Homework Assignment 4
Due Friday April 27

1. From the text book:

   (a) page 41 Ex. 2,3,5

   (b) page 47 Ex 1,2

2.
$$f(x) = \begin{cases} -1, & -1 < x < 0 \\ 1, & 0 < x < 1 \\ 0, & otherwise \end{cases}$$

   Show that
$$f(x) = \frac{2}{\pi} \int_0^\infty \left(\frac{(1 - \cos s)}{s} \right) \sin sx \, ds$$

3. Find the integral representation for

$$f(x) = \begin{cases} 1 - x^2, & |x| < 1 \\ 0, & |x| > 1 \end{cases}$$

   and deduce the value of the integral

$$I = \int_0^\infty \left(\frac{\sin x - x \cos x}{x^3} \right) \cos(\frac{1}{2}x) dx$$