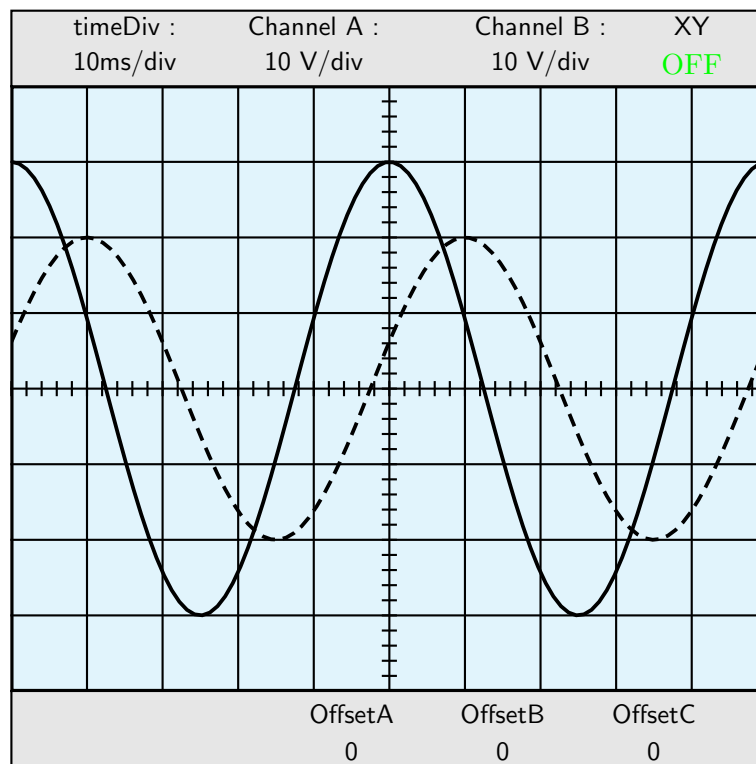


- Homework is due at the beginning of class
- Start early and get help if you need it
- Show all work neatly and clearly; redraw and/or rewrite problem if needed as work turned in should stand alone
- Identify your answers (with units) using a box, circle or underline
- Staple multiple pages together

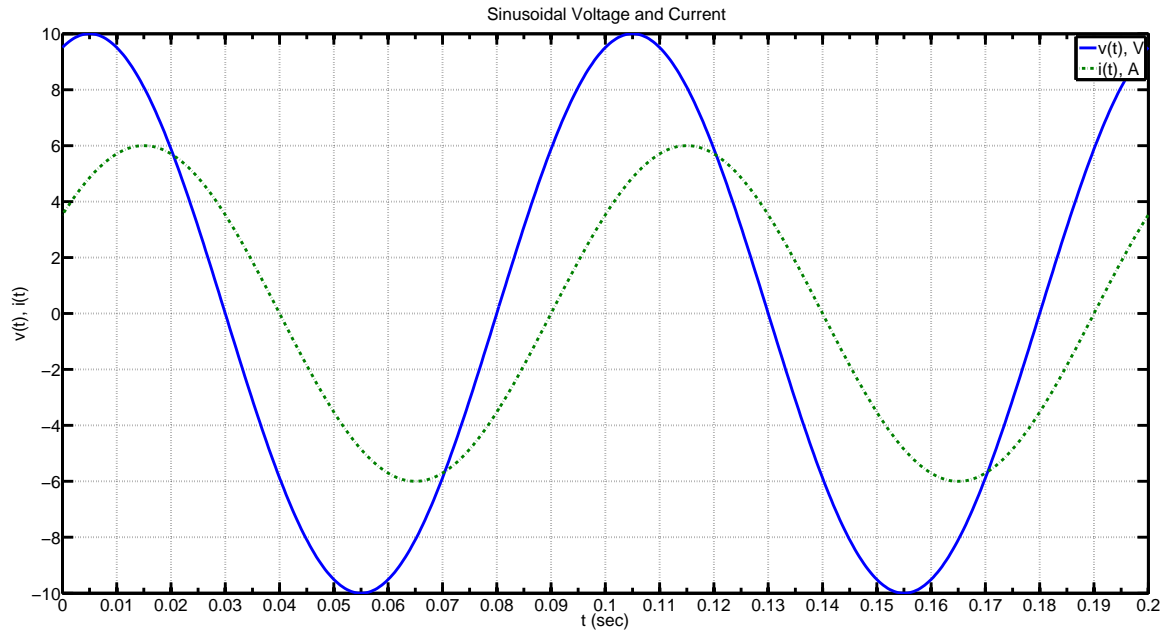
1. Sketch  $v(t) = 160 \cos(377t - 36^\circ)V$  making note of peak value, period and time-shift.
2. Consider the oscilloscope's display below that shows a sinusoidal voltage (solid line) and current (dashed line) with the same period. The voltage and current are displayed such that each square (division) is 10 units vertically and 10ms horizontally, and the origin (0,0) is in the center of the display.



Determine the following:

- (a) period,  $T$ , of the voltage and current;
- (b) frequency,  $f$ , of the voltage and current;
- (c) angular frequency,  $\omega$ , of the voltage and current;
- (d) amplitude (peak value),  $V_P$ , of the voltage;
- (e) peak-to-peak value,  $V_{PP}$ , of the voltage;
- (f) RMS value,  $V_{RMS}$ , of the voltage;
- (g) time-shift,  $\Delta t_v$ , of the voltage;
- (h) phase-shift,  $\phi_v$ , of the voltage in radians and degrees;
- (i) mathematical expression for the voltage  $v(t)$  as a cosine;

- (j) amplitude (peak value),  $I_P$ , of the current;
  - (k) peak-to-peak value,  $I_{PP}$ , of the current;
  - (l) RMS value,  $I_{RMS}$ , of the current;
  - (m) time-shift,  $\Delta t_i$ , of the current;
  - (n) phase-shift,  $\phi_i$ , of the current in radians and degrees; and
  - (o) mathematical expression for the current  $i(t)$  as a cosine;
3. Consider the sinusoids in the figure below where the voltage and current have the same frequency. Note the origin (0,0) point for reference.



Determine the following:

- (a) period,  $T$ , of the voltage and current;
- (b) frequency,  $f$ , of the voltage and current;
- (c) angular frequency,  $\omega$ , of the voltage and current;
- (d) amplitude (peak value),  $V_P$ , of the voltage;
- (e) peak-to-peak value,  $V_{PP}$ , of the voltage;
- (f) RMS value,  $V_{RMS}$ , of the voltage;
- (g) time-shift,  $\Delta t_v$ , of the voltage;
- (h) phase-shift,  $\phi_v$ , of the voltage in radians and degrees;
- (i) mathematical expression for the voltage  $v(t)$  as a cosine;
- (j) amplitude (peak value),  $I_P$ , of the current;
- (k) peak-to-peak value,  $I_{PP}$ , of the current;
- (l) RMS value,  $I_{RMS}$ , of the current;
- (m) time-shift,  $\Delta t_i$ , of the current;
- (n) phase-shift,  $\phi_i$ , of the current in radians and degrees; and
- (o) mathematical expression for the current  $i(t)$  as a cosine;