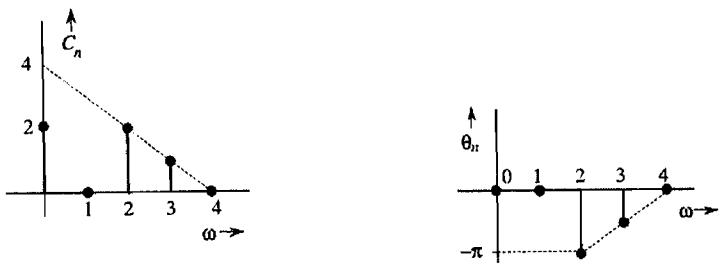
King Fahd University of Petroleum & Minerals
Electrical Engineering Department
EE370: Communications Engineering I (101)
Quiz 1

Serial # 0

-1 points for not writing your serial #

Name: KEY Sec. 2

The Figure below shows the trigonometric Fourier spectra for a periodic signal $g(t)$



a) By inspection of the Figure, find the trigonometric Fourier series representing $g(t)$. **(2 points)**

$$g(t) = 2 + 2\cos(2t - \pi) + \cos\left(3t - \frac{\pi}{2}\right)$$

b) Find the power of the signal **(2 points)**

$$\text{Power} = (2)^2 + \frac{(2)^2}{2} + \frac{(1)^2}{2} = 4 + 2 + \frac{1}{2} = 6.5$$

c) Evaluate the following integrals: **(2+1 points)**

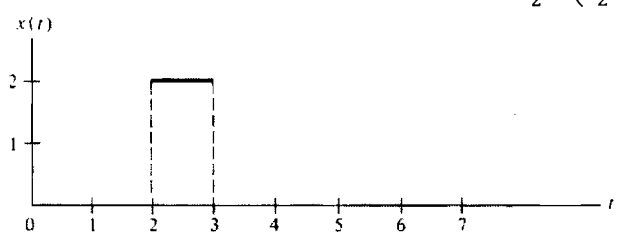
$$\int_{-\infty}^{\infty}\left[e^{-\alpha t^3}\delta(t-10)+\sin(5\pi t)\delta(t)\right]dt = e^{-\alpha(10)^3} + \sin(0) = e^{-1000\alpha}$$

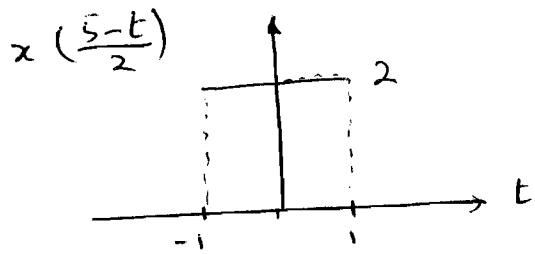
$$\int_{0}^{\infty} e^{-\alpha t^2}\delta(t+9)\,dt = \int_{0}^{\infty} e^{-\alpha t^2}\delta\left(t-(-9)\right)dt = 0$$

→ 0 ← notice

← because −9 is not included in the limits

c) The signal x(t) is shown below. Sketch $-\frac{3}{2}x\left(\frac{5-t}{2}\right)$ **(3 points)**



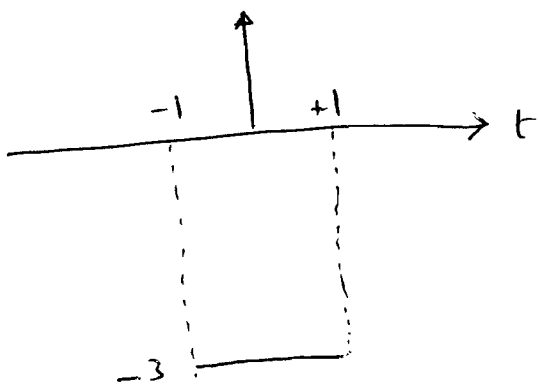


$$t' = \frac{5-t}{2} \Rightarrow 2t' = 5 - t$$

$$\Rightarrow \boxed{t = 5 - 2t'}$$

t'	2	3
t	1	−1

$$\Rightarrow -\frac{3}{2}x\left(\frac{5-t}{2}\right)$$



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