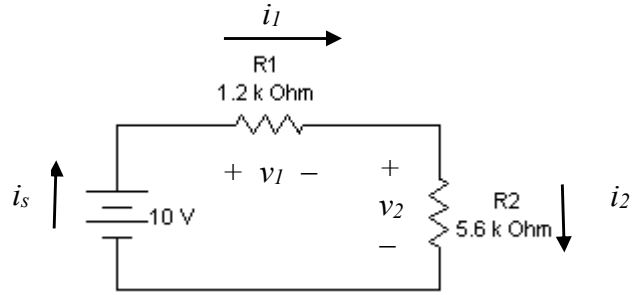


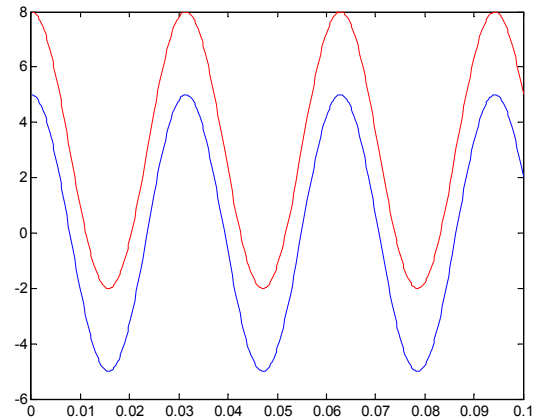
1. Find the following quantities for the circuit at right.

- a. $i_s =$ _____
- b. $i_1 =$ _____
- c. $i_2 =$ _____
- d. $v_1 =$ _____
- e. $v_2 =$ _____
- f. $p_s =$ _____ (Voltage source's power)
- g. $p_1 =$ _____ (R1's power)
- h. $p_2 =$ _____ (R2's power)



2. The graph shows a plot of $v_1 = 5 \cos 200t$ (the lower waveform) and $v_2 = 3 + 5 \cos 200t$ (the upper waveform).

- a. What is v_1 's average value? _____
- b. What is v_2 's average value? _____



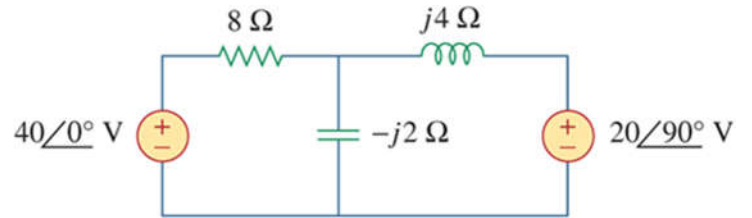
3. If $v(t) = 5 \cos 200t$ V and $i(t) = 8 \cos(200t + 70^\circ)$ A, write the expression for $p(t)$, knowing that $p(t) = \frac{1}{2} V_m I_m \cos(\theta_v - \theta_i) + \frac{1}{2} V_m I_m \cos(2\omega t + \theta_v + \theta_i)$

4. Continuing the previous question, what is the average power?

5. Continuing the previous question, what is the power factor?

6. *Practice Problem 11.4 from the textbook:* Consider the circuit shown below.

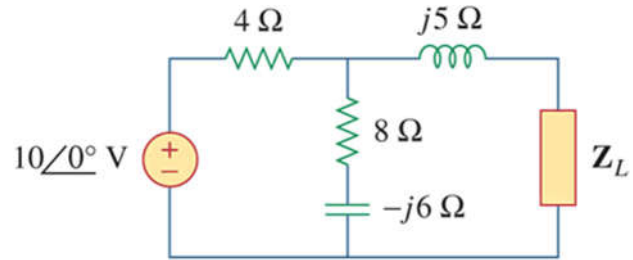
- a. Perform a mesh analysis to find the circuit's mesh currents.



- b. Find the resistor's average power.
- c. Find the inductor's average power.
- d. Find the capacitor's average power.
- e. Find the left-hand voltage source's average power.
- f. Find the right-hand voltage source's average power.

7. *Example 11.5 from the textbook:* Consider the circuit shown below.

- a. Find the circuit's Thevenin-equivalent voltage V_{Th} . Express your answer in polar form.



- b. Find the circuit's Thevenin-equivalent impedance Z_{Th} . Express your answer in both rectangular form and polar form.
- c. What value of load impedance Z_L maximizes the load's average power?
- d. What is the value of the maximum average load power?

8. What is the effective voltage of $v(t) = 5 \cos 200t$ V?
9. What is the peak value of a sinusoidal voltage whose effective value is 120 V rms?
10. Knowing the outlet voltage in the USA is a sinusoid whose frequency is 60 Hz and whose effective value is 120 V rms, write an expression for the voltage's instantaneous value (similar to $v(t) = 5 \cos 200t$ V, but with different numbers). Assume a phase angle of 0° .
11. Suppose you use a digital multimeter to measure the following voltage: $3 \cos 500t$ V.
- If the multimeter is set to measure **DC** voltage, what value will the meter display?
 - If the multimeter is set to measure **AC** voltage, what value will the meter display?
 - To produce that voltage on a function generator, you should adjust the function generator's amplitude knob until the peak-to-peak voltage (as displayed on an oscilloscope) is equal to what value?
 - To produce that voltage on a function generator, you should set the function generator's frequency controls to produce what frequency?