Objective: Verify the AC power formulas.

Procedure:
1. Construct the circuit shown in Figure 1.
2. Connect Channel 1 of the scope to measure the function generator output. Connect Channel 2 to measure the voltage across the resistor.
3. Measure and record the amplitude of the function generator output voltage with the scope and the voltmeter. Compare the RMS voltages.
4. Measure and record the amplitude of the voltage across the resistor with both the scope and the voltmeter. Compare the RMS voltages.
5. Use the scope to measure and record the phase angle difference between the input voltage and the voltage across the resistor (because the circuit current is directly proportional to the voltage across the resistor this will also be the phase angle between the current and the input voltage). Record whether the resistor voltage leads or lags the input voltage. (You must use the scope and be simultaneously looking at both the function generator voltage and the resistor voltage on separate scope channels in order to make this measurement.)
6. Calculate the $I_{\text{RMS}}$ phasor based on the voltage measured across the resistor (use your previous phase angle measurement to determine the phase angle of the $I_{\text{RMS}}$ phasor, the sign depends on whether the angle is leading (+) or lagging (-)).
7. Calculate the apparent power delivered by the source and the apparent power absorbed by the resistor. Compare.
8. Calculate the complex power delivered by the source and the complex power absorbed by the resistor. Use the complex power values to find and compare the real power delivered by the source to the real power absorbed by the resistor.
9. Analyze the circuit and verify all lab results (voltage, current, and power values).

$$v_s(t) = 5 \cos(2\pi 1000t) \text{ V}$$

$$C = 0.22 \, \mu\text{F}$$

$$R = 1 \, \text{k} \Omega$$

Figure 1