

Homework Assignment #11 – due in class on Wednesday, Nov. 14, 2012

Note on phase shift:

Remember that the standard way of expressing phase is to use values with magnitudes less than 180° . That is, phase shift is normally expressed in the range -180 to $+180$. For example, a waveform that lags (follows) another by -210° would usually be said to *lead* the other by $+150^\circ$ ($-210^\circ = +150^\circ$).

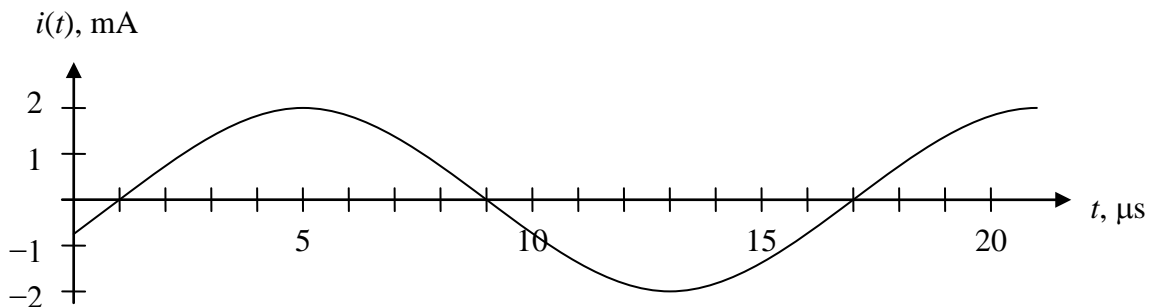
Textbook Problems: 7.19 and 7.20.

Simultaneous, linear equations with complex numbers: Use your calculator to solve for x and

y and express the solution in polar form: $(j2)x + (1 - j)y = 5 \angle -30^\circ$
 $(1 + j)x - (3 + j)y = 1$

Additional Problems:

1. Find a mathematical expression for the following sinusoidal current in cosine form. Assume that the sinusoidal waveform extends beyond the curve shown in the positive and negative t directions. Pay attention to the units on both axes.



2. What is the *period* of the sinusoidal waveform in Prob. 1?
3. If the current in Prob. 1 is flowing through a $10\text{-}\mu\text{H}$ inductor, what is the maximum voltage drop (any polarity) across the inductor at any time?
4. Redraw the current waveform in Prob. 1 for the case when it has experienced a phase shift of $+40^\circ$.
5. Calculate the phase shift (in degrees) between waveforms i_1 and i_2 in the figure below. Be sure to indicate which waveform leads or lags (follows) the other.

