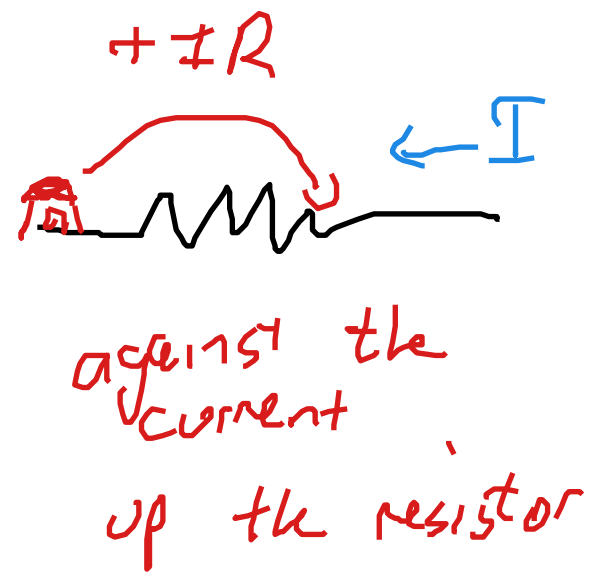
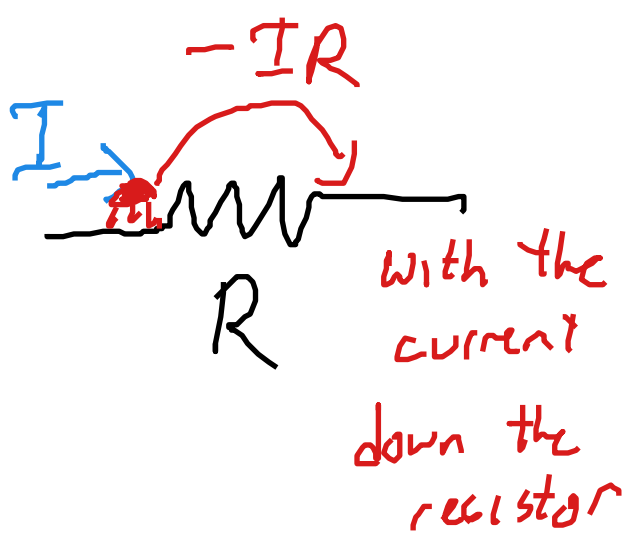
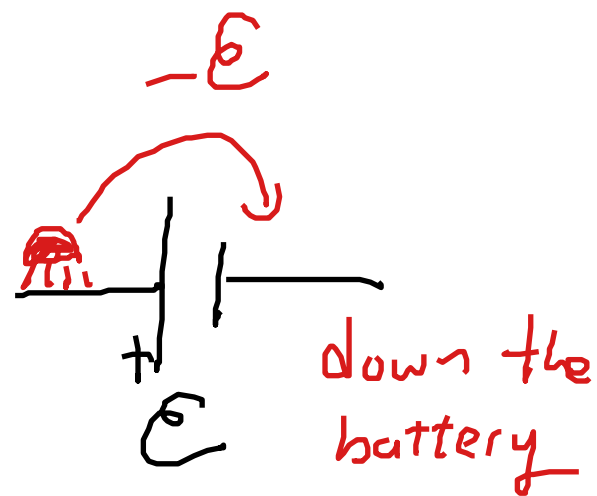
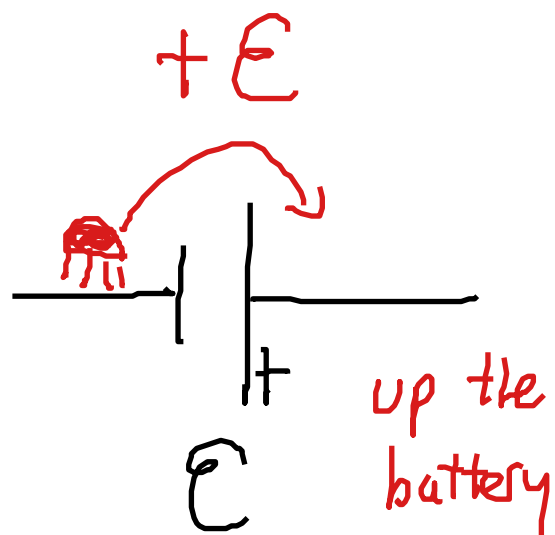
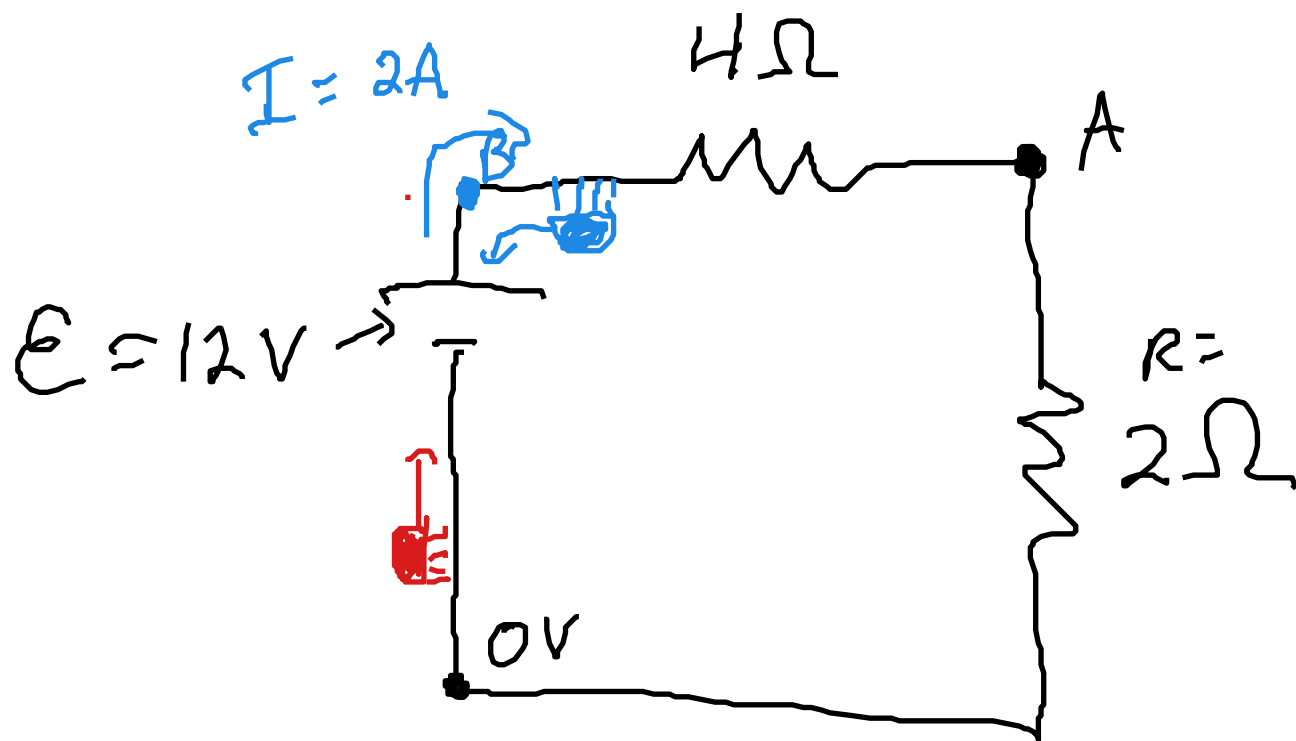




$$V_A = ?$$

$$\Delta V = |IR|$$

$$V_{\text{high}} - V_{\text{low}} = |IR|$$

$$+12$$

$$\underline{- (4)(2)}$$

$$V_A - 0 = 12 - 8 = 4V$$

$$-12$$

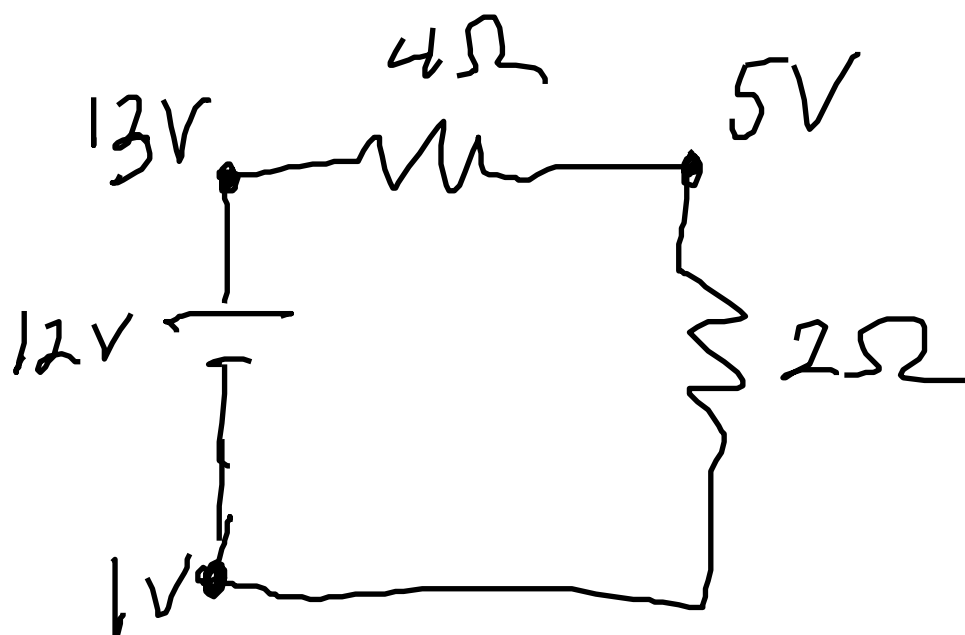
$$\underline{+ 2(2)}$$

final initial

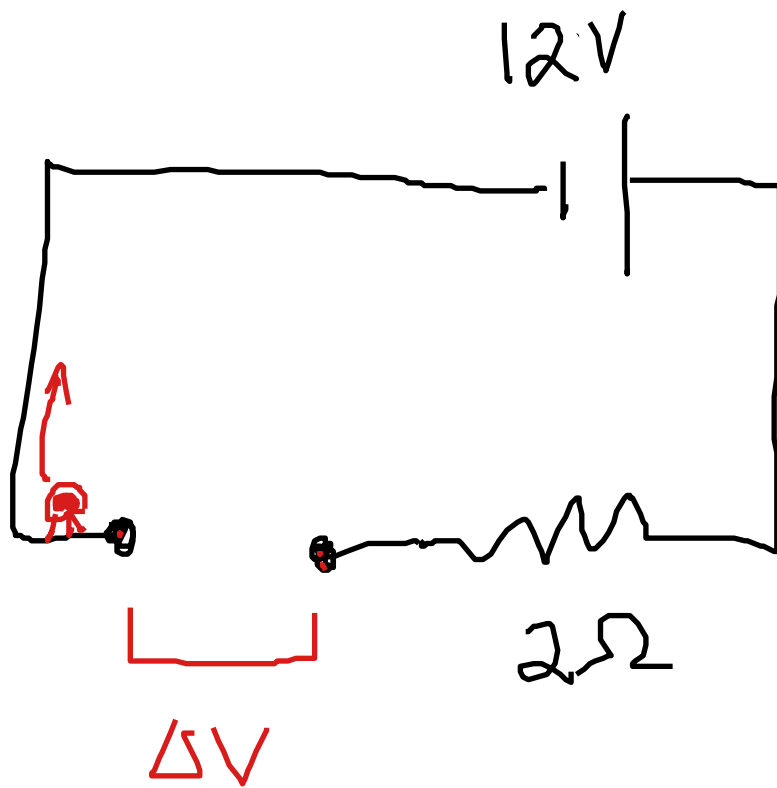
$$V_A - V_B = -12 + 4 = -8$$

$$V_A - 12 = -8$$

$$V_A = 12 - 8 = 4V$$



You can shift all
the potentials up or down
by same amount -
physics remains the same



$$I = \Delta V G \quad \text{for gap}$$

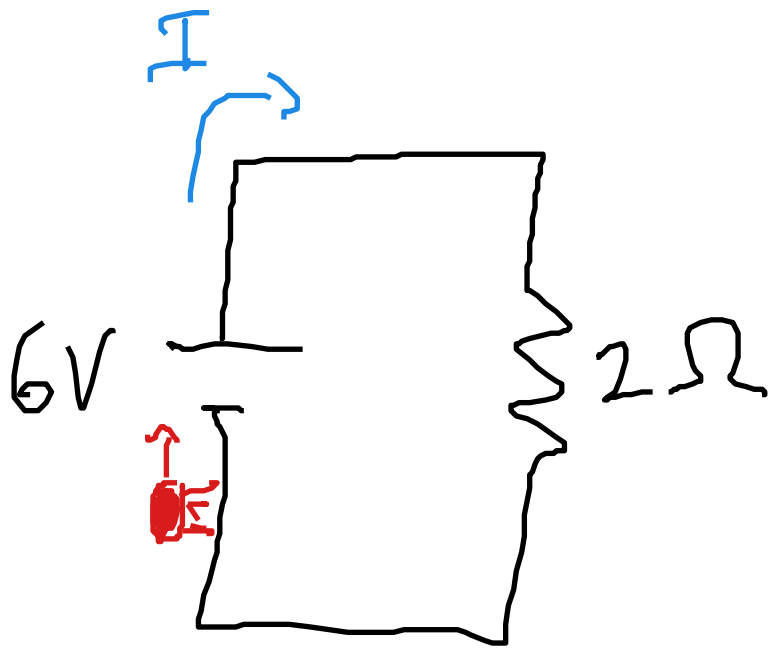
$$0 = ? \quad 0$$

$$\Delta V = I R$$

$$\text{undefined} \quad 0 \cdot \infty$$

$$\begin{array}{r} +12 \\ -(0)(2) \\ \hline 12 \end{array}$$

$$\Delta V = 12V$$



A closed loop
path on a
circuit has
a $\Delta V = 0$,
"Loop Rule"

$$+6 - 2I = 0$$

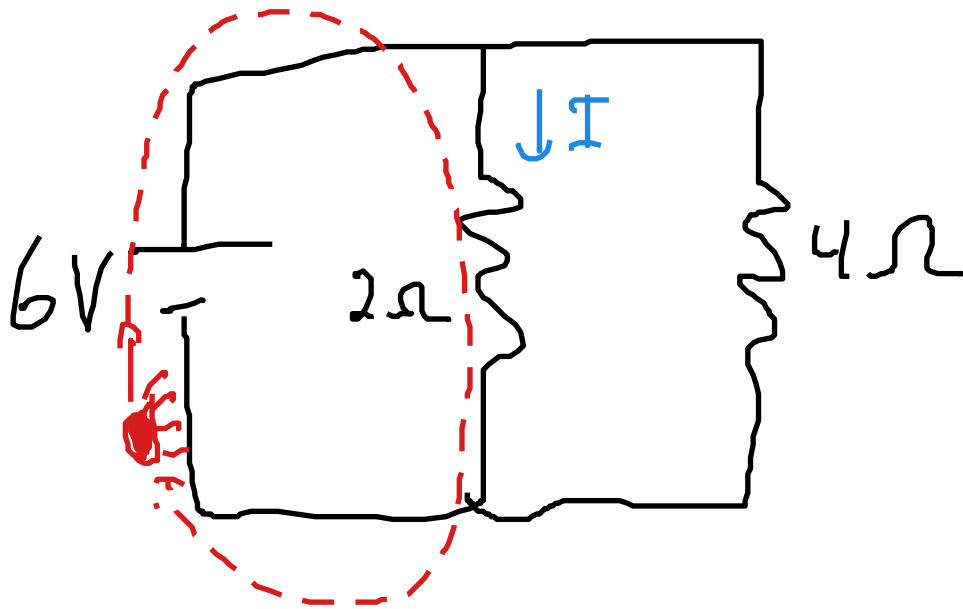
$$6 = 2I$$

$$3A = I$$

Resistors

in

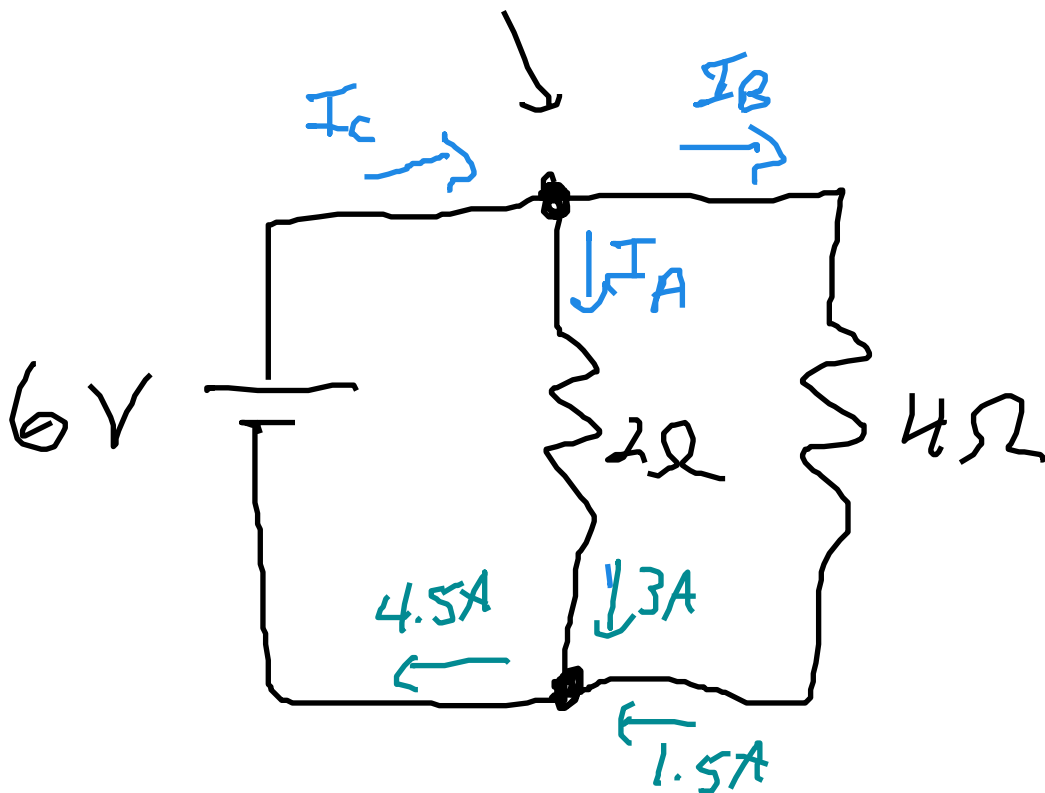
Parallel



$$+6 - 2I = 0$$

$$I = 3A$$

Junction



$$I_C = 4.5A$$

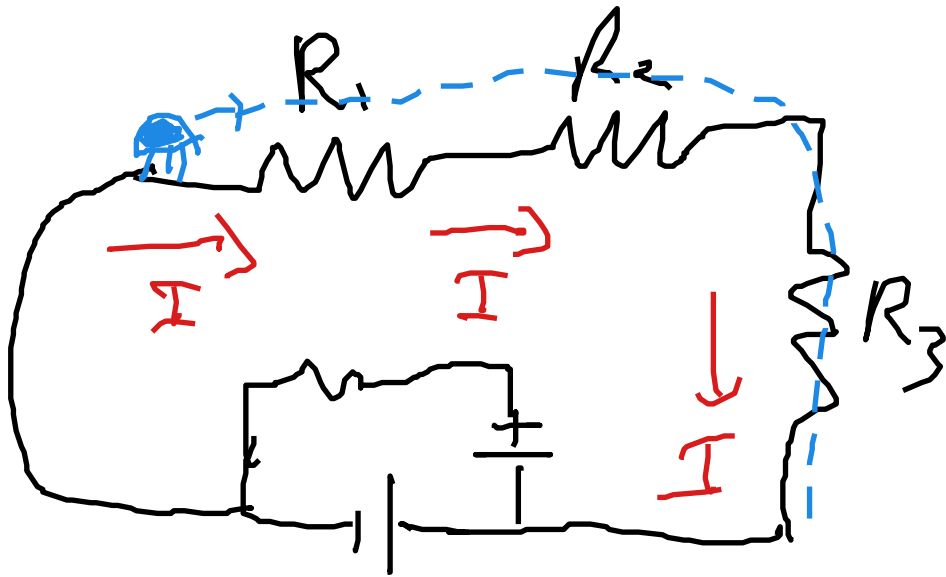
$$6 - 2I_A = 0$$

$$6 - 4I_B = 0$$

$$I_A = 3A$$

$$I_B = \frac{6}{4} = 1.5A$$

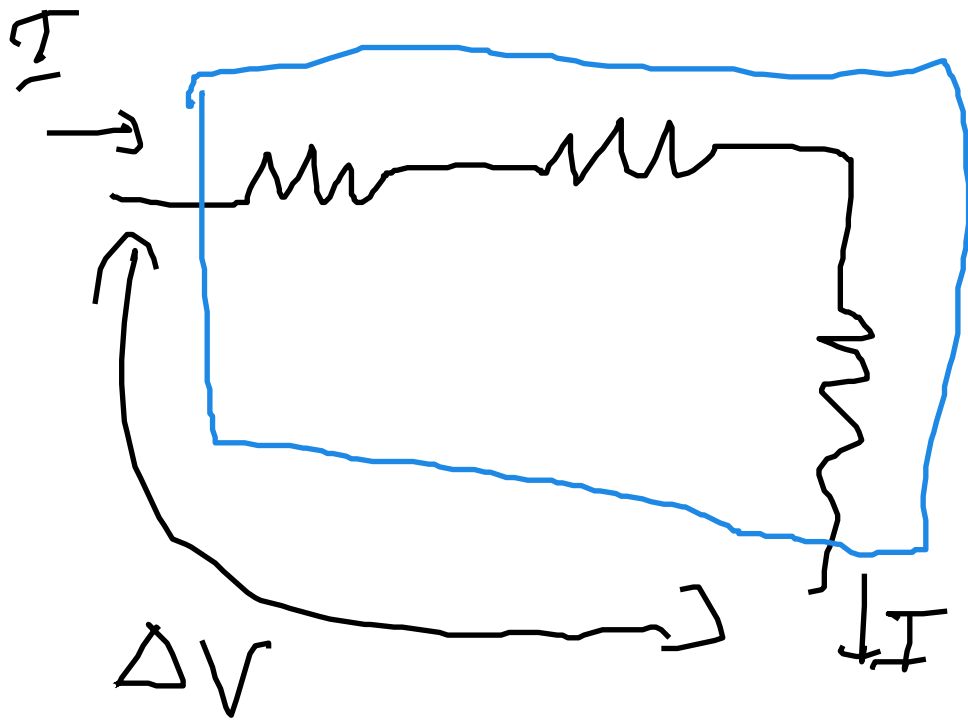
Resistors in Series



- All have the same current through them.
- You can draw a path through the resistors which does not cross a junction

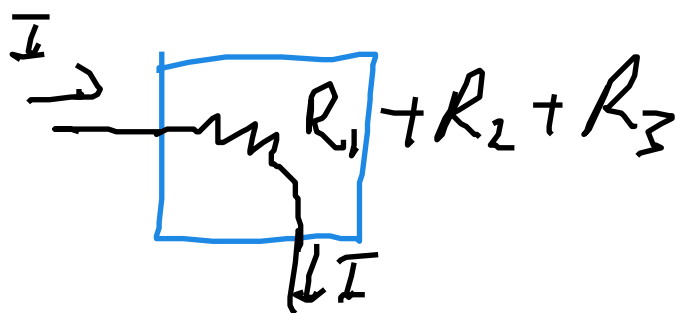
$$\Delta V_{\text{tot}} = -IR_1 - IR_2 - IR_3 \\ - I(R_1 + R_2 + R_3)$$

All objects with two terminals have resistance,



$$R_{\text{box}} = \frac{|\Delta V|}{I} = \frac{\cancel{I}(R_1 + R_2 + R_3)}{\cancel{I}}$$

$$R_{\text{box}} = R_1 + R_2 + R_3$$



You can replace resistors in series $R_1, R_2, R_3, \dots$ with a single resistor

$$R_{eq} = R_1 + R_2 + R_3 + \dots$$

Equivalent Resistance
or

Effective Resistance

