

H3-08

1. Simplify the following expressions and sketch the signal.

(a) $x(t) = \delta(t-2)r(t) + \frac{d}{dt}[u(t) - r(t-1)]$

(d) $x(t) = \int_{-\infty}^t \delta(\tau+2) d\tau + \frac{d}{dt}[u(t+2)r(t)]$

2. Sketch the signal $x(t)$ and compute and sketch $\int_{-\infty}^t x(\sigma) d\sigma$. Check your integration by "graphical differentiation."

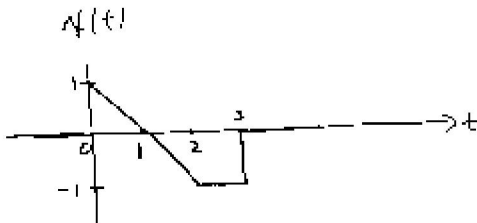
(a) $x(t) = u(t) - u(t-1) + 2\delta(t-2) - 3\delta(t-3) + \dot{\delta}(t-4)$

(b) $x(t) = -2u(t+1) + 3u(t) - u(t-2)$

3. Sketch the signal $x(t)$ and compute and sketch $\dot{x}(t)$. Check your derivative by "graphical integration."

$$x(t) = r(t+1) - r(t) + u(t) - 3u(t-1) + u(t-2)$$

4. Write a mathematical expression for the signal $x(t)$ shown below.



Compute and sketch $\dot{x}(t)$, the generalized derivative of $x(t)$.

5. Determine if the following signals are periodic, and if so compute the fundamental period.

(a) $x[n] = e^{j\frac{20\pi}{3}n}$

(b) $x[n] = e^{j4\pi n} - e^{-j\frac{\pi}{4}n}$

(c) $x[n] = e^{j\frac{5}{7}\pi n} + e^{-j\frac{3}{4}\pi n}$