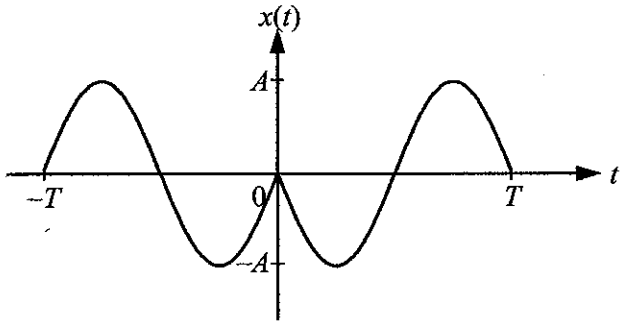
Stanford University, Department of Electrical Engineering
Qualifying Examination, Winter 2009-10
Professor Joseph M. Kahn

A continuous-time signal $x(t)$, $-\infty < t < \infty$, has a Fourier transform $X(j\omega)$, $-\infty < \omega < \infty$.



Without computing $X(j\omega)$, answer the following:

a. What is $X(j0)$?

b. What is $\int_{-\infty}^{\infty} X(j\omega) e^{j\frac{\omega T}{4}} d\omega$?

c. What is $\int_{-\infty}^{\infty} |X(j\omega)|^2 d\omega$?

d. By what power of $|\omega|$ does $|X(j\omega)|$ decrease as $|\omega| \to \infty$?