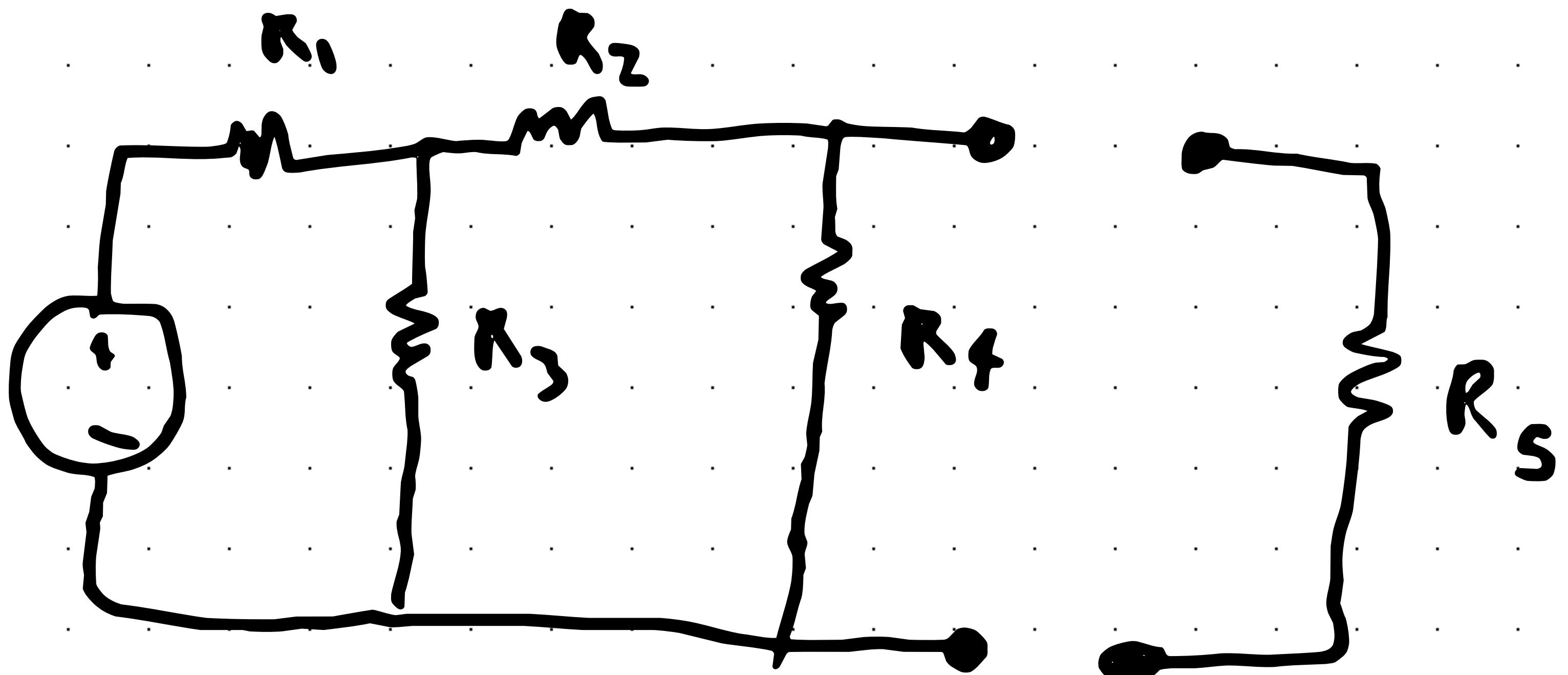


Tutorial One

Open Circuit (O.C)



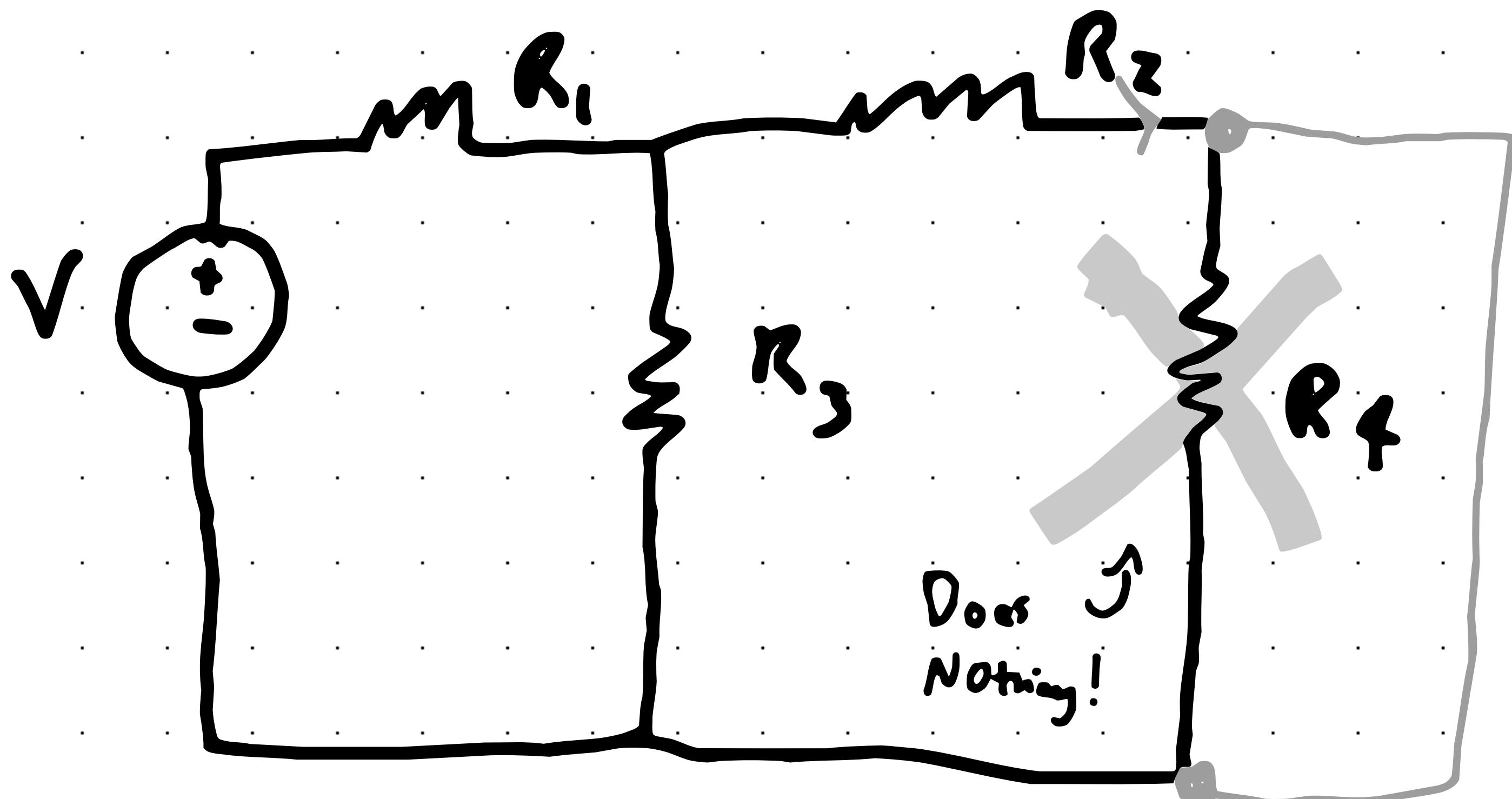
For an open circuit:

$$I = 0$$

But there is voltage!

would you stick your finger in
an outlet?

Short Circuit (S.C.)



Why would i go through a resistor when it doesn't have to?

Currents prefer lower resistance values.

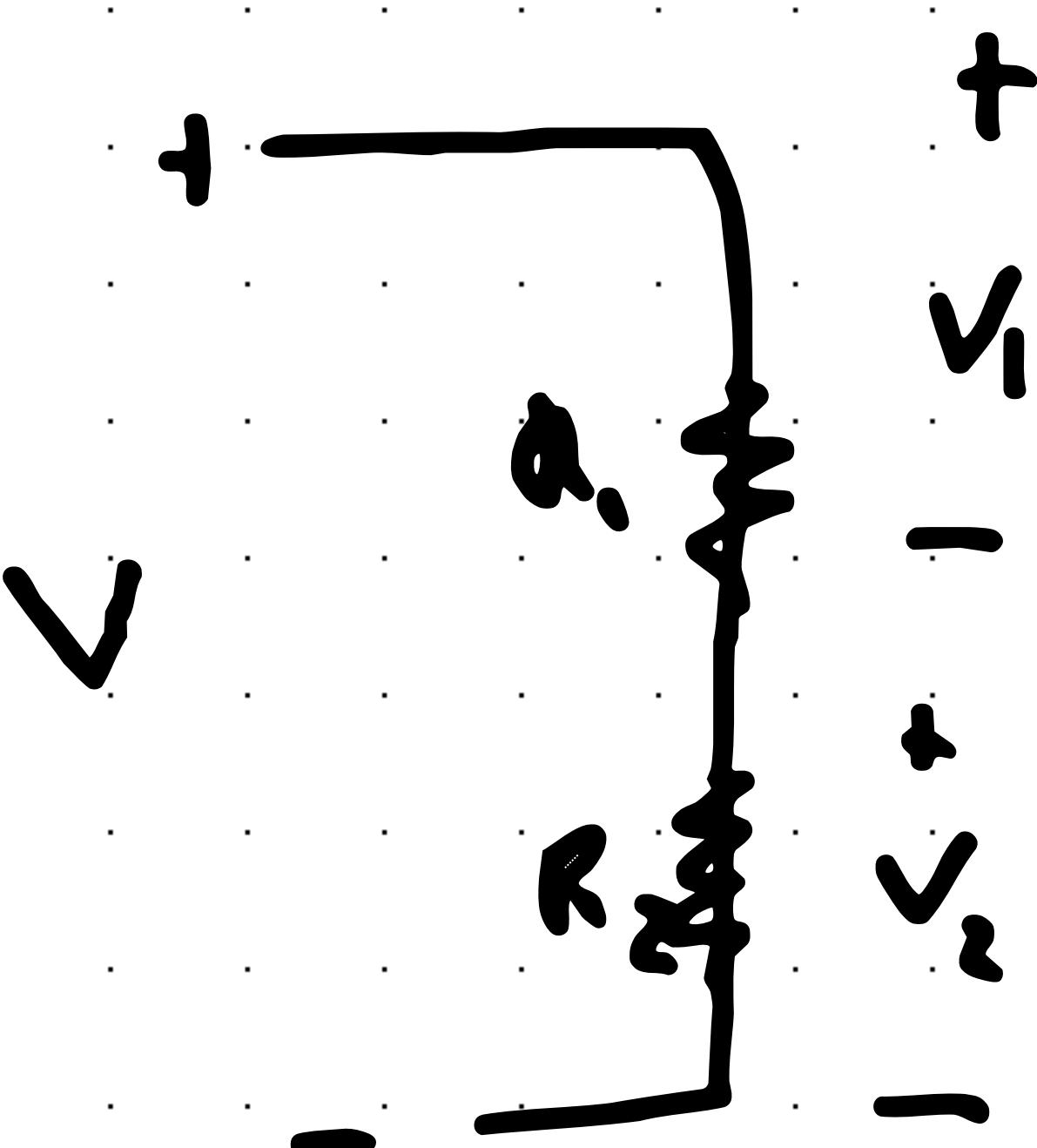
There is a current in the short circuit branch, but the voltage is equal to zero.

$$V = I(0) \frac{R}{R}$$

Voltage Divider

$$V_1 = \left(\frac{R_1}{R_1 + R_2} \right) V$$

$$V_2 = \left(\frac{R_2}{R_1 + R_2} \right) V$$

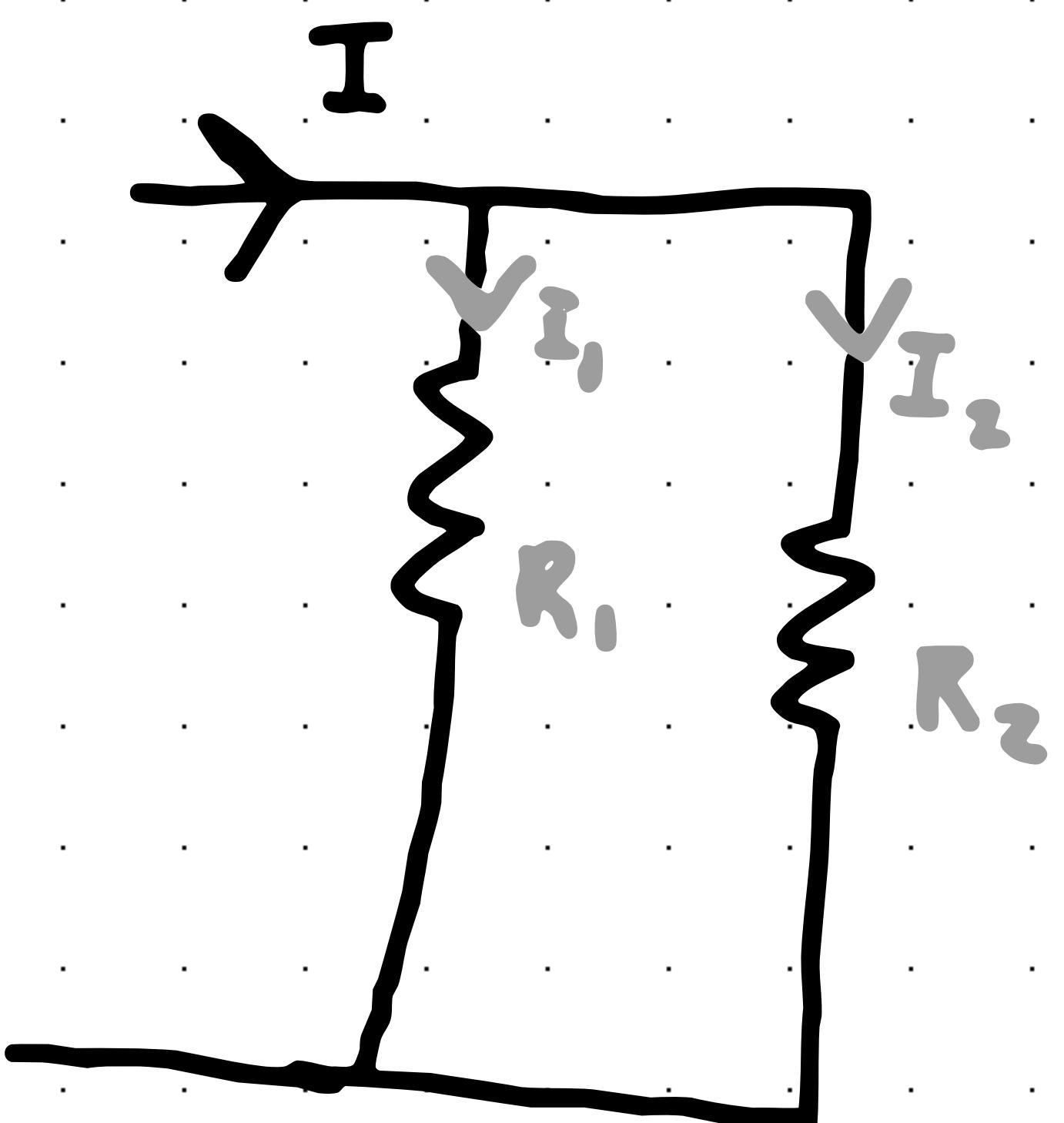


Thus applies for resistors in series!

Current Divider

$$I_1 = I \frac{R_2}{R_1 + R_2}$$

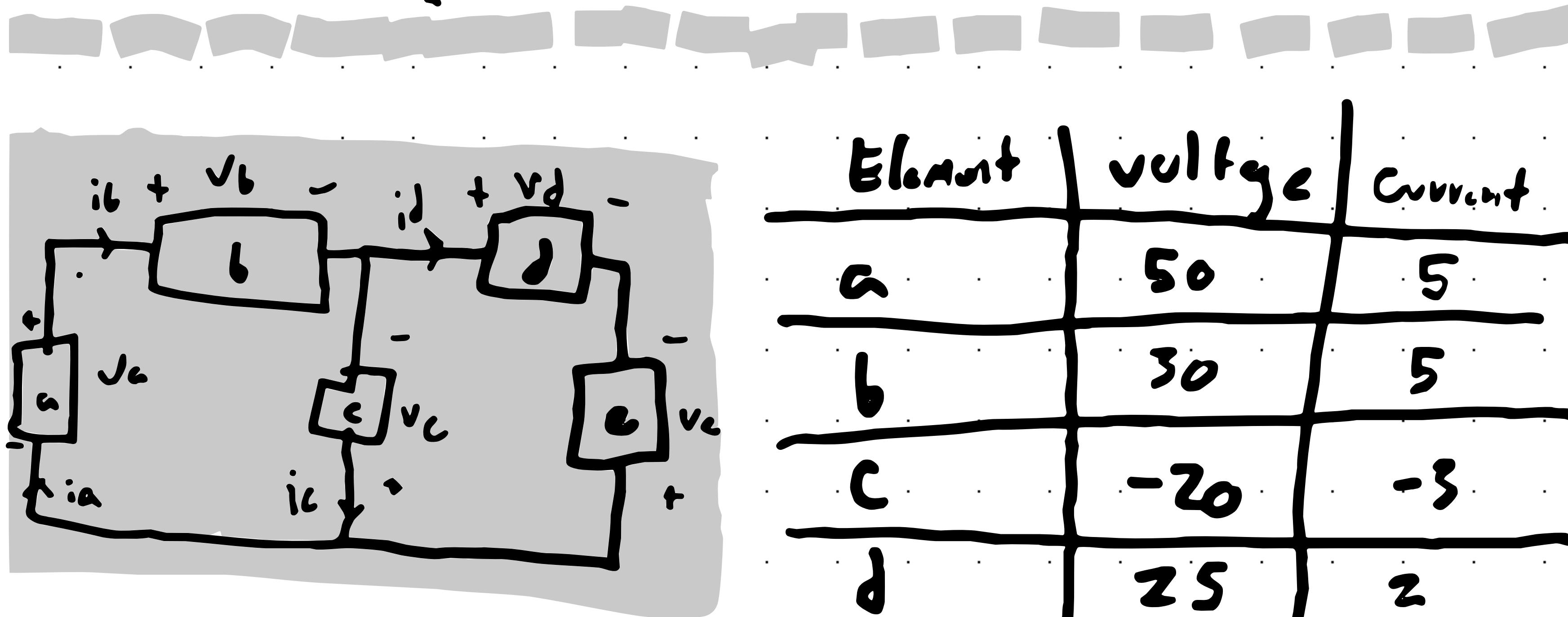
$$I_2 = I \frac{R_1}{R_1 + R_2}$$



This applies to resistors in parallel!!

Problem 1:

Does the interconnect satisfy the Power Check?



$$P_{gen} = \textcircled{0} \text{ to } \textcircled{+}$$

$$P_{abs} = \textcircled{+} \text{ to } \textcircled{-}$$

$$P_a = -V_a i_a = -50(5) = -250W \quad \textcircled{A}$$

$$P_b = V_b i_b = + (30)(5) = 150W \quad \textcircled{P}$$

$$P_c = -V_c i_c = - (-20)(-3) = -60W \quad \textcircled{A}$$

$$P_d = V_d i_d = + (25)(2) = 50W \quad \textcircled{P}$$

$$P_e = -V_e i_e = - (-30)(2) = 60W \quad \textcircled{P}$$

A is active
Current going low to high
($P_{gen}, -V_a i_a$)

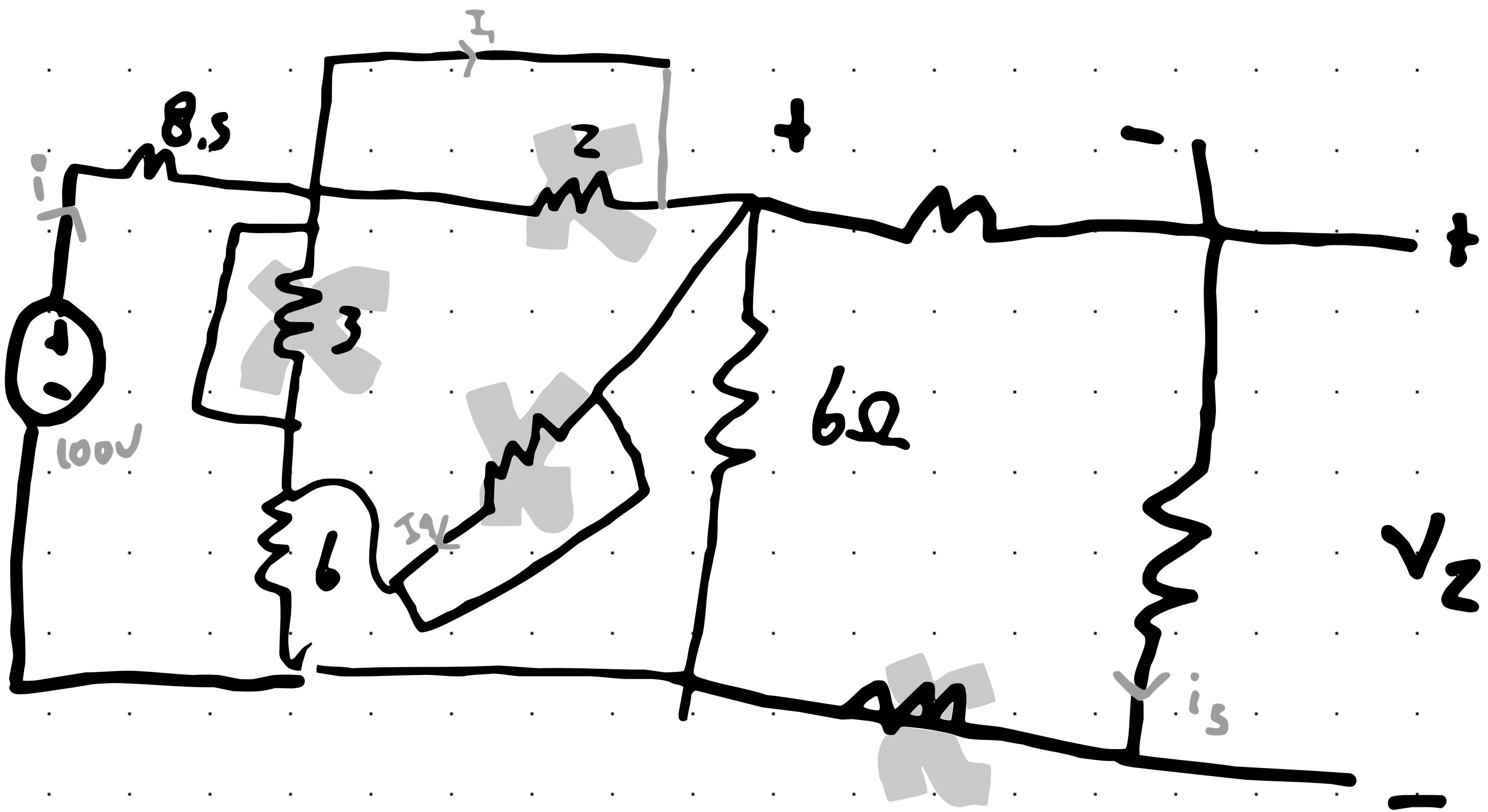
B is passive
Current going high to low
($P_{abs}, V_b i_b$)

We were given
the wrong polarity,
but it's okay!

$$P_{gen} = -310W \neq P_{abs} = 260W$$

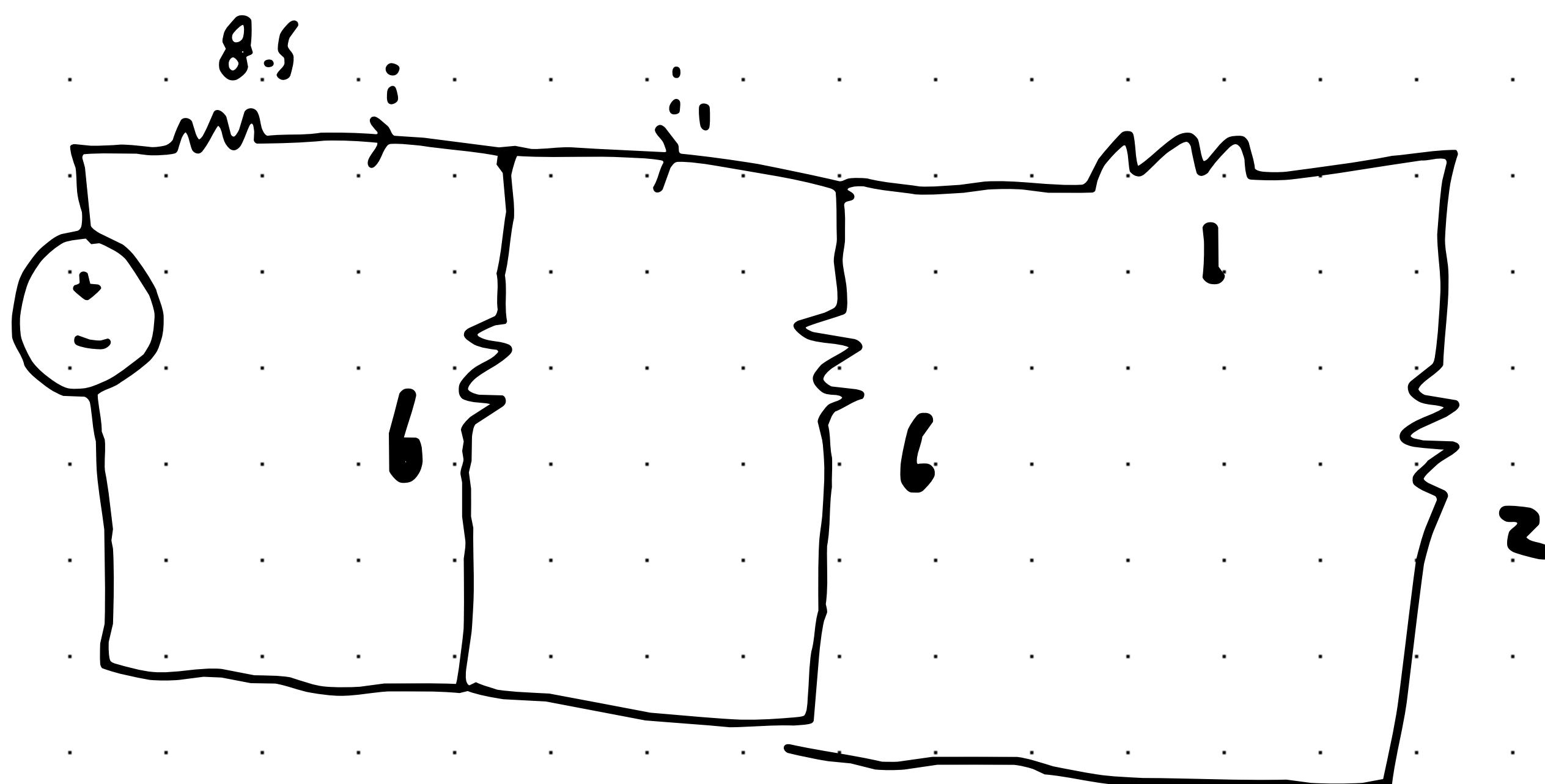
A = Active
P = Passive

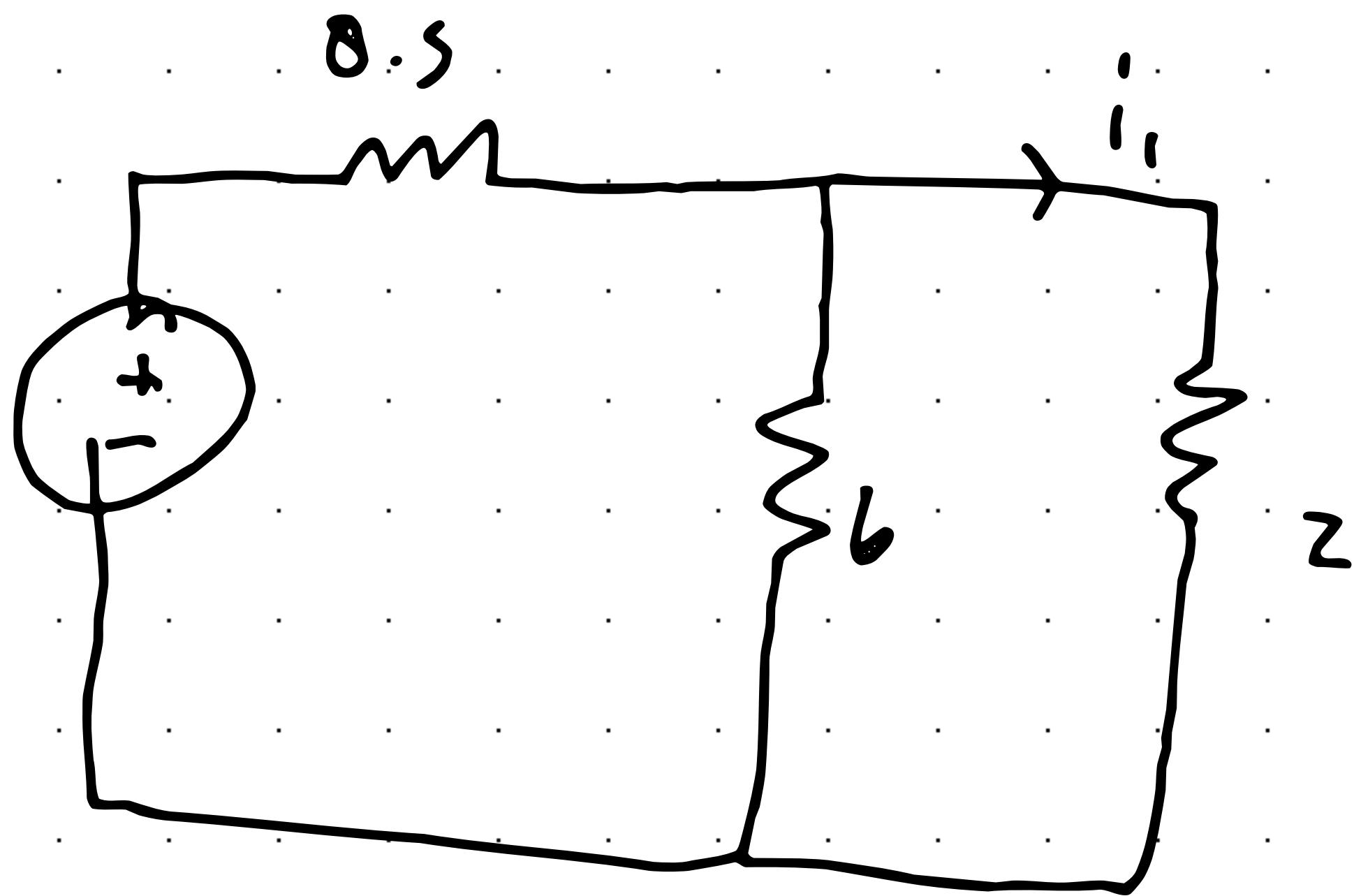
Problem 2



Because of Short Circuit:

$$i_1 = i_2 = i_4 = i_6 = 0$$





$$R_T = \left(\frac{z(6)}{z+6} \right) + 8.5$$

10V
Series

$$R_T = 10\Omega$$

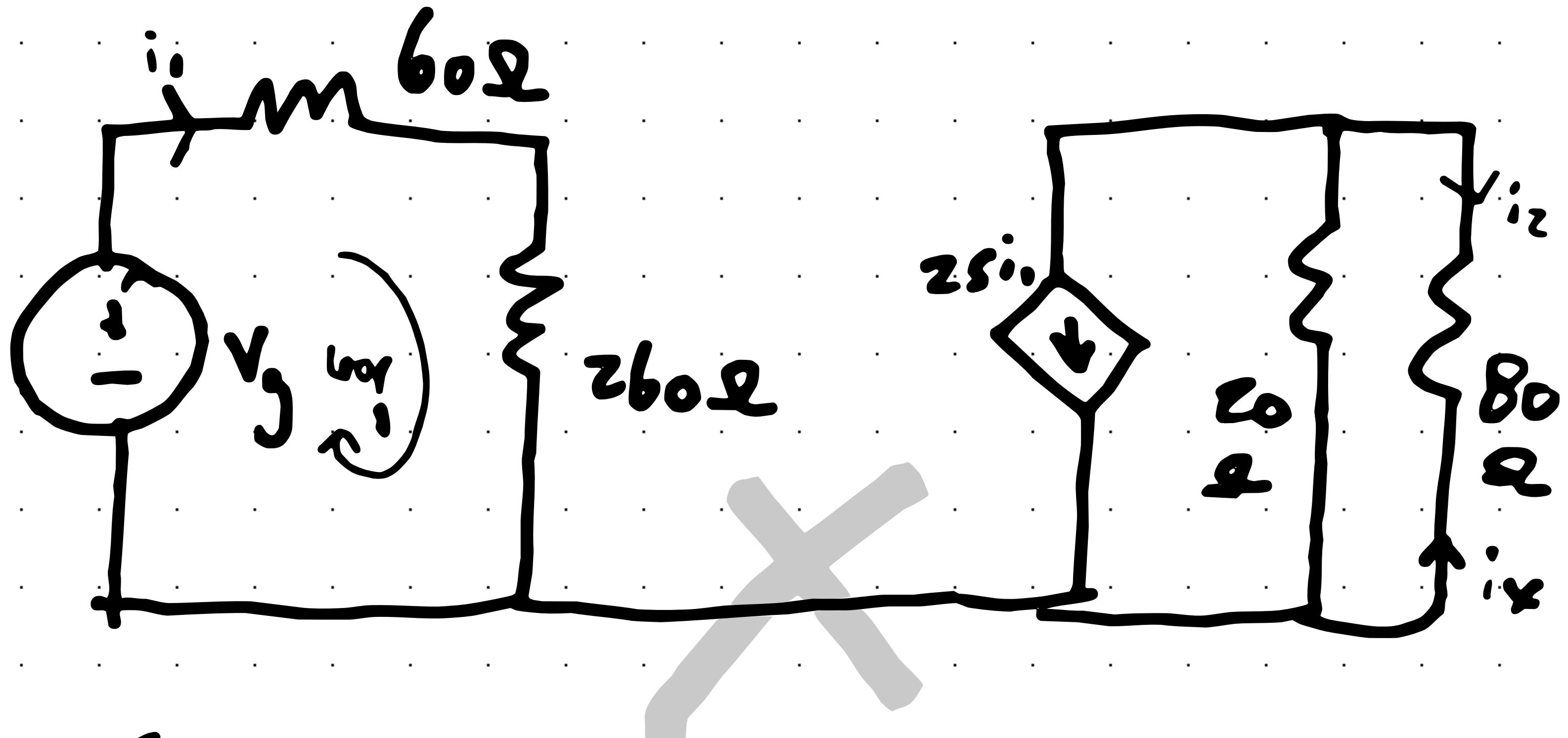
$$V = IR$$

$$10V = I(10)$$

$$I = 1.0A$$

Using the Current Divider

$$i_1 = i \left(\frac{6}{6+2} \right) = 10 \left(\frac{6}{8} \right) \quad 7.5A$$



Solden foor V_g and
 i_x

$$\text{if } i_1 = 1A$$

No Current

on a unclsoed
loop!

loop one

$$V_g - i_1(60) - i_1(260) = 0$$

$$V_g = 320V$$

current divider

$$i_x = 25 \left(\frac{20}{20+80} \right) = 5A$$