1. **Jumpstarting a Car**

Your discussion TA left their lights on, and their car won’t start. Lucky for them, a friendly former Governor happened to be driving by, and he has a few minutes to help.

(a) Given two cables (one red and one black), connect your TA’s battery to the governor’s.

(b) A fully charged car battery has a voltage of 12 V across its terminals. Your TA’s battery is measuring a measly voltage of 10 V. What will happen when you connect the two?

(c) Your TA’s car draws 100 A when you turn the ignition. Describe what happens if:
   i. Immediately after connecting the two batteries, you attempt to start the car.
   ii. You wait a long time between connecting the two batteries and then attempt to start the car.

2. **Series and Parallel Combinations**

For the resistor networks shown below, find an equivalent resistance between the terminals $A$ and $B$ using the resistor combination rules for series and parallel resistors.

(a) ![Diagram of resistor network](image1)

(b) ![Diagram of resistor network](image2)
3. Voltage and Current Dividers

(a) For the circuit below, find the voltage $V_{\text{out}}$ in terms of the resistances $R_1$, $R_2$, and $V_s$.

(b) For the circuit below, find the current through $R_2$.

4. KVL and KCL

For the circuit shown below, $V_s = 5\, \text{V}$, $R_1 = R_2 = 4\, \text{k}\Omega$ and $R_3 = R_4 = 2\, \text{k}\Omega$.

(a) For the circuit above, write KVL equations for each loop and KVL equations for each node.

(b) Solve for the voltage between $A$ and $B$ using resistor combination rules and divider rules.