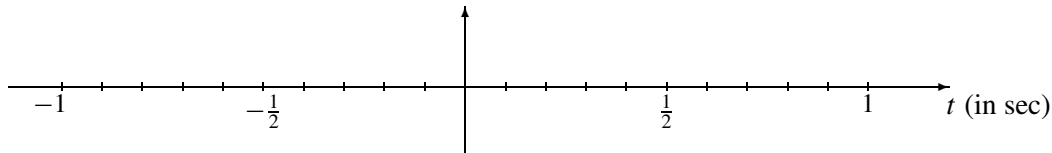## PROBLEM:

Suppose that a periodic signal is defined (over one period) as: $x(t) = \begin{cases} 1 & \text{for } 0.0 < t < 0.3 \\ -1 & \text{for } 0.3 < t < 0.6 \end{cases}$

(a) Assume that the period of $x(t)$ is 0.6 s. Sketch $x(t)$ over the ENTIRE range $-1 \leq t \leq 1$ s.

(b) Write the general Fourier integral expression for the coefficient a_k in terms of the specific signal $x(t)$ defined above. *Set up all the specifics of the integrals (e.g., limits of integration), but do not evaluate the integrals. All parameters in the integrals should have numeric values.*

(c) Evaluate the Fourier integral below. Simplify your answer and express it in **polar form.**

$$\frac{1}{4} \int\limits_{-1}^{1} \cos(\tfrac{1}{2}\pi t) e^{-j2\pi(1)t/4} dt$$