1. Let

\[ x(t) = \begin{cases} 
  t, & 0 \leq t \leq 1 \\
  3 - 2t, & 1 \leq t \leq 2 \\
  0, & \text{otherwise}
\end{cases} \]

(a) Plot \( x(t) \)

(b) Determine and plot the odd component \( x_o(t) \) and even component \( x_e(t) \) of \( x(t) \)

(c) Is this a power or energy signal? Explain your answer.

(d) Plot \( y(t) = x(2t + 1) \)

2. Let \( x(t) = \cos \left( \frac{2}{5} t \right) + \sin \left( \frac{1}{5} t \right) \)

(a) Is \( x(t) \) periodic? If so, find its fundamental period. If not, explain why?

(b) If \( y[n] = x(5n/2) \), i.e., \( y[n] \) is the sampled signal of \( x(t) \) at every interval \( T = \frac{5}{2} \). Is \( y[n] \) periodic? If so, find its fundamental period. If not, explain why?

3. Given an LTI system with the impulse response \( h(t) \) is shown in Fig. 1.

![Figure 1: \( x(t) = h(t) \)](image)

(a) Determine whether \( h(t) \) is BIBO stable? memoryless? causal? Explain your answer for each case.

(b) Find the output \( y(t) \) corresponding to an input signal \( x(t) = h(t) \).