

Kirchhoff's Rules

physics.info/kirchhoff/problems.shtml

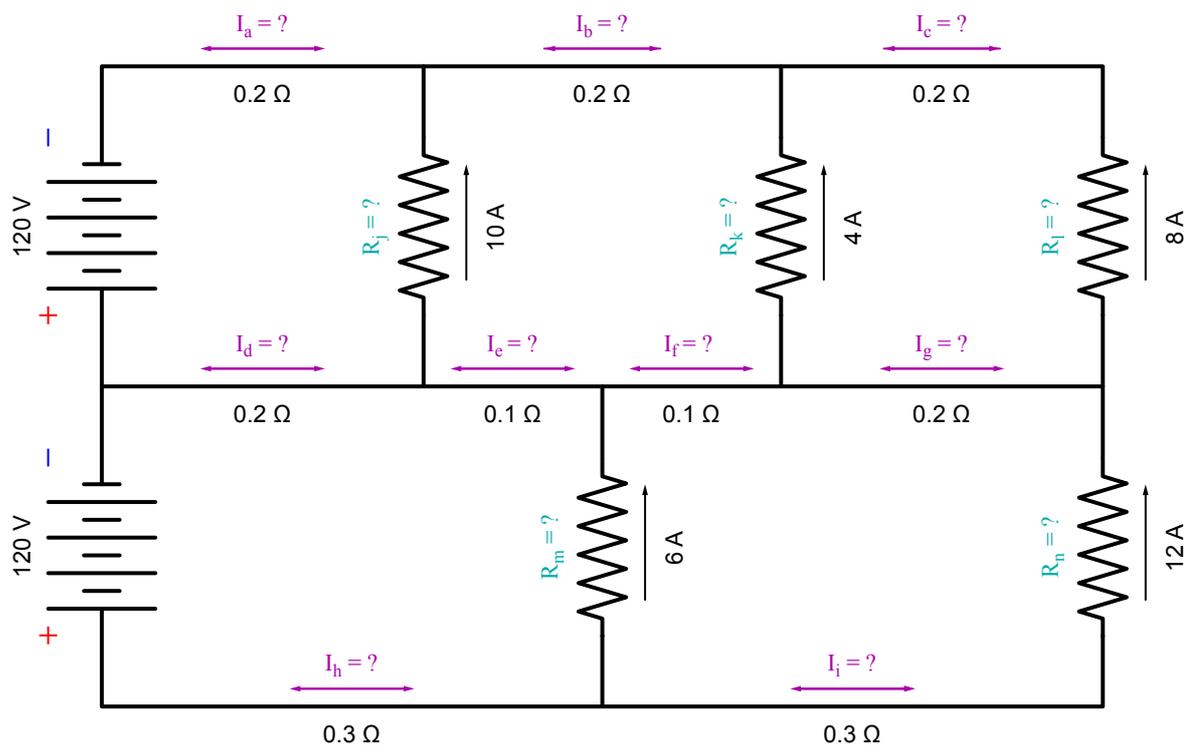
Problems

practice

1. [naval-personnel.pdf](#)

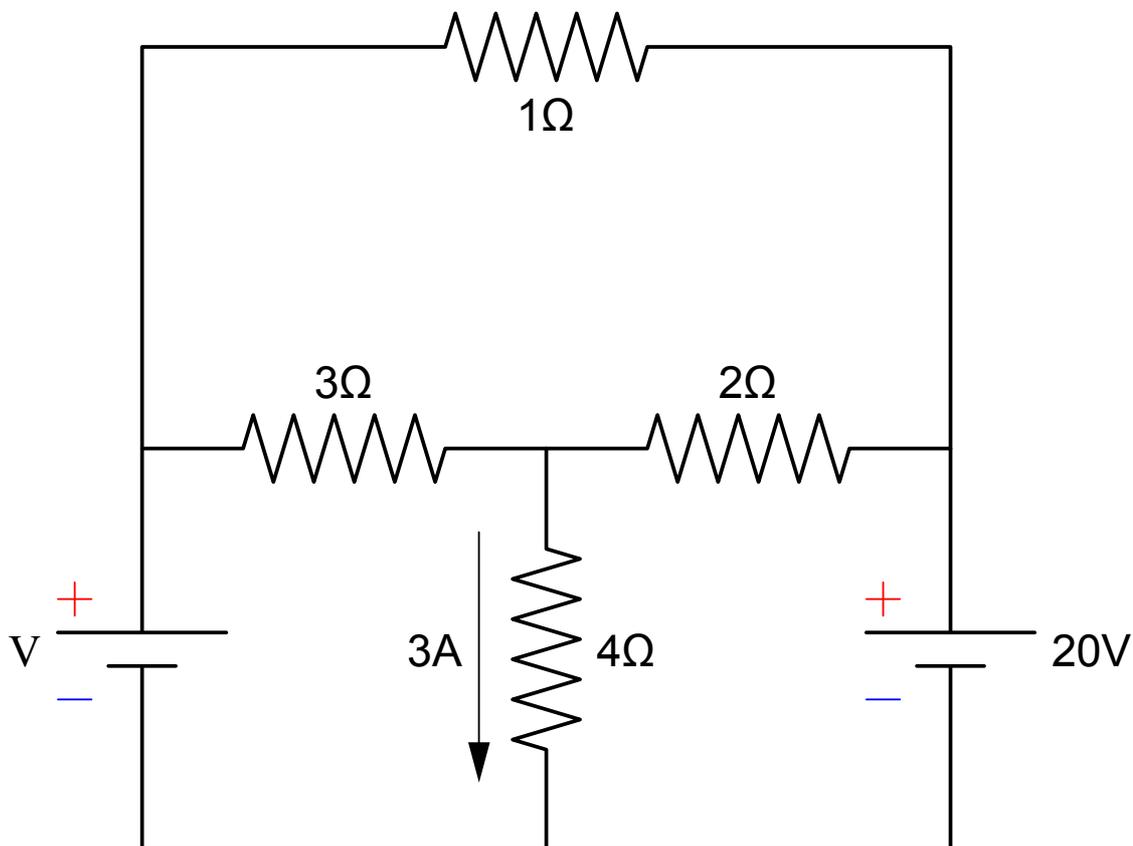
A fairly complicated three-wire circuit is shown below. The source voltage is 120 V between the center (neutral) and the outside (hot) wires. Load currents on the upper half of the circuit are given as 10 A, 4 A, and 8 A for the load resistors j, k, and l, respectively. Load currents on the lower half of the circuit are given as 6 A and 12 A for the load resistors m and n, respectively. The resistances of the connecting wires a, b, c, d, e, f, g, h, and i are also given. Determine...

1. the current through each of the connecting wires (a, b, c, d, e, f, g, h, i) with the direction (left, right);
2. the voltage drop across each load element (j, k, l, m, n); and
3. the resistance of each load element (j, k, l, m, n).

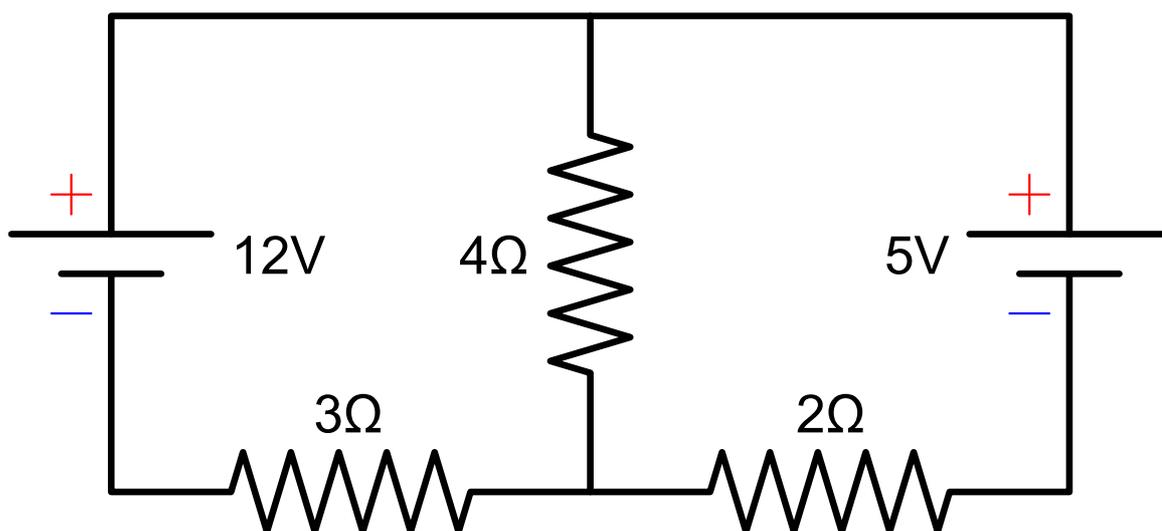


2. Given the circuit below with 3 A of current running through the 4 Ω resistor as indicated in the diagram to the right. Determine...

1. the current through each of the other resistors
2. the voltage of the battery on the left
3. the power delivered to the circuit by the battery on the right



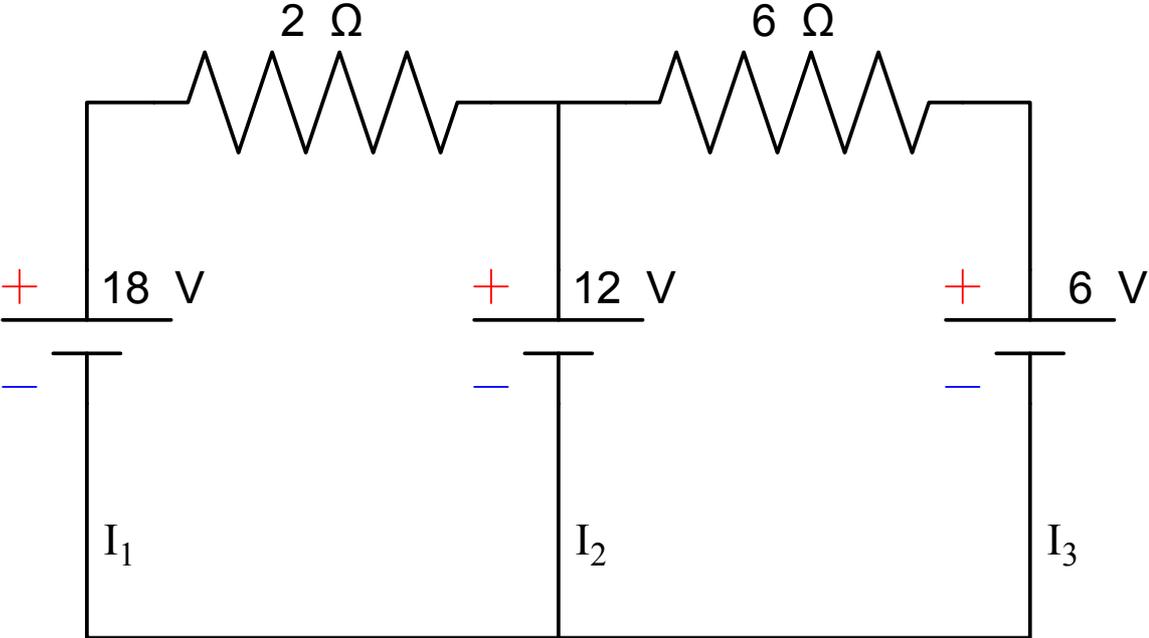
3. Determine the current through each resistor in the circuit shown below.



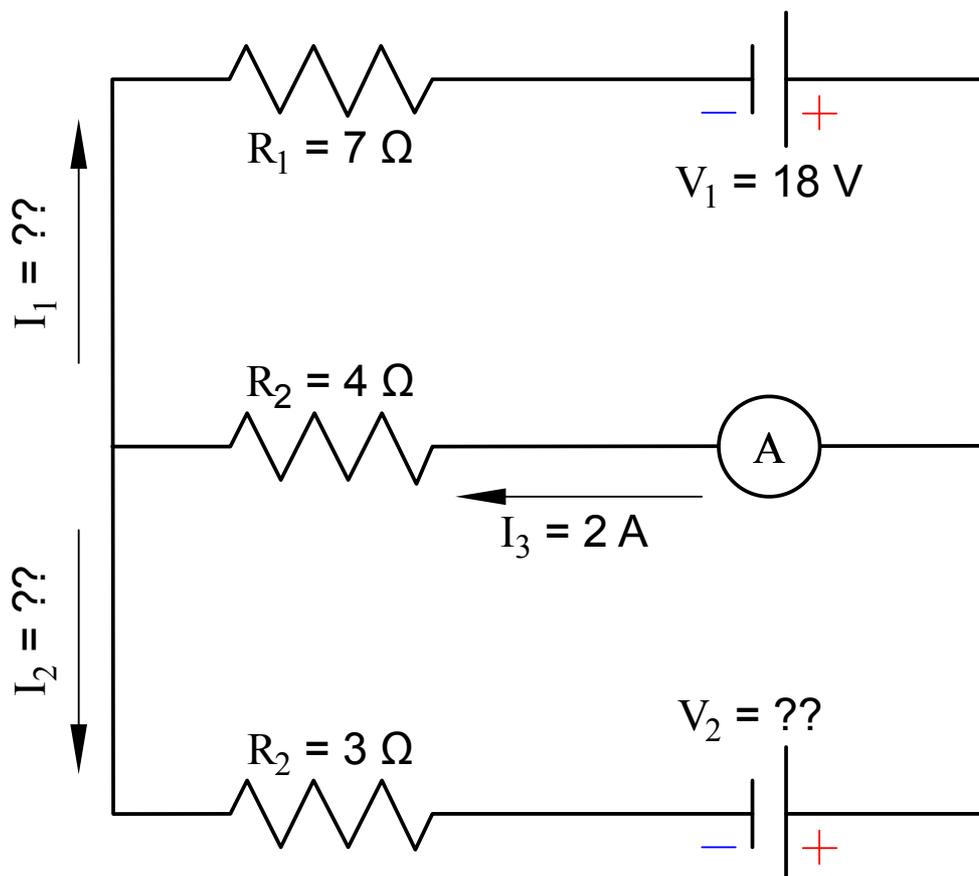
4. Write something completely different.

numerical

1. Determine the currents in the relatively simple three-wire circuit shown below. Specify whether the current is flowing up or down the wire in each case.

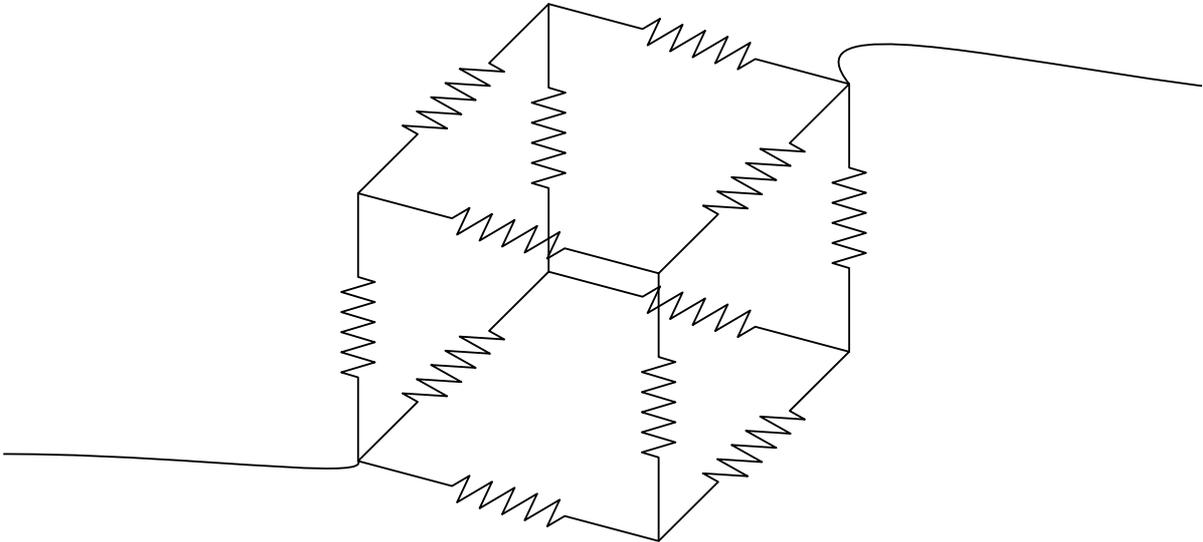


2. Check out the circuit shown below.
 1. Write Kirchhoff's equations for this circuit.
 2. Find the unknown currents I_1 and I_2 .
 3. Find the unknown battery voltage V_2 .



algebraic

1. The circuit below is made of 12 identical resistors on the edges of a cube. Determine the equivalent resistance of the cube across diagonally opposite corners in terms of the resistance R of one edge.



calculus

1. Two batteries of emf \mathcal{E} and internal resistance r are connected in parallel to a load of resistance R as shown in the diagram below.
1. Write Kirchhoff's equations for this circuit.
 2. Determine the current through the load.
 3. Show that the power dissipated by the load is a maximum when $R = \frac{1}{2}r$.

