Plot Problem Number 3

This time we want 2 graphs. The 2π-periodic function

$$f(x) = \frac{1}{12}x(x^2 - \pi^2)$$

has Fourier series approximations given by

$$f(x) = \lim_{N\to\infty} \sum_{n=1}^{N} (-1)^n \frac{1}{n^3} \sin nx$$

The first required graph will plot $f(x)$ and the 3 Fourier series approximations for $N = 1, 2$ and 3. The second required graphs only plots the errors of estimation, that is it graphs the values of

$$\text{error}_N(x) = f(x) - \sum_{n=1}^{N} (-1)^n \frac{\sin nx}{n^3}$$

for $N = 1, 2, 3$ and 4. (One more than the first plot.) (Make sure the second graph shows the x-axis)