Tutorial 8

Find the Fourier series of the given function *f(x)*, which is assumed to have the period 2π. Show the details of your work. Give the first three non-zero terms of the Fourier series.

1. $f(x) = \begin{cases} x, & \text{if } -\pi < x \leq 0 \\ \pi - x, & \text{if } 0 < x \leq \pi \end{cases}$.

2. $f(x) = x^2$ $(0 < x \leq 2\pi)$.

3. $f(x) = x^2$ $(-\pi < x \leq \pi)$.

4. $f(x) = \begin{cases} x + \pi, & \text{if} -\pi < x \leq 0 \\ \pi - x, & \text{if} \quad 0 < x \leq \pi \end{cases}$.

5. $f(x) = x, (-\pi < x \leq \pi)$.