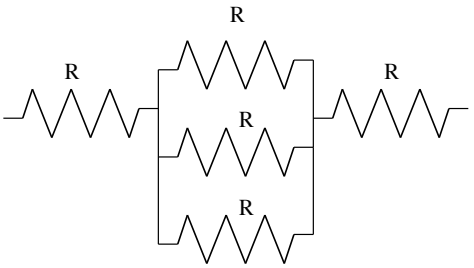
Problem 18.7

a.) Equivalent resistance?



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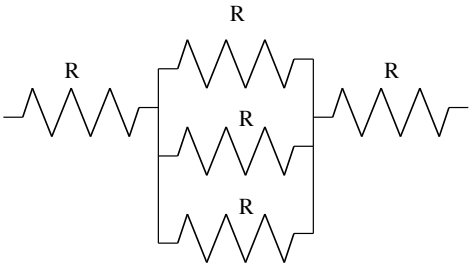

This is, in general, a series combination (the two R's in series with the three parallel R's). What's interesting here is that IF THE RESISTANCE VALUES ARE THE SAME in a parallel combination, the equivalent resistance for the combination will be the single resistance value divided by the number of resistors in the combination. That is:

For 2 R's in parallel:

$$\frac{1}{R_{eq}} = \frac{1}{R} + \frac{1}{R}$$
$$= \frac{2}{R}$$
$$\Rightarrow R_{eq} = \frac{R}{2}$$

For 4 R's in parallel:

$$\frac{1}{R_{eq}} = \frac{1}{R} + \frac{1}{R} + \frac{1}{R} + \frac{1}{R}$$
$$= \frac{4}{R}$$
$$\Rightarrow R_{eq} = \frac{R}{4}$$

Etc.

Using this information, we can automatically write:

$$R_{eq} = R + \frac{R}{3} + R$$
$$= 2.33R$$