

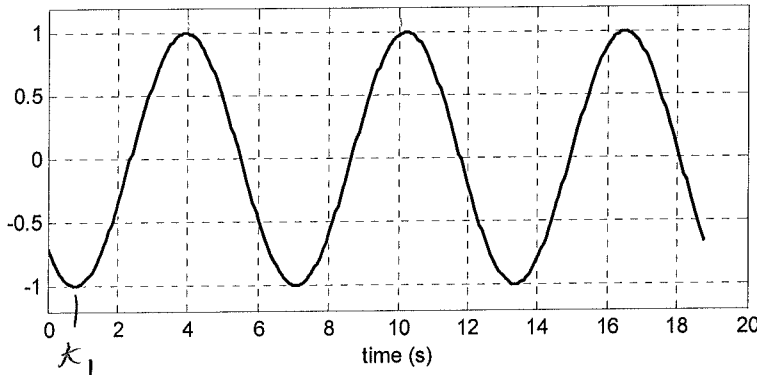
Name: Solution

EMA 545 – Pop Quiz #1 - Prof. M. S. Allen
Closed book, no calculators

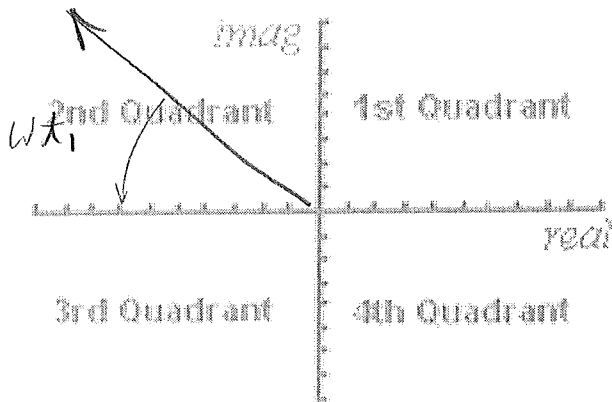
Apr. 2013

Problem #1 (5 pts each)

The figure below shows a harmonic function $q(t)$ whose frequency is $\omega=1.0$ rad/s.

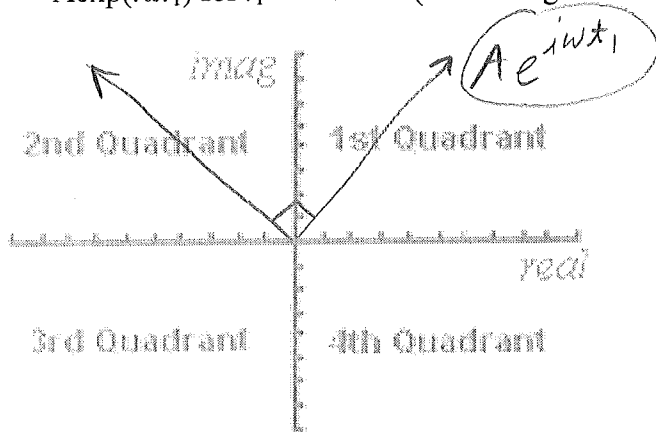


- a.) If this were expressed as a complex exponential $q(t)=\text{real}(A\exp(i\omega t))$, in which quadrant would A be located? Why? Sketch the complex vector A on the axes below.



2nd Quad
 $\rightarrow q$ is negative and increasing, so it would reach its neg. extreme soon (neg peak at t_1)

- b.) Suppose that the expression for $q(t)$ is also valid before time zero. Sketch the complex vector $A\exp(i\omega t_1)$ for $t_1 = -1.5$ sec (i.e. $t =$ negative 1.5 seconds).



$\omega = \frac{2\pi}{6} \approx 1$
 $A e^{i(1)(-1.5)} \approx A e^{-i1.5}$
 rotate backwards by 1.5 rad $\approx 90^\circ$