

Last Name: _____

First Name: _____

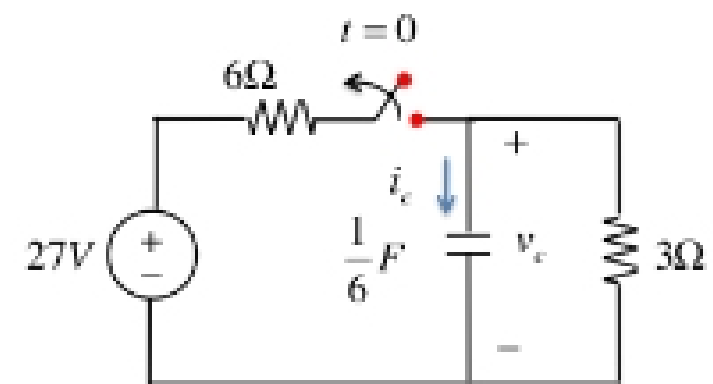
The switch has been closed for a long time. At $t = 0$, the switch is opened.

- At $t = 0^-$, switch is closed, find $v_c(0^-)$ and $i_c(0^-)$

$t = 0^-$ Switch is closed & capacitor (open circuit branch)

$$v_c(0^-) = 27 \left(\frac{3}{6+3} \right)$$

$$v_c(0^-) = 9V \quad i_c(0^-) = 0$$



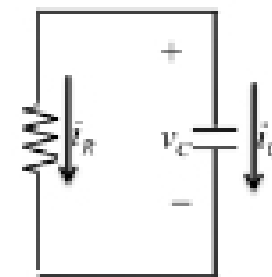
- At $t = 0^+$, switch is open, find $v_c(0^+)$ and $i_c(0^+)$

$$v_c(0^+) = 9V$$

$$i_c(0^+) + i_R(0^+) = 0 \quad i_c(0^+) + \frac{9V}{3\Omega} = 0$$

$$i_c(0^+) = -3A$$

$t \geq 0^+$



- Find the time constant τ for $t \geq 0^+$.

$$\tau = RC \quad \tau = (3\Omega) \left(\frac{1}{6} F \right) \quad 0.5s$$

- Find $v_c(t)$ for $t \geq 0^+$ and sketch the function.

$$v_c(t) = v_c(\infty) + [v_c(0^+) - v_c(\infty)] e^{-\frac{t}{\tau}}$$

$$v_c(t) = 0 + [9 - 0] e^{-\frac{t}{0.5}}$$

