Plot Problem Number 1

Use scilab, matlab, maple, or your favorite spreadsheet or graphing program to graph on the same graph the function $h(x)$ (below) and the Fouries series approximations for $N = 1, 3, 5, 11$ and 21. Your plot needs to use color and/or line style changes so as to be able to tell which function is which. The function

$$h(x) = \begin{cases} -1 & -\pi < x < -\pi/2 \\ 1 & -\pi/2 < x < \pi/2 \\ -1 & \pi/2 < x < \pi \end{cases}$$

has Fourier series approximations given by

$$h(x) = \frac{4}{\pi} \sum_{n=1}^{N} \frac{1}{n} \sin \frac{n\pi}{2} \cos nx$$

(which is just another way of saying letting $N \to \infty$ yields the Fourier series).

Many computers on campus have Maple or Matlab, but most have scilab and you can download it from free. There is a file minplot.sci (in our scilab directory) which shows how to use scilab to make a postscript file with a plot.