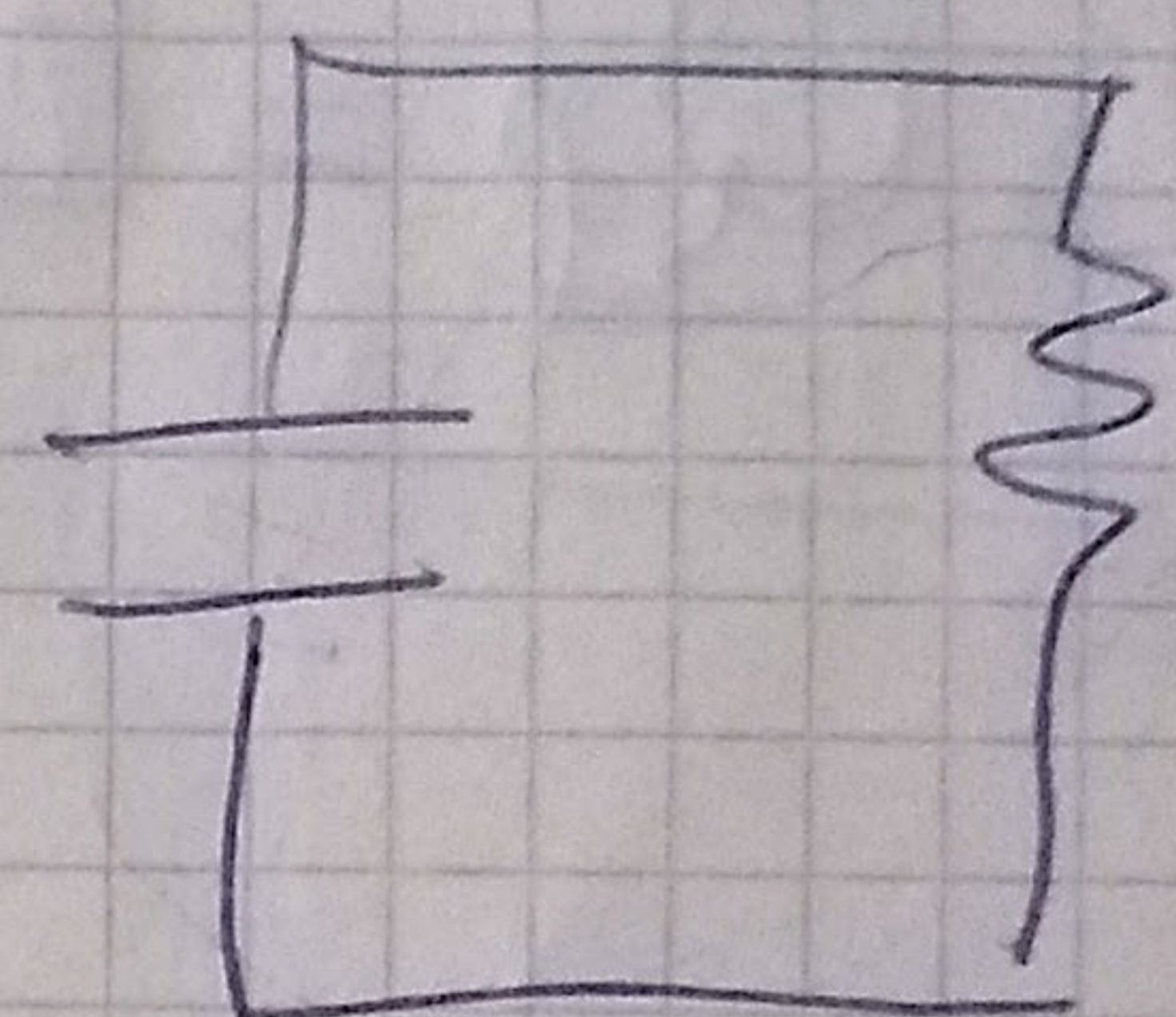
$$\ln\left(\frac{Q(t)}{Q(0)}\right) = -\frac{t}{RC} \rightarrow Q(t) = Q_0 e^{-\frac{t}{RC}}$$

$$Q(t) = Q(0) e^{-t/RC}$$



$$e^{-1} \approx 0,36$$

$$Q = CV$$

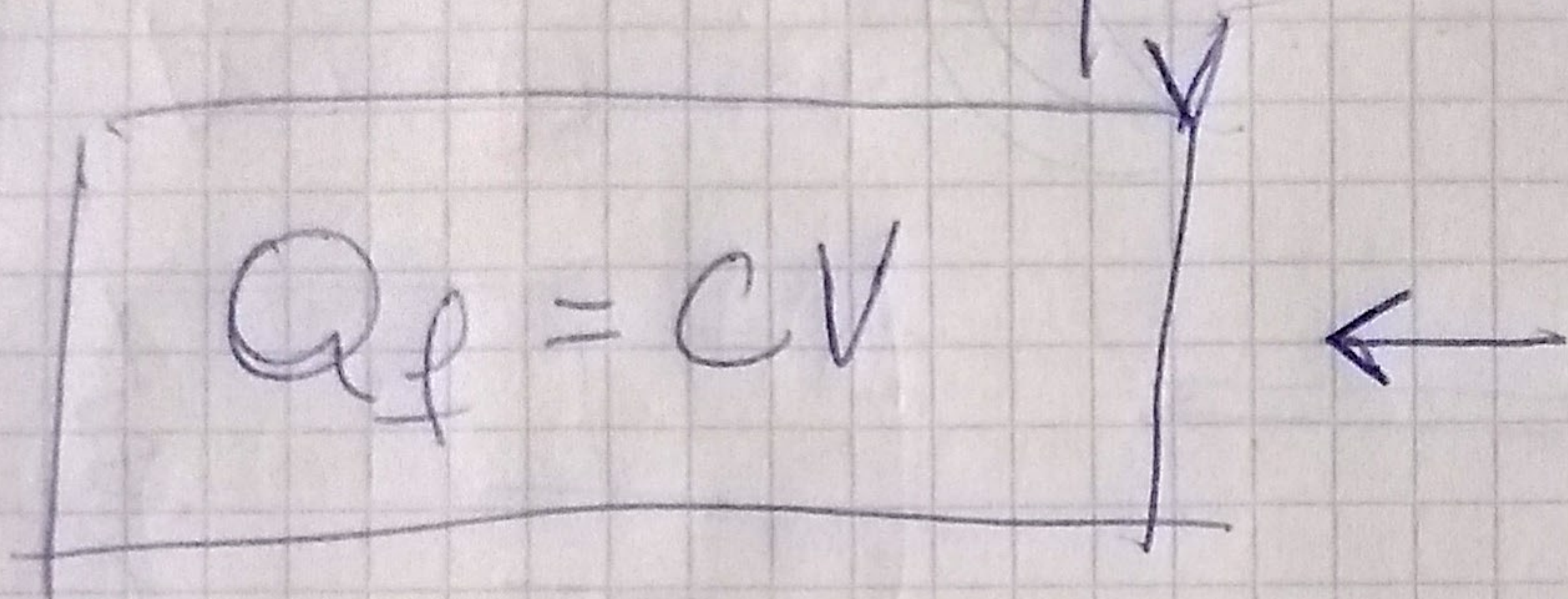
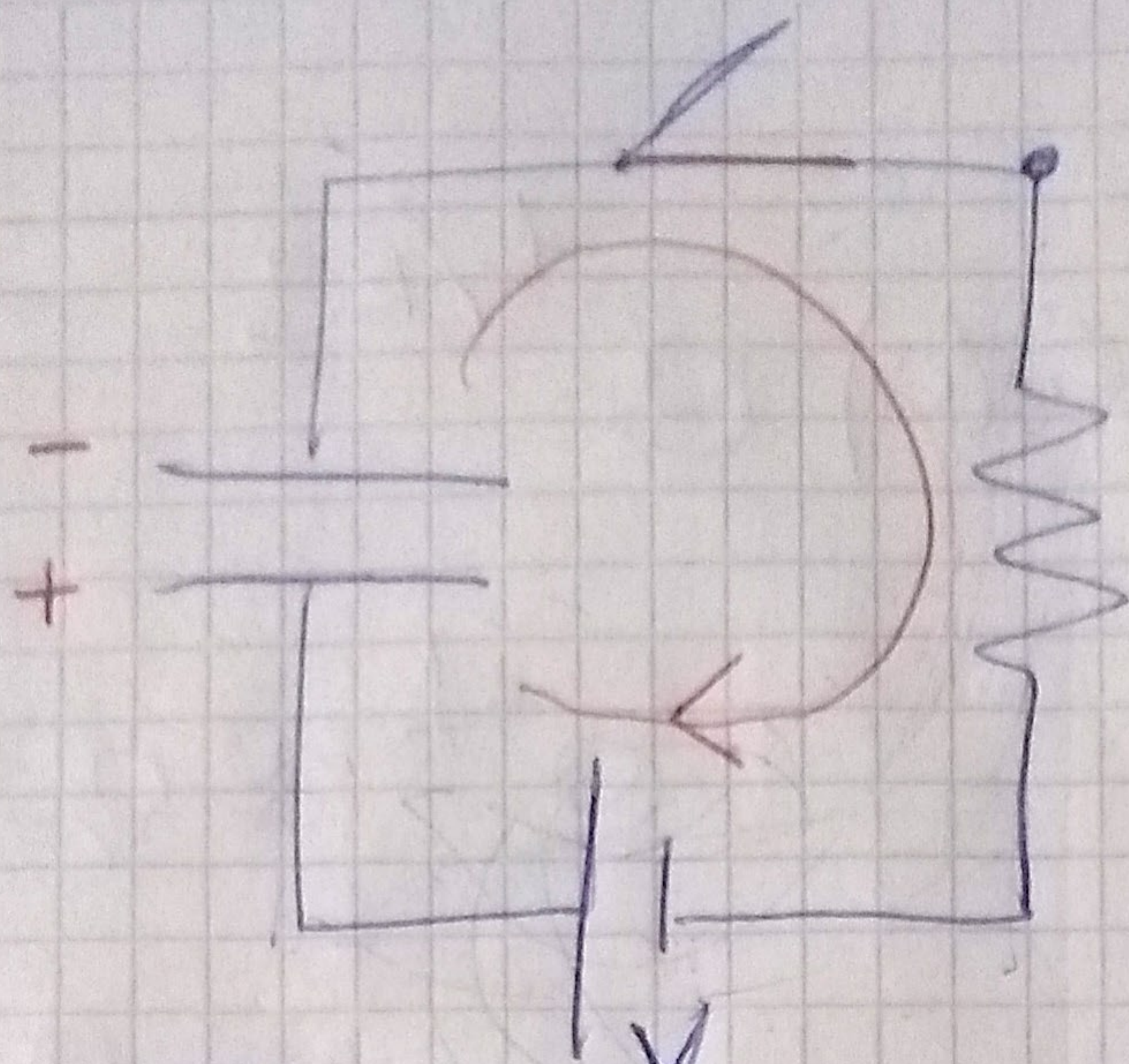


$$\tau_2 < \tau_1 < \tau_3$$

$$I = -\frac{dQ}{dt}$$

b)

$$Q = CV$$



$$-IR + V - \frac{Q}{C} = 0$$

$$I = \frac{dQ}{dt}$$

$$- \frac{dQ}{dt} R + V - \frac{Q}{C} = 0$$

$$\frac{dQ}{dt} + \frac{Q}{RC} = \frac{V}{R}$$

$$Q(t) = A e^{-\frac{t}{RC}} + Q_{part.}$$

Solución homogénea:

$$Q(t) = A e^{-t/\tau_0}$$

$$Q(t) = A e^{-t/\tau_0} + B$$

$$Q(t \rightarrow \infty) = B = CV$$

$$Q(t=0) = A + B = A + CV = 0$$

$$A = -CV$$

$$Q(t) = -CV e^{-t/\tau_0} + CV$$

$$Q(t) = CV (1 - e^{-t/\tau_0})$$

