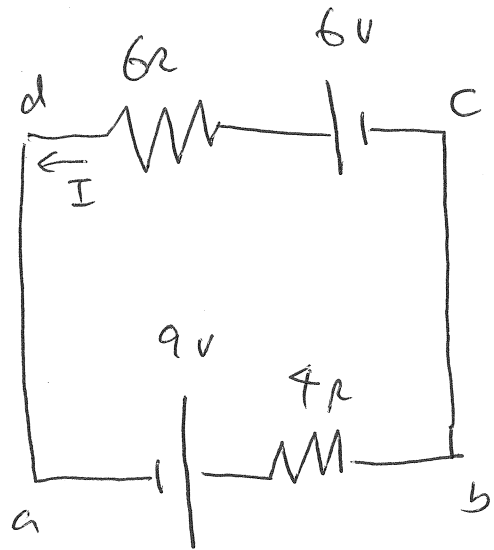
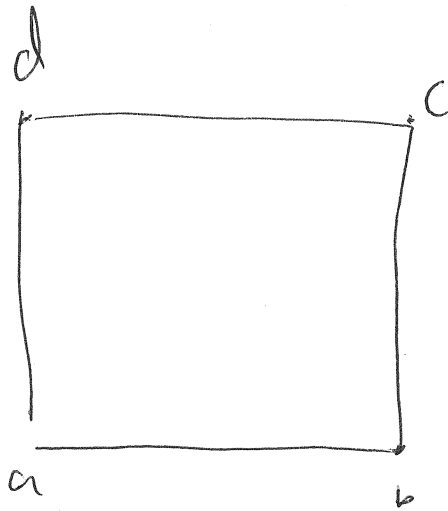
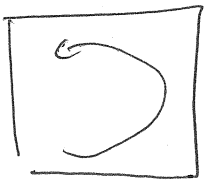


CLARIFICATION: LOOKS + ~~2nd LAW OF~~

2nd RULE OF KIRCHOFF

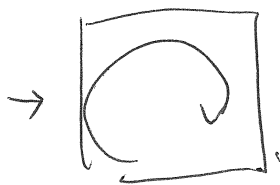


STEP 1



$$(V_b - V_a) + (V_c - V_b) + (V_d - V_c) + (V_a - V_d) = 0$$

↗



$$(V_d - V_a) + (V_c - V_d) + (V_b - V_c) + (V_a - V_b) = 0$$

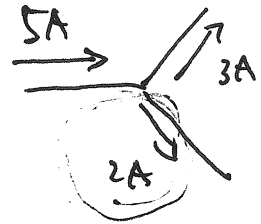
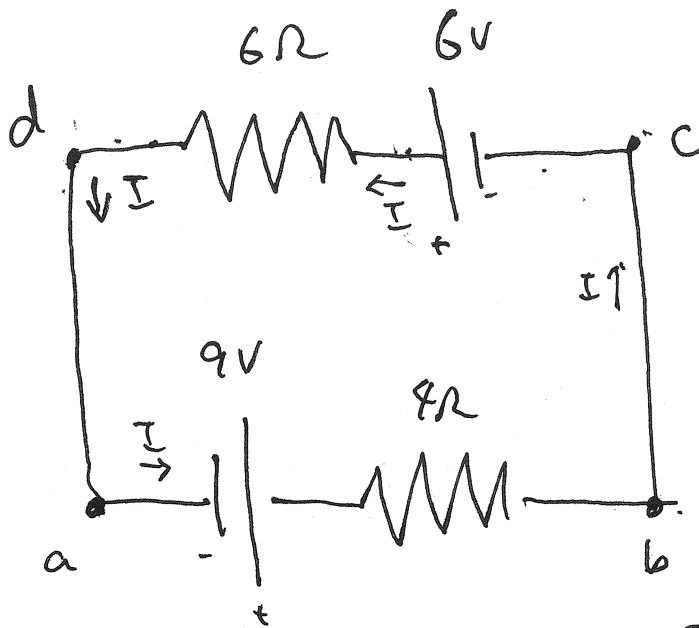
↓

STEP 2 : ASSUME A DIRECTION OF CURRENT

$$0 + 6I - 6 + 0 + 4I - 9 = 0$$

$$10I = 15$$

$$I = 1.5A$$

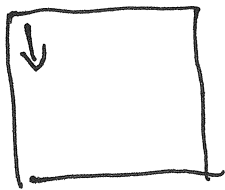


STEP 1 : CHOOSE ONE RELATIONSHIP

$$0 = (V_b - V_a) + (V_c - V_b) + (V_d - V_c) + (V_a - V_d)$$

$$\Rightarrow 0 = (V_d - V_a) + (V_c - V_d) + (V_b - V_c) + (V_a - \cancel{V_b})$$

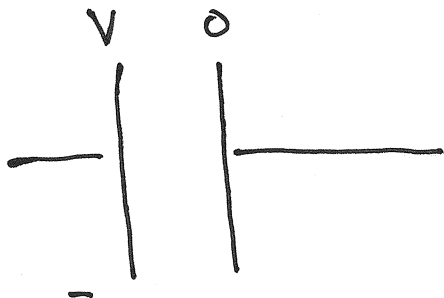
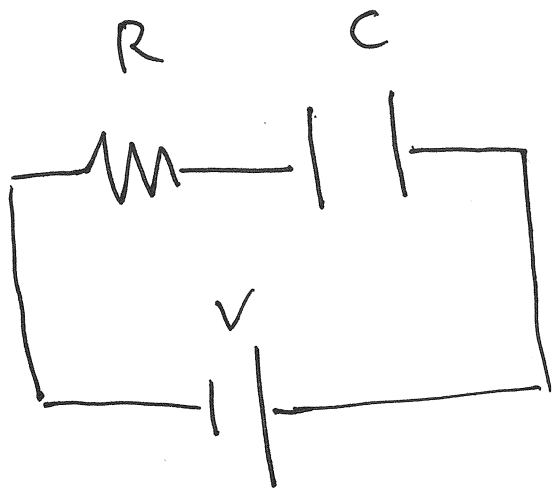
STEP 2 : ASSUME A DIRECTION OF CURRENT



$$0 + 6I - 6 + 0 + 4I - 9 = 0$$

$$10I - 15 = 0$$

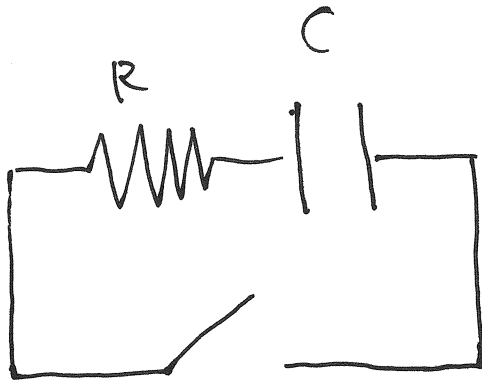
$$I = 1.5A$$



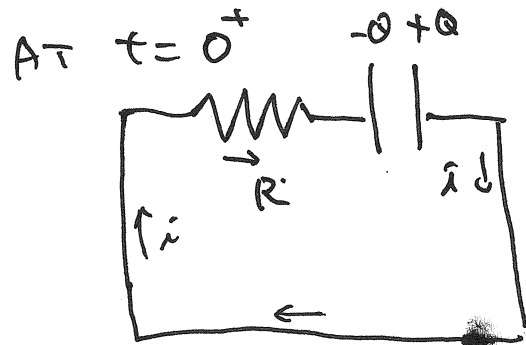
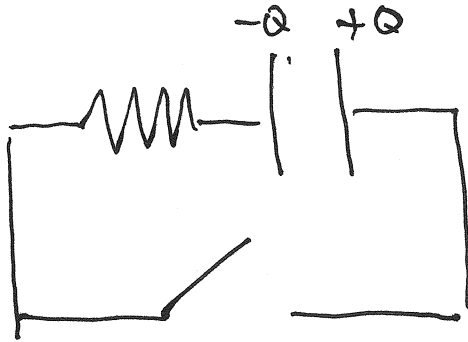
$$|\Delta V| = \frac{Q}{C}$$

K-loop  $\rightarrow \Delta V = -\frac{Q}{C}$

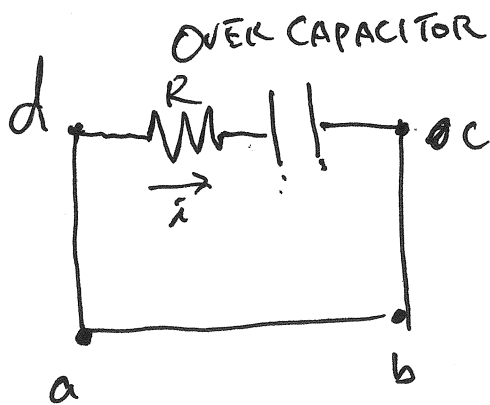
$\leftarrow \Delta V = \frac{Q}{C}$



AT  $t=0$   $V_c = V_0$   
 + WE USED THE SWITCH



Q: POSITIVE



$\Delta V = V_c$

$a \rightarrow b \rightarrow c \rightarrow d \rightarrow a$

$0 + 0 + -V_c + iR + 0 = 0$

WE NOTE  $i$  IS POSITIVE

$V_c = \frac{Q}{C} \quad i = -\frac{dQ}{dt}$

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

$-\frac{Q}{C} = \frac{dQ}{dt} R \quad \frac{dQ}{dt} = -\frac{Q}{RC}$

$\frac{dQ}{Q} = -\frac{dt}{RC}$   
 $\int_{Q_i}^{Q_f} \frac{dQ}{Q} = \int_0^t -\frac{dt}{RC}$

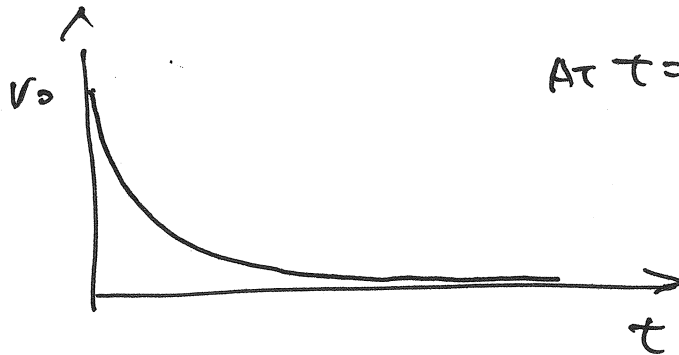
$$\ln \frac{Q_t}{Q_0} = -\frac{t}{RC}$$

$$Q_t = Q_0 e^{-t/RC}$$

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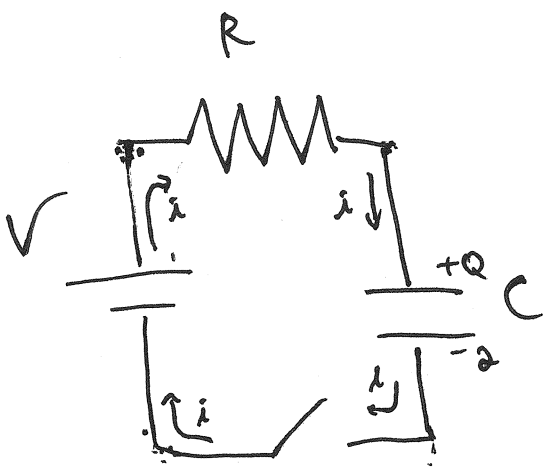
$$Q = CV$$

$$V(t) = V_0 e^{-t/RC}$$



At  $t = RC$

$$V(t) = \frac{V_0}{2.73} = \frac{V_0}{e}$$



$$V_c = 0 \text{ AT } t = 0$$

AS SWITCH IS CLOSED  
CURRENT FLOW CLOCKWISE

$$V - iR - V_c = 0$$

\*  $i$ : POSITIVE

$\frac{dQ}{dt}$ : POSITIVE

$$V_c = \frac{Q}{C} \quad i = \frac{dQ}{dt}$$

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

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

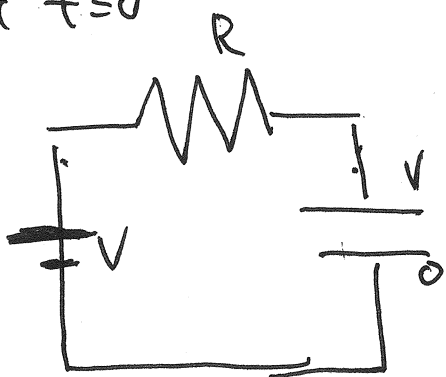
$$\frac{dQ}{dt} = \frac{CV - Q}{RC}$$

SOLVE



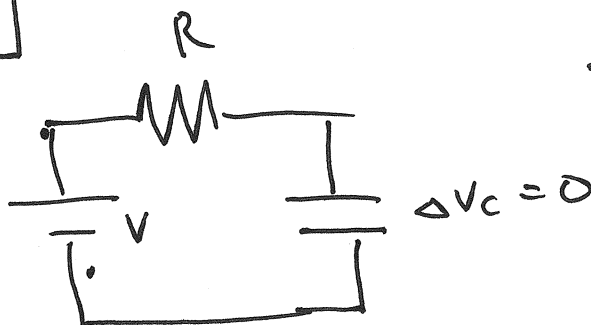
$$Q(t) = CV(1 - e^{-t/RC})$$

AT  $t = \infty$



$$Q(\infty) = CV$$

AT  $t = 0$



$$i = \frac{V}{R}$$

$$\Delta V_c = 0$$