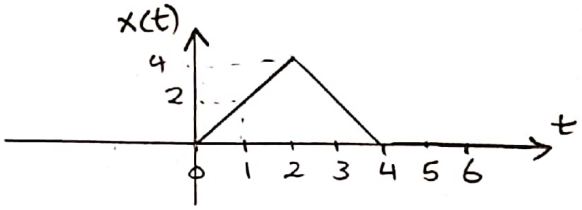
1. Given the following signal:

$$x(t) = \begin{cases} 2t & 0 \le t \le 2 \\ -2t + 8 & 2 < t \le 4 \\ 0 & otherwise \end{cases}$$

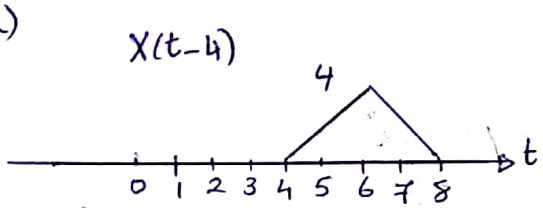
Sketch the following signals

a) $x_1(t) = even\{x(t-4)\}$

b) $x_2(t) = odd\{x(t+2)u(t)\}$

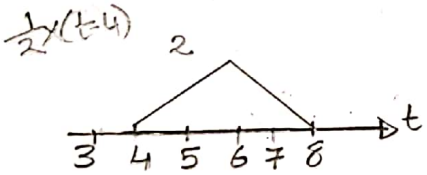


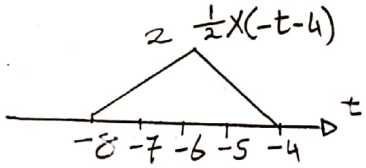
(a)

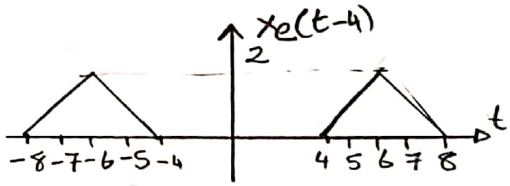


$X_e(t) = \frac{1}{2}X(t) + \frac{1}{2}X(-t)$

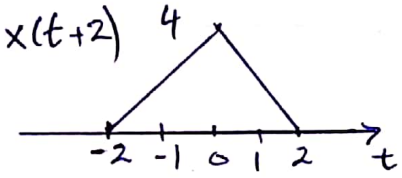
$\therefore X_e(t-4) = \frac{1}{2}X(t-4) + \frac{1}{2}X(-t-4)$

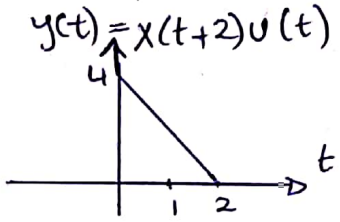




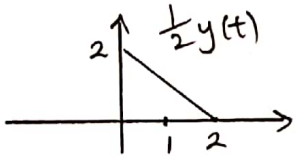


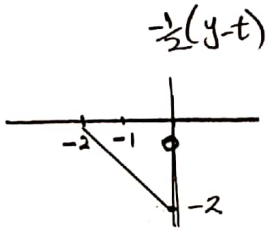
(b) $X(t+2)U(t)$

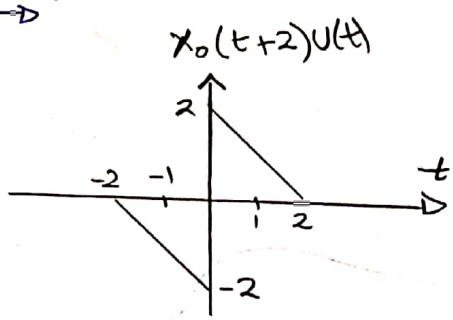




$y_o(t) = \frac{1}{2}y(t) + \left(-\frac{1}{2}y(t)\right)$







Determine for the following signals whether (Periodic or Aperiodic)

$$x[n] = \left(\frac{1}{2}\right)^{2n} u[n] \qquad x[n] = e^{j[\frac{\pi}{2}n - \frac{\pi}{8}]}$$

(a) $x[n] = (1/2)^{2n} u[n]$

Signal is Aperiodic, as it's defined only from $0 \rightarrow \infty$ as signals must be periodic from $-\infty \rightarrow \infty$

(b) $x[n] = e^{j[\frac{\pi}{2}n - \pi/8]}$

$\therefore \frac{N}{m} = \frac{2\pi}{\omega} = \frac{2\pi}{\pi/2} = 4$ $\therefore$ Signal is Periodic with fund. Period $N=4$ @ $m=1$