Math 2080: Differential Equations
Worksheet 6.3: Fourier sine and cosine series

NAME:

1. Consider the function defined by $f(x) = 1$ on $[0, \pi]$.

   (a) Sketch the even extension of $f(x)$ and compute the Fourier cosine series.

   (b) Sketch the odd extension of $f(x)$ and compute the Fourier sine series.

2. Consider the function defined on $[0, \pi]$ by $f(x) = x(\pi - x)$. Sketch the even extension of this function and compute its Fourier cosine series. The following indefinite integral will be needed:

$$\int x(\pi - x)\cos(nx)\,dx = \frac{(n^2(\pi - x)x + 2)\sin nx + n(\pi - 2x)\cos nx}{n^3} + C.$$