1. i) Sketch the signal,
   $x(t) = 2u(t) + tu(t) - (t-1)u(t-1) - 3u(t-2)$

   ii) Sketch $x(n)$ and then odd and even part, $x(n) = 1 + u(n)$, $x(t) = e^{2t}$
2. Determine whether the signals given below are periodic or not. If periodic, what is the period?
   i) $x(t) = \cos(t)u(t)$ ii) $x(t) = \cos(2t)+\sin(3t)$ iii) $x(t) = \sin(t)(u(t)+u(-t))$
   iv) $\cos(\pi n2/8)$ v) $\cos(n/2)\cos(n\pi/4)$ vi) $\cos^2(t)$ vii) $\cos(2\pi t u(t))$
3. Determine the total energy or power (whichever is applicable) of the signals $x(t)$, $x[n]$ and $y(t)$ given below.

i) $x(t) = 0.5(\cos(2\pi ft)+1)$, $-(1/2f) < t < (1/2f)$ and zero for all other values of t

ii) $x[n] = u[n]+u[-1-n] +(-1)^n u[n]$ iii) $y(t) = \int_0^t x(\tau)d\tau$ where $x(t) = 3(u(t) - u(t-T))$

iv) $x(t) = 0.5(\cos(\omega t)+1)(u(t+\pi/\omega) - u(t - \pi/\omega))$ v) $x[n] = u[-3- \ n]+u[n-3]$.

vi) $x(t) = tu(t)$ vii) $x[n] = Cos(n\pi)u(n)$

4. State with justification whether the following systems are Memory less, causal, linear, time invariant, stable and invertible.

a) $y(t)=x(t-2)+ x(2-t)$	b) $y(n) = x^2(n)$
c) $y(t) = \begin{cases} 0 \text{ for } x(t) < 0 \\ x(t) + x(t-2) \text{ for } x(t) \geq 0 \end{cases}$	d) $y(n) = x(n^2)$
e) $y(t) = \int_{-\infty}^{2t} x(\tau)d\tau$	f) $y(n) = n.x(n)$
g) $y(n) = x(4n+1)$	h) $y(n) = x(\|n\|)$

5. For the following block diagram (assume square root operator produce the positive square root)
   - Find the relationship between input and output.
   - Test for linearity.