

1. Consider the periodic continuous-time signal  $x(t) = |\cos(20\pi t)|$ . [10 points]
  - (a) Find the Fourier transform of  $x(t)$ . Sketch the magnitude response. Label and amplitude and the frequency axes.
  - (b) Using your answer from part (a) above, determine the exponential Fourier series coefficients,  $C_k$ , for  $x(t)$ .
  - (c) Design a filter with frequency response,  $H(\omega)$ , such that when  $x(t)$  through the associated LTI system, the output is  $\cos(80\pi t + \pi/4)$ . Determine the magnitude and phase response of  $H(\omega)$ . What type of filter does this correspond to?
2. 7.6-2 on page 766.
3. 7.7-1 on page 766.
4. 7.7-4 on page 767.