Useful facts:

- A function $f(t)$ is odd if $f(-t) = -f(t)$ and even if $f(-t) = f(t)$.
- The Fourier series expansion of a function $f(t)$ of fundamental period $L$ can be written as

$$f(t) = \frac{a_0}{2} + \sum_{n=1}^{\infty} a_n \cos\left(\frac{2\pi nt}{L}\right) + \sum_{n=1}^{\infty} b_n \sin\left(\frac{2\pi nt}{L}\right),$$

where the coefficients are given by the Euler formulas:

$$a_0 = \frac{2}{L} \int_{-L/2}^{L/2} f(t) \, dt$$
$$a_n = \frac{2}{L} \int_{-L/2}^{L/2} f(t) \cos\left(\frac{2\pi nt}{L}\right) \, dt$$
$$b_n = \frac{2}{L} \int_{-L/2}^{L/2} f(t) \sin\left(\frac{2\pi nt}{L}\right) \, dt$$

Questions:

1. Sketch, and write a formula for, the odd extension of the following function (triangle wave). What is its fundamental period?

$$f(t) = \begin{cases} 
    t & \text{for } 0 \leq t < \frac{\pi}{2}, \\
    \pi - t & \text{for } \frac{\pi}{2} \leq t < \pi.
\end{cases}$$

2. Compute the first four nonzero terms in the Fourier series expansion of the odd extension in the previous problem.