

In this problem, we wish to find the source current i . The circuit has one independent voltage source and 8 resistors. We will combine these resistors into a single equivalent resistor. We can then find i by using Ohm's Law. Since $V=I \cdot R$, i will be the source voltage divided by equivalent resistance.

First recognize that the $3\text{k}\Omega$ and $6\text{k}\Omega$ resistors are in parallel since they share the same pair of nodes. We can combine them by dividing their product by their sum, giving us a $2\text{k}\Omega$ resistor to replace them.

Next, notice that two identical $2\text{k}\Omega$ resistors are in parallel and can be reduced to a single $1\text{k}\Omega$ resistor by dividing the resistance of a single resistor by two.

Note that the $1\text{k}\Omega$ and $1.5\text{k}\Omega$ resistors are actually in parallel since they share the same pair of terminals a and b. To see this, mentally drag terminal b over to a and redraw the circuit. It is clear that the two are in parallel. They can then be reduced to a single $0.6\text{k}\Omega$ resistance by dividing their product by their sum.

We can identify that the $2\text{k}\Omega$, $1\text{k}\Omega$, and $0.6\text{k}\Omega$ resistors are all in series because the same current flows through them. Add these resistances to derive the $3.6\text{k}\Omega$ equivalent resistor.

We can then combine the $3.6\text{k}\Omega$ and $2\text{k}\Omega$ resistors into a $1.29\text{k}\Omega$ resistor by dividing their product by their sum.

The equivalent resistor seen by the source should be the combination of the two remaining resistors into one $2.29\text{k}\Omega$ resistor.

Use Ohm's Law to find the source current. Divide 10 by 2.29×10^3 to get a source current of 4.38mA .