

## **Homework #2, due February 10.**

1. Find the Fourier integral representation of  $f(x) = \sin x/x$ . (use the cosine-sine representation).
2. A typical 35-mm camera with a standard lens and normal outdoor film can be assumed to have the following parameters:
  - focal length  $f = 50$  mm
  - spatial resolution  $l = 50$  line pairs/mm
  - negative size 25 mm x 35 mm
    - a) Estimate the performance of this camera when taking aerial photographs from an altitude of 5000 m (looking straight down). By “performance” I mean resolution, width and height of the image.
    - b) Assume the center of the image is straight down. If the side of a building spans a distance of 0.5 mm, and the top of the building is 10 mm from the center of the image, how tall is the building?
3. Go to [www.marsunearthed.com](http://www.marsunearthed.com). Find a stereo pair of MOC images that you like. Download the processed, but not map-projected images. Find the relative elevation differences between five points on the two images. You can do this either by identifying pixel locations on the two images digitally, or printing the images and using a ruler. Please show all your work (tell me the measurements you made, the formulas you used, and the values for the constants you plugged in). Please print out the “ancillary data” for the two images so I can check your work. Be careful to use all the data at your disposal; for instance, often the pixels are not square in a MOC image, and the x-scale is different from the y-scale.