Oscilloscope

Review the Textbook on AC Electricity:

- **Phys 1402:** Serway/Vuille: Section 21.1.
- **Phys 2426:** Serway/Jewett: Section 33.1-33.2.

AC Voltage and Current is described by a sin-like oscillation instead of a single value: $V(t) = V_{max}\sin(2\pi ft)$
The product of RMS values of voltage and current describes power delivered by AC power supply.

$$V_{\text{RMS}} = \frac{V_{\text{max}}}{\sqrt{2}} \qquad I_{\text{RMS}} = \frac{I_{\text{max}}}{\sqrt{2}}$$

On a graph, we tend to read the maximum or peak value of the voltage (V_{max}) or current (I_{max}).
With a multimeter, we tend to read the RMS value of the voltage (V_{RMS}) or current (I_{RMS}).

1. The voltage of an AC power supply is given by the function: $V(t) = 15\sin(377t)$, where V is in volts and t is in seconds. What is the frequency of this AC voltage?
(60 Hz, because $2\pi f = 377$.)

2. What is the peak voltage (V_{max}) of the above AC voltage?
(15 V)

3. What is the RMS voltage (V_{RMS}) of the above AC voltage?
(10.6 V)

4. If the above AC voltage is applied to a 100 Ω resistor, what is the amplitude (I_{max}) of the current?
(0.15 A)

5. If the above AC voltage is applied to a 100 Ω resistor, what is the RMS current (I_{RMS})?
(0.106 A)

6. How much power is delivered by the above AC power supply?
(1.124W)

7. What is the peak voltage (V_{max}) of the AC power supply shown in Graph 1?
(6V)

Graph 1: AC Voltage