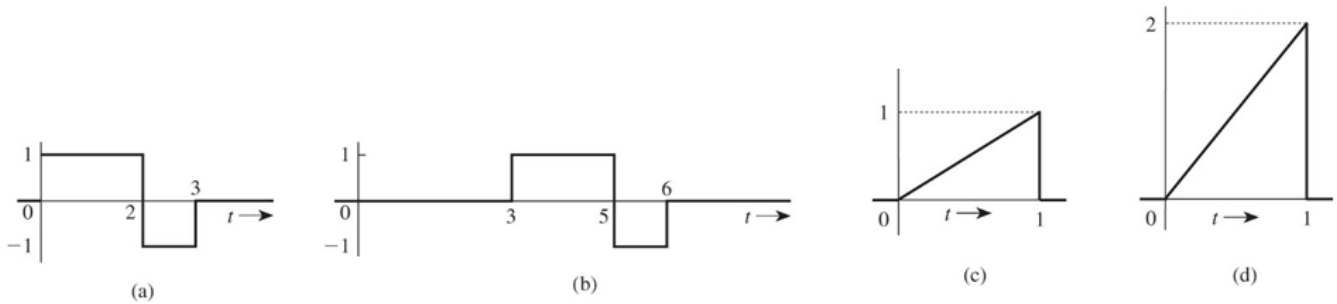


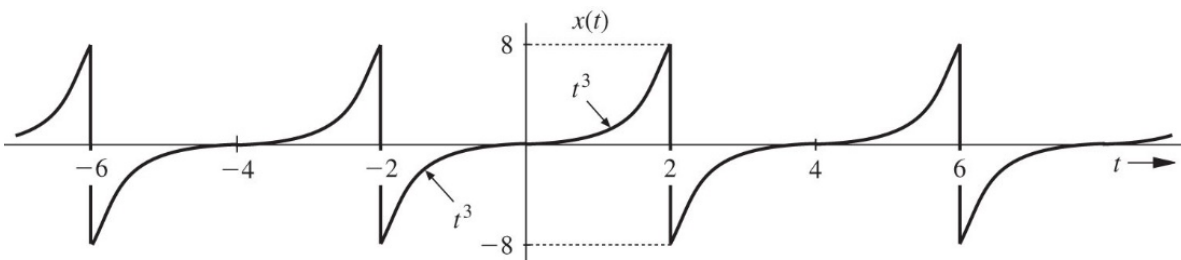
ENGR 3323: Signals and Systems

HW 1_Ch1

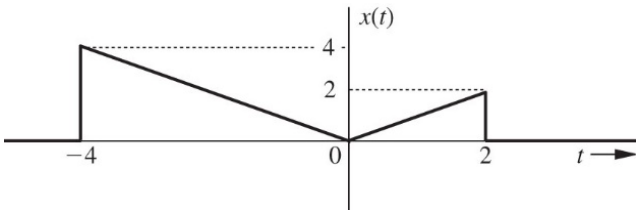
1) Find the energies of the following signals below.



2) Find the power and the rms value of the signal below



3) for the signal $x(t)$ shown below, sketch the signals **a) $x(t-4)$** **b) $x(-t)$** **c) $x(2t-4)$**



4) sketch the following signals **a) $u(t-5) - u(t-7)$** **b) $(t-4)[u(t-2)-u(t-4)]$**

5) Simplify the following expressions:

(a) $\left(\frac{\sin t}{t^2 + 2}\right)\delta(t)$ (b) $\left(\frac{j\omega + 2}{\omega^2 + 9}\right)\delta(\omega)$ (c) $[e^{-t} \cos(3t - 60^\circ)]\delta(t)$ (d) $\left(\frac{\sin k\omega}{\omega}\right)\delta(\omega)$

6) Evaluate the following integrals:

(a) $\int_{-\infty}^{\infty} \delta(\tau)x(t-\tau) d\tau$ (b) $\int_{-\infty}^{\infty} x(\tau)\delta(t-\tau) d\tau$ (c) $\int_{-\infty}^{\infty} \delta(t+3)e^{-t} dt$

7) A sinusoid $e^{\sigma t} \cos(\omega t)$ can be expressed as a sum of exponentials e^{st} and e^{-st} with complex frequencies $s = \sigma + j\omega$ and $s = \sigma - j\omega$. Locate in the complex plane the frequencies of the following sinusoids:

(a) $\cos 3t$ (b) e^{-2t} (c) $e^{-3t} \cos 3t$ (d) 5