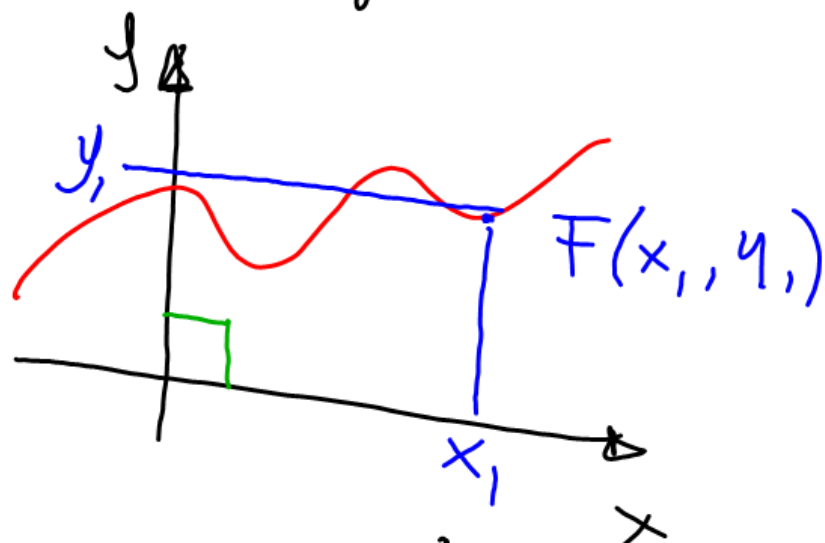
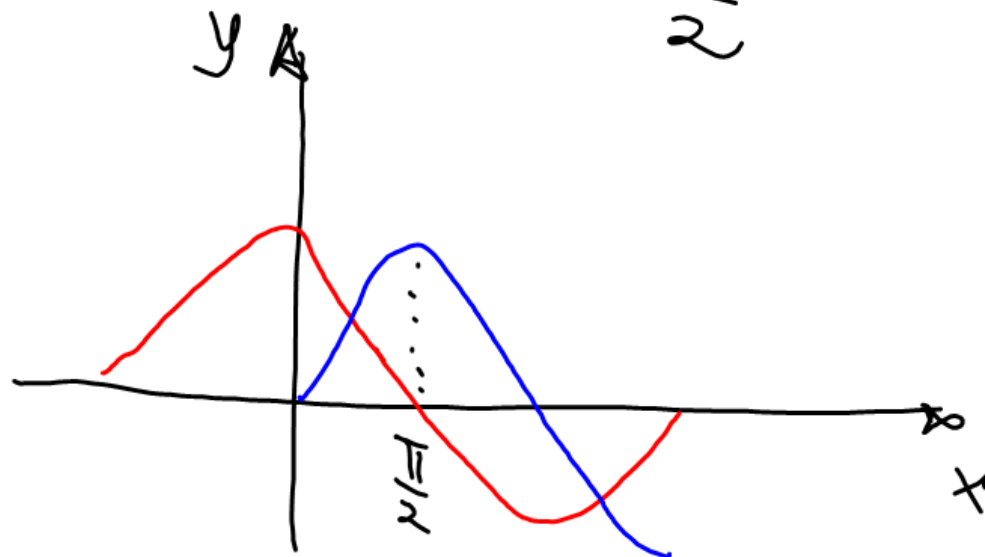


# Serie Trigonométrica de Fourier



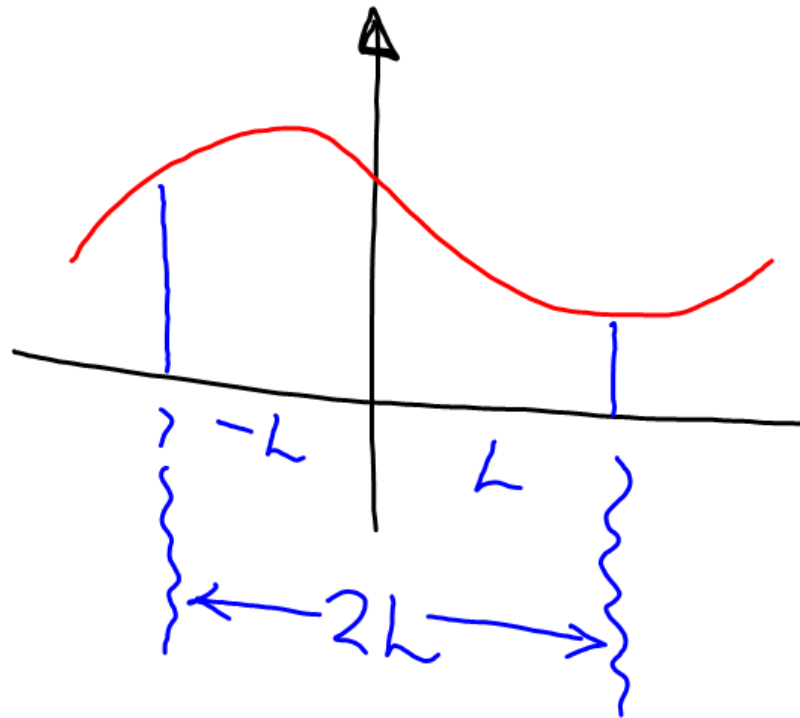
$\text{sen}(x)$        $\cos(x)$

$\frac{\pi}{2}$



STF.

$$f(x) = \frac{1}{2} a_0 + \sum_{n=1}^{\infty} \left( a_n \cos\left(\frac{n\pi}{L}x\right) + b_n \sin\left(\frac{n\pi}{L}x\right) \right)$$

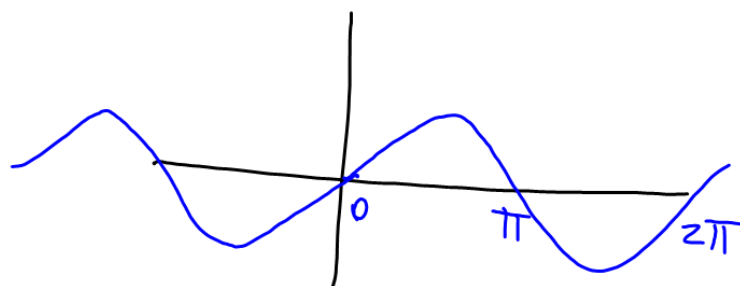


$$a_0 = \frac{1}{L} \int_{-L}^L f(x) dx$$

$$a_n = \frac{1}{L} \int_{-L}^L f(x) \cos\left(\frac{n\pi}{L}x\right) dx$$

$$b_n = \frac{1}{L} \int_{-L}^L f(x) \sin\left(\frac{n\pi}{L}x\right) dx$$

$$\sin(n\pi) = 0 \quad \forall n \in \mathbb{Z}$$



$$\cos(n\pi) = (-1)^n$$

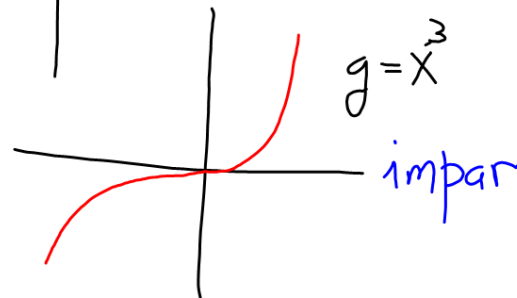
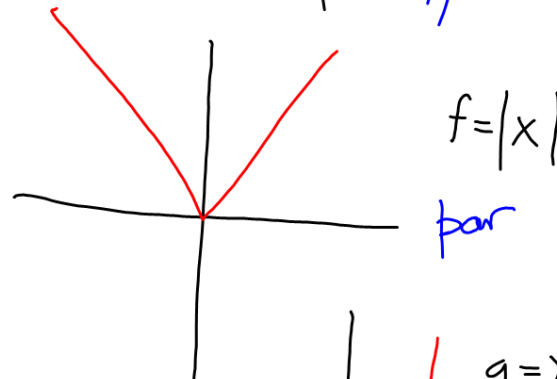
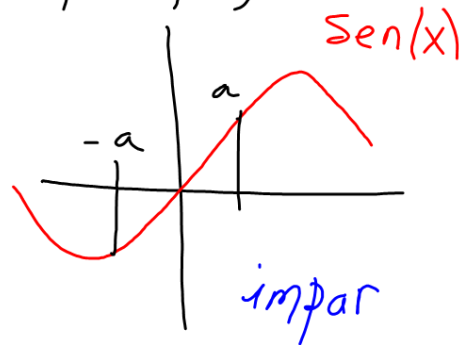
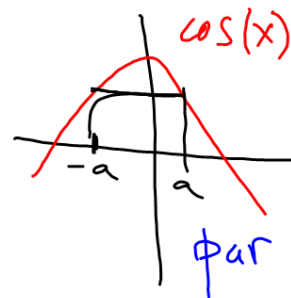
## funciones simétricas

una  $f(x)$  en  $-L < x < L$  es "par"

$$f(-x) = f(x)$$

es "impar"

$$f(-x) = -f(x)$$



$$\int_{-L}^L f(x) dx = 2 \int_0^L f(x) dx \neq 0.$$

par

$$\int_{-L}^L f(x) dx = 0.$$

impar

$$(\text{par}) \cdot (\text{par}) \hat{=} (\text{impar})(\text{impar}) = \text{par}$$

$$(\text{par}) \cdot (\text{impar}) = \text{impar}$$

$$g(x) = x^3 \quad (\text{impar})$$

$$a_0 = \frac{1}{L} \int_{-L}^L g(x) dx = 0$$

$$a_n = \frac{1}{L} \int_{-L}^L g(x) \cos\left(\frac{n\pi}{L}x\right) dx = 0.$$

impar par

$$b_n = \frac{1}{L} \int_{-L}^L g(x) \sin\left(\frac{n\pi}{L}x\right) dx = \frac{2}{L} \int_0^L g \cdot \sin\left(\frac{n\pi}{L}x\right) dx \neq 0.$$

$$x^3 = \sum_{n=1}^{\infty} \left( b_n \sin\left(\frac{n\pi}{L}x\right) \right)$$

$$f(x) = 5e^{2x} \quad -1 \leq x \leq 1$$

$$L=1$$

