

Name (Last, First)

1. (7pts) Compute the Fourier series for $f(x) = |x|$, $-\pi < x < \pi$.

2. (3pts) Compute the Fourier series for

$$g(x) = \begin{cases} x^2, & \text{if } 0 < x < \pi \\ -x^2, & \text{if } -\pi < x < 0 \end{cases}$$

You can use the fact (without a proof) that $-\pi^2 + 2 \int_{-\pi}^x f(t)dt = g(x)$ where $f(x)$ is the function from Problem 1. Also, you will need the following Fourier series

$$x \sim \frac{2}{\pi} \sum_{n=1}^{\infty} (-1)^{n+1} \frac{\sin nx}{n} \quad \text{on } [-\pi, \pi].$$