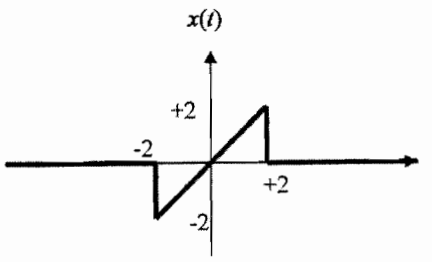
King Fahd University of Petroleum & Minerals
Electrical Engineering Department
EE370 Communication Engineering I (071)
Quiz 1: Review of Signals and System

Serial # 0

-2 points for not writing your serial #

Name: KEY ver. 2

1. Find the energy and the power of the following signal. Is it an energy signal or power signal? **(3 points)**



Power = 0

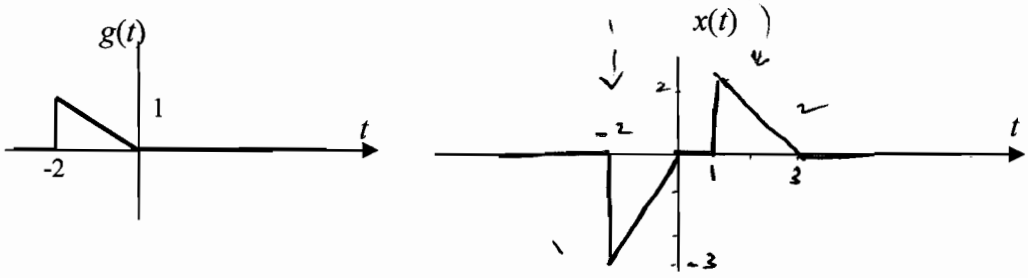
$$\text{Energy} = \int_{-2}^{2} t^2\,dt = \frac{1}{3}\,t^3\Big|_{-2}^{2} = \frac{16}{3}$$

Since the energy is finite.

$0 < E < \infty$

It is energy signal

2. Given $g(t)$ as shown in the figure, sketch $x(t)= 2g(t-3) -3g(t)$ **(3 points)**
show important point on the sketch

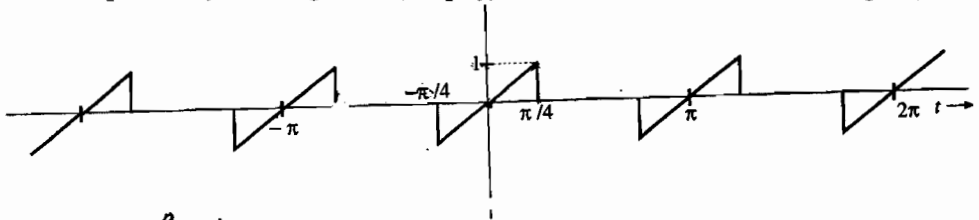


3. What is the difference between the single sided spectrum and the double sided spectrum (i.e. what is the relation between C_n and D_n) **(1 point)**

$|C_0| = |D_0|$ $\quad |C_n| = 2\,|D_n| = 2\,|D_{-n}|$

$\angle D_n = \angle C_n$ $\quad \angle D_{-n} = -\angle C_n$

5. For the shown signal, Mr. Emad wants to find the trigonometric Fourier Series Expansion. Please help him by finding a_n? (*simplify but do not evaluate the integral*) **(3 points)**



$T = \pi$ $\quad f = \frac{1}{\pi}$, $\omega = 2\pi f = 2$

$$a_n = \frac{2}{T}\int_{-\pi/2}^{\pi/2} g(t)\cos(2nt)\,dt = \frac{2}{\pi}\int_{-\pi/4}^{\pi/4} \frac{4}{\pi}\,t\cos(2nt)\,dt$$

I hope you the best, **Dr. Ali Muqaibel**