Ex: Find the voltage, v_C, across the capacitor in the circuit below for $t > 0$ if $v_C(t = 0) = 100 \ \mu V$.

$C{=}150 \ \mu F$

$R{=}3 \ k\Omega$
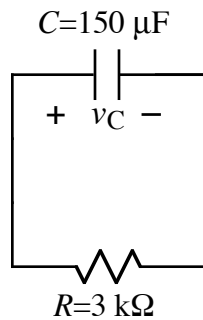
SOL'N: The form of solution is an exponential.

$$v_C(t) = Ae^{-t/RC}$$

The value of the constant, A, is chosen to match the initial voltage on C, since the exponential has a value of unity at $t = 0$: $e^0 = 1$.

$$v_C(t) = 100 \ \mu V \cdot e^{-t/450 \text{ms}}$$