EE322 Fall 2012 Homework Problem Set 21 (PS21)

1. Sketch the magnitude and phase functions for:
   a. $x(t) = \sin(2\pi 100t)$

   b. $x(t) = j\,\mathrm{sgn}(t)$

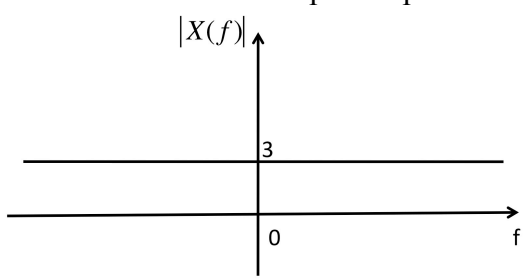
   c. $X(f) = -0.5j\left[\delta(f-50) - \delta(f+50)\right]$

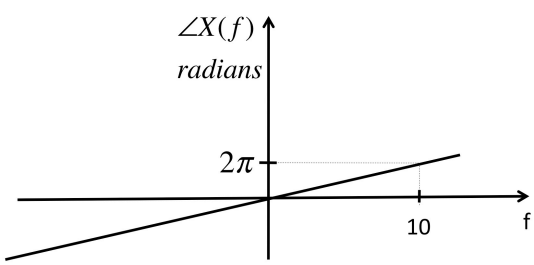
2. A complex function is given by: $x(t) = \cos(2\pi 10t) + j\sin(2\pi 10t)$. Determine its magnitude and phase functions.

3. A complex function is given by $2e^{j20t}$. Determine its associated:

   a. Magnitude function.
   b. Phase function.
   c. Real function.
   d. Imaginary function.

4. The magnitude and phase plot for a complex function of frequency is given below. Determine its equation. Hint: think "complex exponential".





5. Bonus: Find all roots of $x^6 = 1$. Hint: there are 6 roots, and they are all different. Hint: think in terms of complex exponentials. Sketch them on a complex plot.