

In an earlier problem ([Introduction Problems (Page 9)](#_bookmark16) ), we found that the rms value of a sinusoid was

its amplitude divided by 2. What is average power expressed in terms of the rms values of the voltage and current (***V***rms and ***I***rms respectively)?

**Exercise 3.11.2**

### Equivalent Circuits: Impedances and Sources

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When we have circuits with capacitors and/or inductors as well as resistors and sources, Thevenin and Mayer-Norton equivalent circuits can still be defned by using impedances and complex amplitudes for voltage and currents. For any circuit containing sources, resistors, capacitors, and inductors, the input-output relation for the **complex amplitudes** of the terminal voltage and current is



with *V*eq = *Z*eq*I*eq. Thus, we have Thevenin and Mayer-Norton equivalent circuits as shown in [Figure 3.27](#_bookmark122).

###### Equivalent Circuits