Consider the square wave defined by \( f(x) = \begin{cases} 1, & 0 \leq x < \pi \\ -1, & -\pi \leq x < 0 \end{cases} \) and extended to be \( 2\pi \)-periodic.

1. Sketch \( f(x) \) and find its Fourier coefficients (i.e., \( a_0 \), \( a_n \), and \( b_n \)).
2. Write $f(x)$ as a Fourier series: $f(x) = \frac{a_0}{2} + \sum_{n=1}^{\infty} a_n \cos nx + b_n \sin nx$.

3. Explicitly write out the first few terms ($n = 0, 1, \ldots, 7$) of the Fourier series of $f(x)$.