

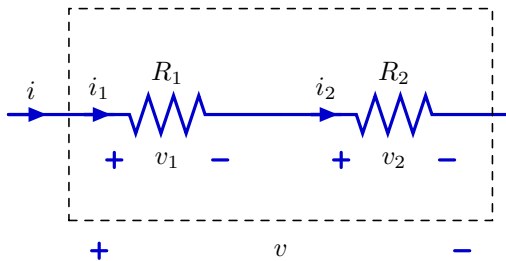
6.200 Circuits and Electronics

Week 2, Lecture B: Using Voltage Dividers and Current Dividers

Course web site: <https://circuits.mit.edu>

Grab participation sheet by the door.

Resistors in Series: Voltage Divider

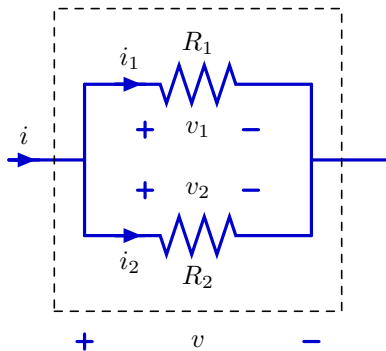


$$R_{\text{eq}} = R_1 + R_2$$

$$v_1 = \frac{R_1}{R_1 + R_2} v$$

$$v_2 = \frac{R_2}{R_1 + R_2} v$$

Resistors in Parallel: Current Divider



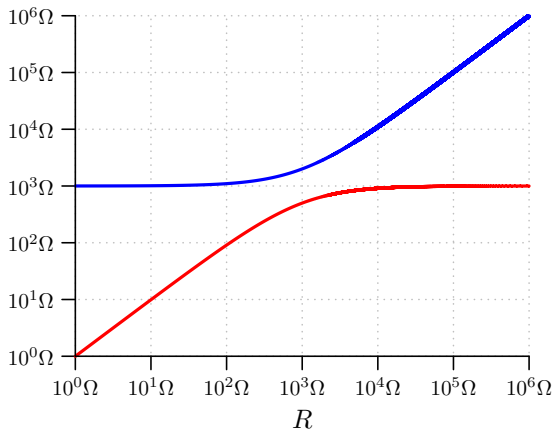
$$R_{\text{eq}} = \frac{R_1 R_2}{R_1 + R_2}$$

$$i_1 = \frac{R_2}{R_1 + R_2} i$$

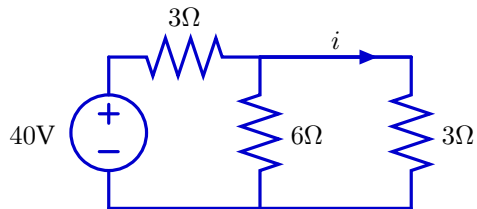
$$i_2 = \frac{R_1}{R_1 + R_2} i$$

Check Yourself! Equivalent Resistance

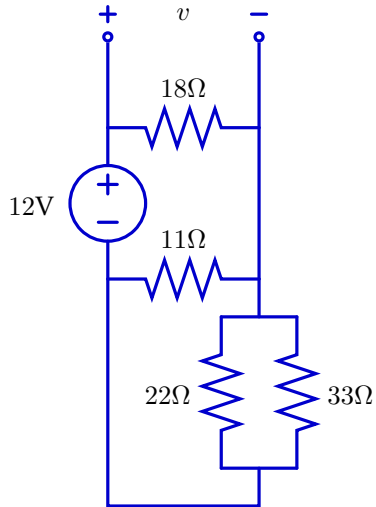
One curve represents the equivalent resistance of R in parallel with $1\text{k}\Omega$, and the other represents the equivalent resistance of R in series with $10\text{k}\Omega$. Which is which?



Check Yourself! Solve for i .

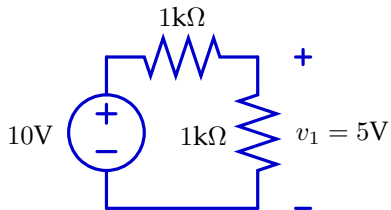


Check Yourself! Solve for v .

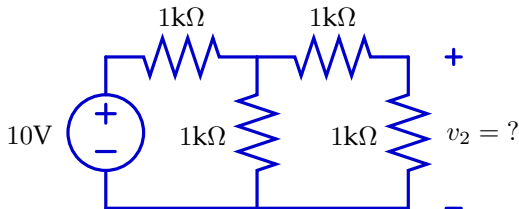


Check Yourself!

Two equal resistors can be used to cut a voltage in half:



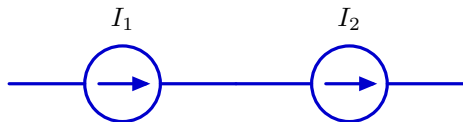
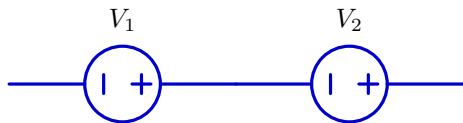
Now consider connecting *another* two resistors of the same form:



Check Yourself!

Lightbulb dimmer problem.

Series Combinations of Other Components



Parallel Combinations of Other Components

