B) Integrator

1) $I_R + I_C = I_B \approx 0$

$$0 = \frac{U_e}{R} + C\frac{dU_a}{dt}$$

$$U_a(t) = -\frac{1}{RC}\int_0^t U_e\,dt$$

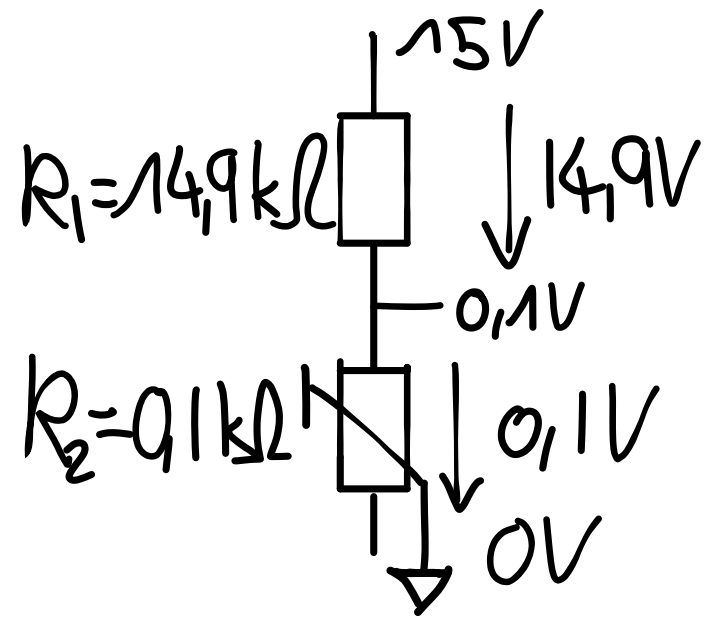
$$U_a(t) = -\frac{U_e t}{RC}$$

$$R = \frac{-U_e \cdot t}{U_a(t)\,C} = -\frac{0{,}1V \cdot 1s}{-10V \cdot 6{,}8nF} = 22k\Omega$$

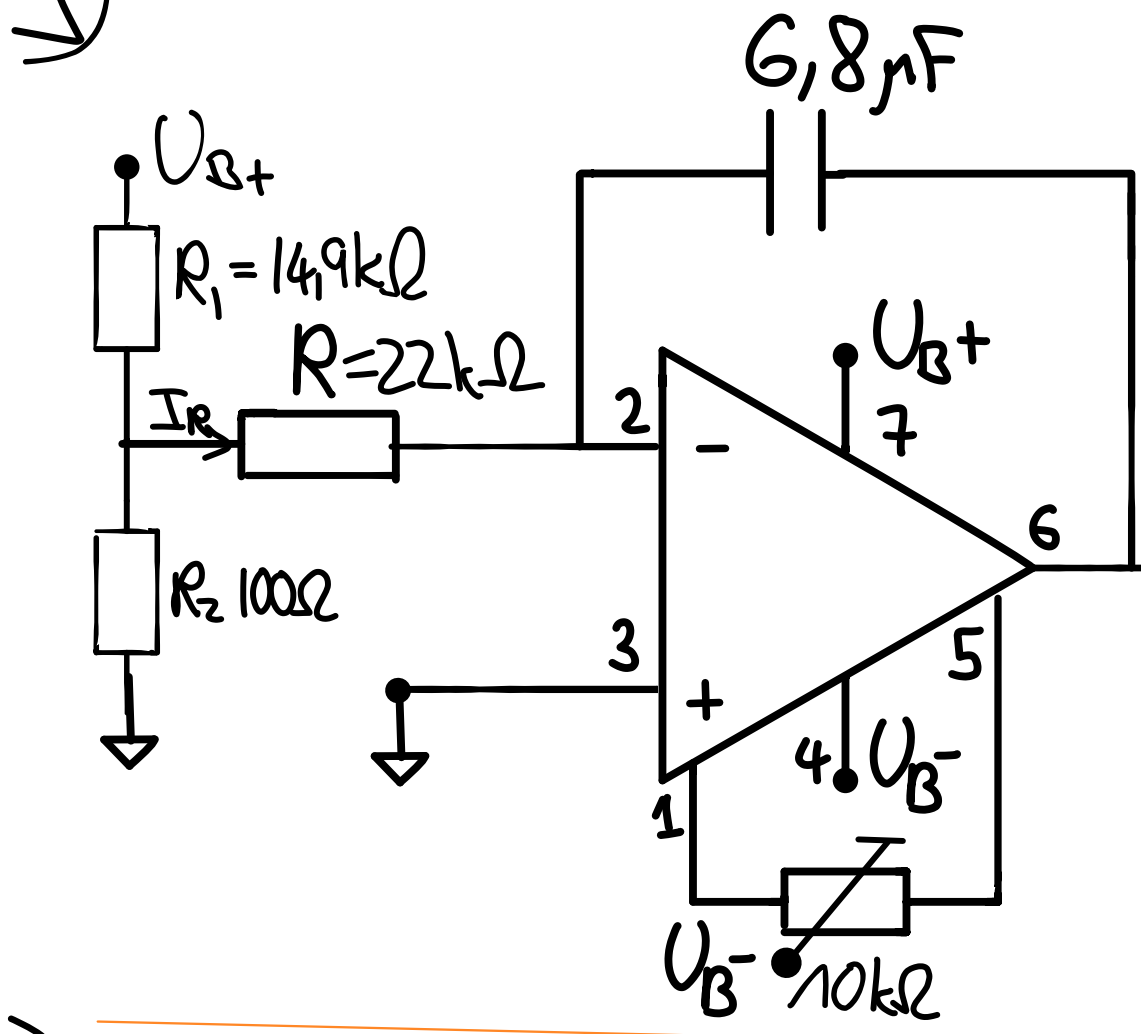
2) $I_S \gg I_R \approx 4mA$

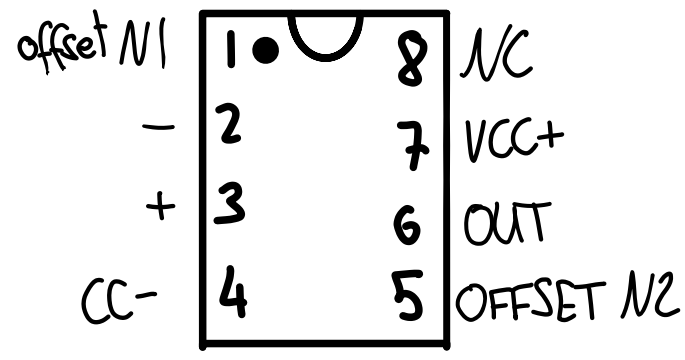
$$1mA \approx \frac{15V}{R_{GES}}$$

$R_{GES} = R_1 + R_2 = 15k\Omega$



3)





4) $U_a(10s) = \frac{-U_e t}{RC} = -6{,}68V$

$$A = -\frac{R_N}{R_1} = \frac{U_a}{U_e} = \frac{10V}{-6{,}68V} = -1{,}496 \approx -\frac{3}{2}$$

$\tilde{R}_1 = 10k\Omega$

$R_N = 15k\Omega$

$$\left|\frac{U_a}{R_N}\right| \wedge \left|\frac{U_e}{R_1}\right| \overset{!}{\gg} I_B \checkmark$$

5)