1. Define the function $\chi_{\pi/4}$ on $[-\pi, \pi]$ by

$$
\chi_{\pi/4}(t) = \begin{cases} 
1 & \text{if } |t| < \pi/4 \\
0 & \text{if } |t| \geq \pi/4 
\end{cases}
$$

(a) Compute the complex Fourier series of $\chi_{\pi/4}$.

(b) Compute the complex Fourier series of $\chi_{\pi/4}$ in orthonormal form.

2. Let $f(t) = t$ on $[-\pi, \pi]$.

(a) Compute the complex Fourier series of $f$.

(b) Compute the complex Fourier series of $f$ in orthonormal form.