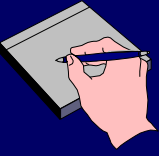


# Example

## Charging: Intermediate Times



Calculate the charge on the capacitor  $3 \times 10^{-3}$  seconds after switch 1 is closed.

$$R = 10 \Omega$$

$$V = 50 \text{ Volts}$$

$$C = 100 \mu\text{F}$$

$$\begin{aligned} q(t) &= q_{\infty}(1 - e^{-t/RC}) \\ &= q_{\infty}(1 - e^{-3 \times 10^{-3} / (20 \times 100 \times 10^{-6})}) \\ &= q_{\infty}(0.78) \end{aligned}$$

**Recall**  $q_{\infty} = \varepsilon C$

$$\begin{aligned} &= (50)(100 \times 10^{-6})(0.78) \\ &= 3.9 \times 10^{-3} \text{ Coulombs} \end{aligned}$$

