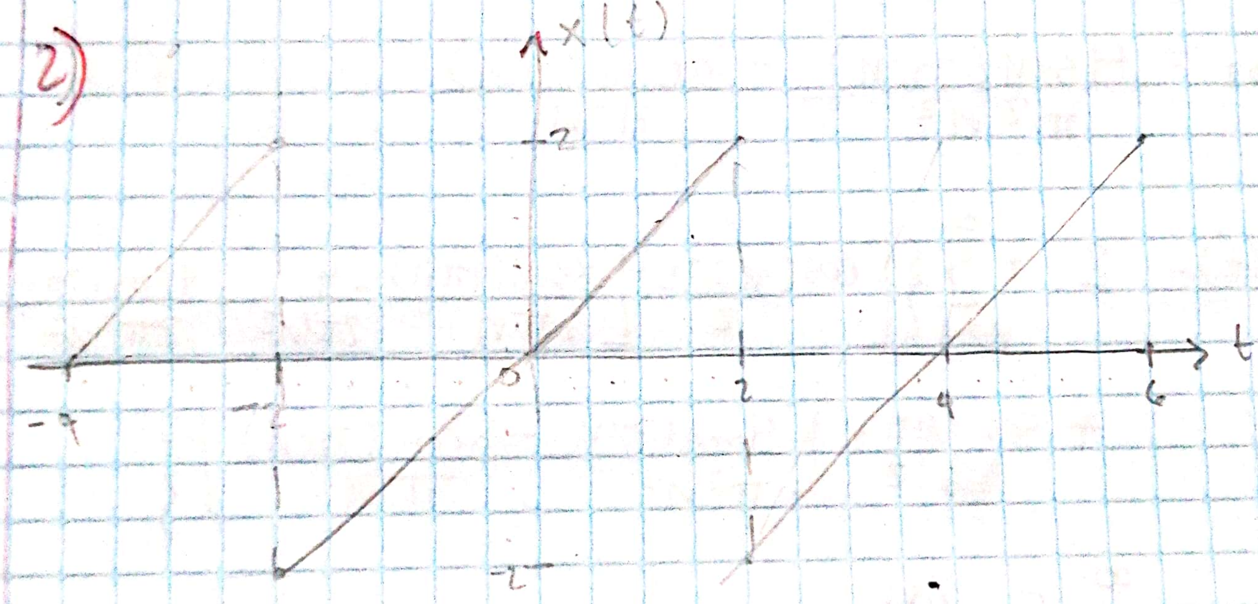
$$\frac{1}{2-0}\int_0^2 f(x)\,dx$$

1) Valor Promedio de la funcion $f(t)$

$$f(t) = \begin{cases} t & 0 < t < 1 \\ 0 & 1 < t < 2 \end{cases}$$

2)



$T = 2 - -2 = 4 \;;\; w = \pi/2$

$f(t) = t \quad -2 \leq t < 2 \;;\; T = 4 \;;\; w = \frac{2\pi}{4} = \frac{\pi}{2}$

$$f(t) = \frac{a_0}{2} + \sum_{n=1}^{\infty}\left(a_n \cos\left(\frac{2\pi n t}{4}\right) + b_n \operatorname{Sen}\left(\frac{2\pi n t}{4}\right)\right)$$

donde:

$$a_0 = \frac{2}{4}\int_0^4 t\,dt = 4$$

$$a_n = \frac{2}{4}\int_0^4 t\cos\left(\frac{2n\pi t}{4}\right)dt$$

$$a_n = \frac{8\,sen(2\pi n)}{2\pi n} + \frac{4\cos(2\pi n)}{2\pi^2 n^2} - \frac{4}{2\pi^2 n^2}$$

$$b_2 = \frac{2}{4}\int_0^T t\,sen\left(\frac{2n\pi t}{4}\right)dt$$

$$b_2 = \frac{4\,sen(2\pi n)}{\pi^2 n^2} - \frac{8\cos(2\pi n)}{\pi n}$$

$$f(t) = 2 + \sum_{n=1}^{\infty}\left\{\left[\cos\left(n\frac{\pi}{2}t\right)\left[\frac{8\,sen(2\pi n)}{2\pi n} - \frac{4}{2\pi^2 n^2} + \frac{4\cos(2\pi n)}{2\pi^2 n^2}\right]\right.\right.$$

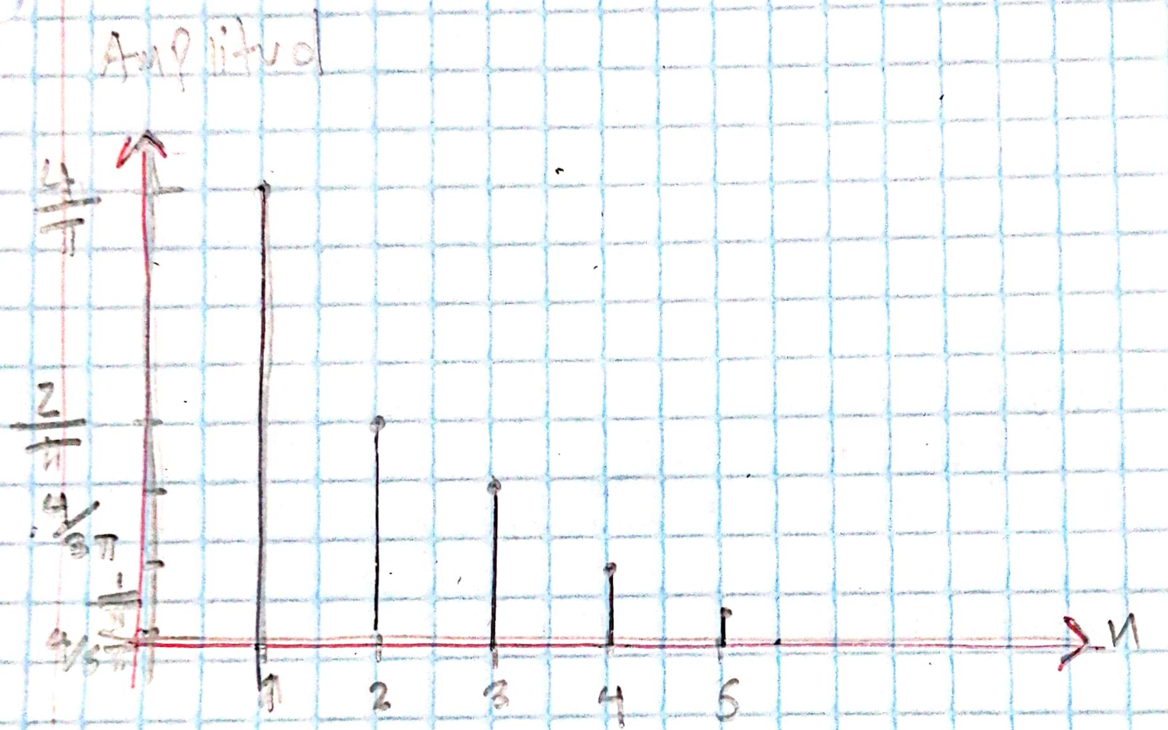
$$\left.+ sen\left(\frac{n\pi t}{2}\right)\left[\frac{4\,sen(2\pi n)}{\pi^2 n^2} - \frac{8\cos(2\pi n)}{\pi n}\right]\right\}$$

$$f(t) = \sum_{n=1}^{\infty}\left[(-1)^{n+1}\frac{4}{n\pi}\cdot sen\left(\frac{n\pi t}{2}\right)\right]$$

$$f(t) = \sum_{n=1}^{\infty}\left[(-1)^{n+1}\cdot\frac{4}{n\pi}\cdot sen\left(\frac{n\pi t}{2}\right)\right]$$

Escaneado con CamScanner

Espectro de Amplitud:



$$f(t) = \sum_{n=1}^{\infty} \left[(-1)^{n+1} \cdot \frac{4}{n\pi} \cdot \operatorname{sen}\left(\frac{n\pi t}{2}\right) \right]$$

$T = 4$; fundamental $= \pi/2$