## MAT2011 Spring 2011: Unassessed Homework Assignment \#4

4.1 Consider the functions $f(x)=1$ and $g(x)=x$ defined on the interval $[0,1]$.
(i) Compute the Fourier sine series of $f$ and $g$. Plot the partial sum of these series together with the odd extensions of $f$ and $g$ on the interval $[-1,1]$.
(ii) Compute the Fourier cosine series of $f$ and $g$. Plot the partial sum of these series together with the even extensions of $f$ and $g$ on the interval $[-1,1]$.
(iii) Compare the results you obtained in (i) and (ii) separately for $f$ and $g$.

You can use MAPLE for producing these plots.
4.2 By writing $u=R(r) \Theta(\theta)$, where $(r, \theta)$ are plane polar coordinates, find the general solution of

$$
\triangle u=0
$$

in the domain

$$
A=\{(r, \theta): a<r<b, 0 \leq \theta \leq 2 \pi\}
$$

(Here, $a$ and $b$ are positive constants.)

