# Homework #3

## (Due by 17:30, November 13, 2014)

1. Determine the Fourier series representation of the signal shown in Fig. 1.
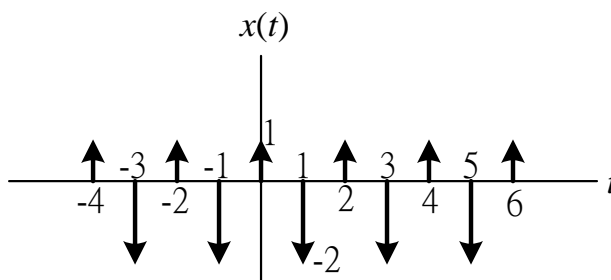


Fig. 1

2. Consider the following three periodic continuous-time signals:

$$x(t) = \cos(4\pi t),$$
$$y(t) = \sin(8\pi t),$$
$$z(t) = x(t)\,y(t).$$

   (1) Determine the fundamental period of each signal.
   (2) Determine the Fourier series coefficients of $x(t)$.
   (3) Determine the Fourier series coefficients of $y(t)$.
   (4) Determine the Fourier series coefficients of $z(t)$.

3. Determine the Fourier transform of the signal $x(t)$ shown in Fig. 2, where

$$x_0(t) = \begin{cases} e^{-t}, & 0 \le t \le 1 \\ 0, & elsewhere \end{cases}.$$

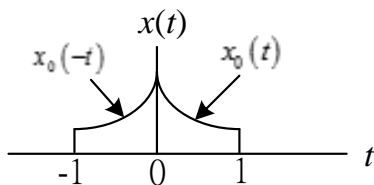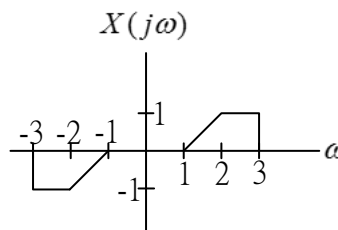4. Determine the inverse Fourier transform of the signal shown in Fig. 3.



Fig. 2



Fig. 3