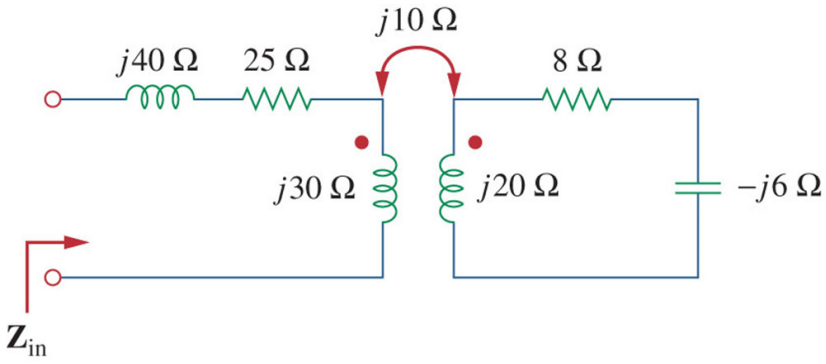
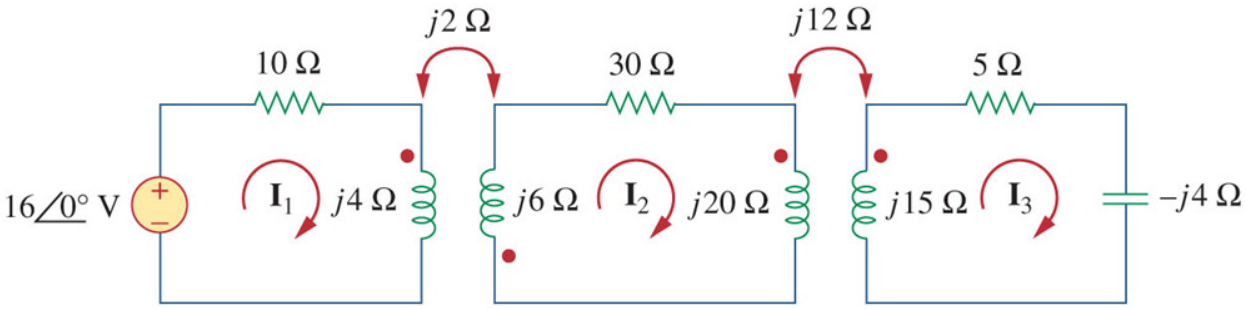
IUPUI ECE 202 Spring 2015:

Homework #3 (Due in class: Feb 4, 2015) Name:

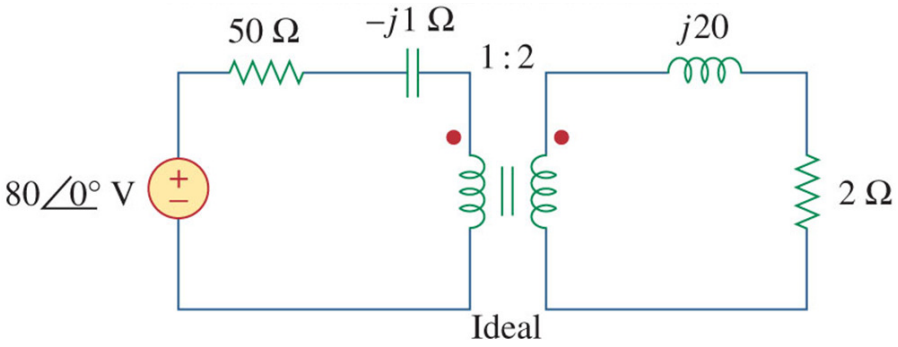
1. (Prob. 13.30 in text) For the circuit shown, find the input impedance by:
   a. Using the concept of reflected impedance Z_R
   b. Replacing the linear transformer by its T equivalent circuit



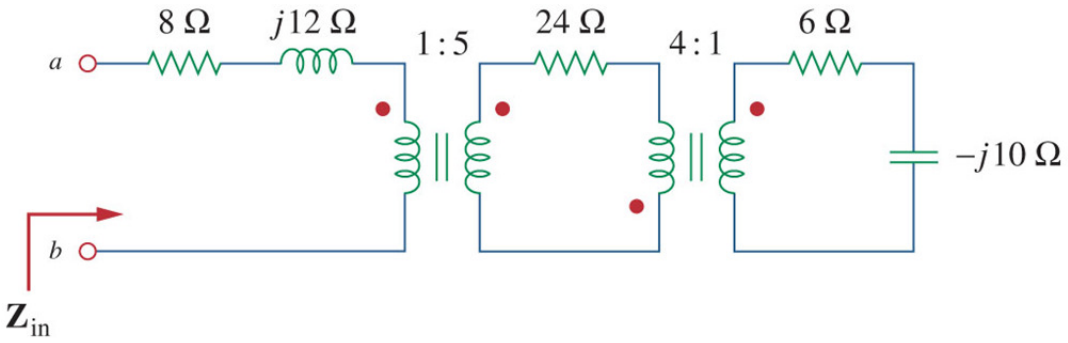
2. (Prob. 13.35 from Text) Find currents $\mathbf{I}_1$, $\mathbf{I}_2$, and $\mathbf{I}_3$ in the circuit below:



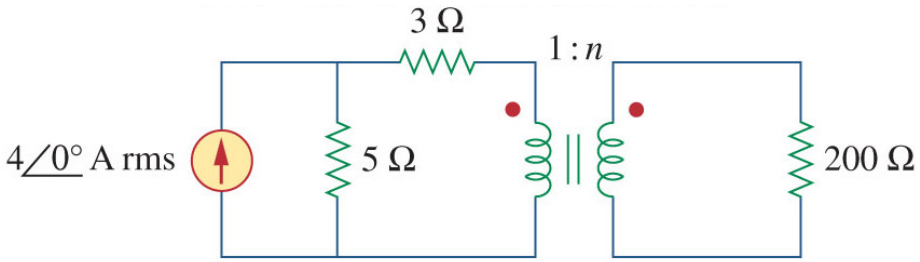
3. (Prob. 13.42 from Text) For the circuit shown, determine the power absorbed by the 2 Ω resistor. (Assume the 80 V is a rms value).



4. (Prob. 13.50 from Text) Calculate the input impedance for the network below:



5. ("Based on" Prob. 13.53 from Text) Refer to the figure below for the following:
   a.) Find the turns ratio n for maximum power supplied to the 200 Ω load.
   b.) Find the average power ($P_{ave} = I_{rms}^2 R$) in the 200 Ω load at this turns ratio.
   c.) Find the average power in the 200 Ω load if the turns ratio n = 6.



6. An audio amplifier with an internal Thevenin impedance of 16 Ω uses a source matching autotransformer shown below to match an 8 Ω speaker for maximum power transfer.
   a. Find the location of the tap N_2 for maximum power transfer to the speaker.
   b. Find the Voltage V_o and Current I_o delivered to the speaker.
   c. Find the average power P_{ave} delivered to the speaker.
   d. Find the location of the tap N_2 if we replaced speaker with a 4 Ω speaker.
   e. Find the average power P_{ave} delivered to the 4 Ω speaker.