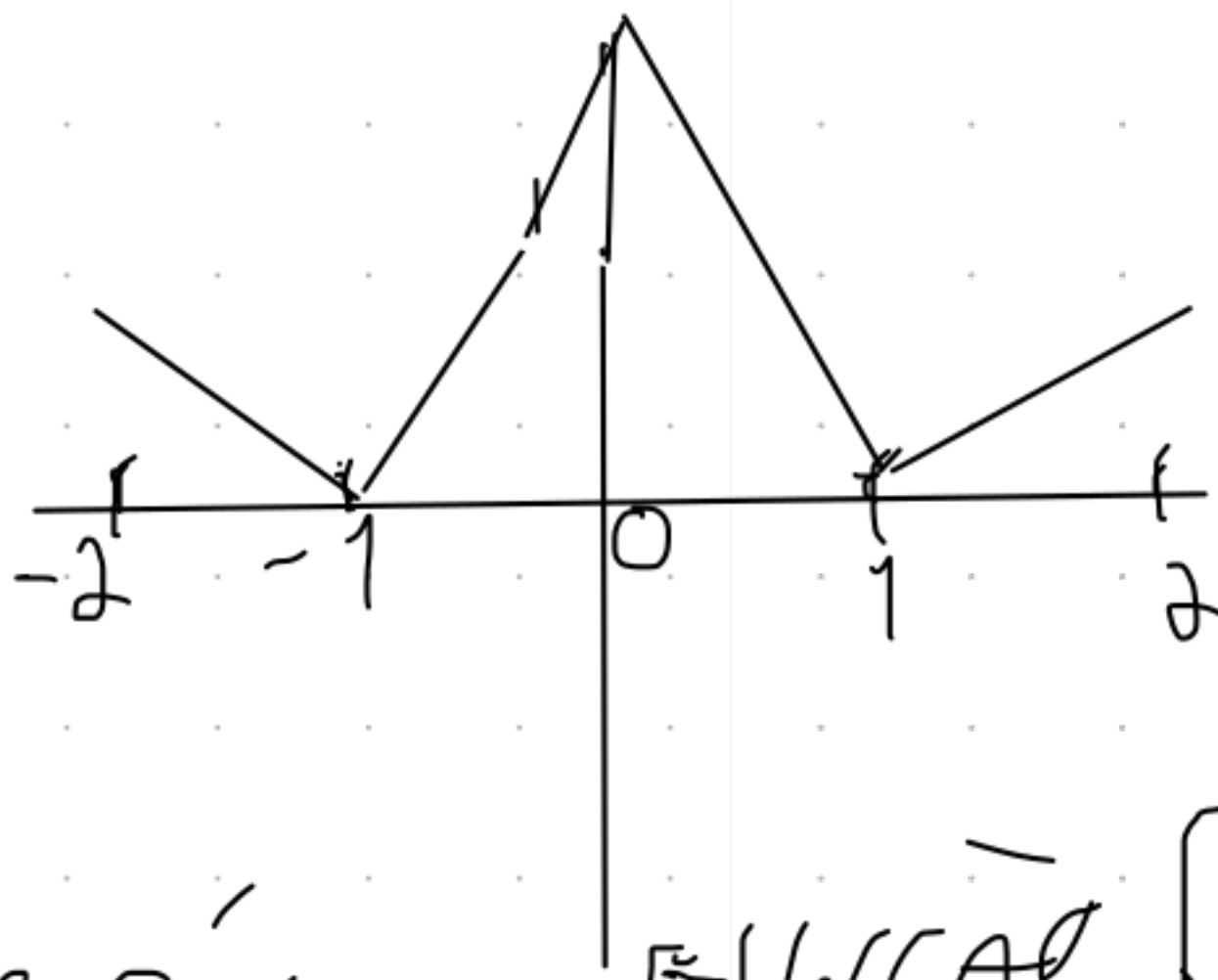

f É UMA FUNÇÃO PAR,

$$f(x) = \begin{cases} 2 - 2x, & 0 \leq x \leq 1 \\ x - 1, & 1 \leq x \leq 2 \\ f(-x), & -2 \leq x \leq 0 \end{cases}$$

$$b_k = 0, \quad k \geq 1$$

$$T = 4, \quad k\frac{2\pi}{1} = k\frac{\pi}{2}$$

$$a_0 = \frac{1}{4}\int_{-2}^{2} g(x)\,dx = (\text{area})$$

$$= \frac{1}{2}\int_{-2}^{2} g(x)\,dx$$

$$= \frac{1}{2}\left[\int_{0}^{1}(2-2x)\,dx + \int_{1}^{2}(x-1)\,dx\right]$$

$$= \frac{1}{2}\left[\frac{1}{2}\cdot 1\cdot 2 + \frac{1}{2}\cdot 1\cdot 1\right]$$

$$= \frac{3}{4}$$

$k \geq 1$

$$a_k = \frac{2}{4} \int_{-2}^{2} \underbrace{f(x) \cos\left(k \cdot \frac{\pi}{2} x\right)}_{\text{PAR}} dx$$

$$= \int_{0}^{2} f(x) \cos\left(k \cdot \frac{\pi}{2} x\right) dx$$

$$= \int_{0}^{1} 2(1-x) \cdot \cos\left(k \frac{\pi}{2} x\right) dx \quad \text{(I)}$$

$$+ \int_{1}^{2} (2x-1) \cos\left(k \frac{\pi}{2} x\right) dx \quad \text{(II)}$$

$$\textcircled{I} = 2\int_0^1 (1-x)\cos\left(k\frac{\pi}{2}x\right)dx$$

$$u = 1-x \qquad v' = \cos\left(k\frac{\pi}{2}x\right)$$

$$u' = -1 \qquad v = \frac{2}{k\pi}\operatorname{sen}\left(k\frac{\pi}{2}x\right)$$

$$= (2)\left[\frac{2}{k\pi}(1-x)\operatorname{sen}\left(k\frac{\pi}{2}x\right)\Big|_0^1 + \frac{2}{k\pi}\int_0^1 \operatorname{sen}\left(k\frac{\pi}{2}x\right)dx\right]$$

$$= \frac{4}{k\pi}\cdot\left(-\frac{2}{k\pi}\cos\left(\frac{k\pi}{2}x\right)\right)\Big|_0^1$$

$$= \frac{8}{k^2\pi^2}\left[1-\cos\left(\frac{k\pi}{2}\right)\right]$$

CONTINUA ...

$$\textcircled{II} = \int_1^2 (x-1)\cos\left(\frac{k\pi}{2}x\right)dx$$

$$u = x-1 \qquad v' = \cos\left(k\frac{\pi}{2}x\right)$$

$$u' = 1 \qquad v = \frac{2}{k\pi}\sin(11)$$

$$= \frac{2}{k\pi}(x-1)\sin\left(\frac{k\pi}{2}x\right)\Big|_1^2 - \frac{2}{k\pi}\int_1^2 \sin\left(\frac{k\pi}{2}x\right)dx$$

$$= \frac{4}{k^2\pi^2}\cos\left(\frac{k\pi}{2}x\right)\Big|_1^2$$

$$= \frac{4}{k^2\pi^2}\left((-1)^k - \cos\left(\frac{k\pi}{2}\right)\right)$$

$$a_k = \frac{8}{k^2\pi^2}\left(1 - \cos\left(\frac{k\pi}{2}\right)\right)$$

$$+ \frac{4}{k^2\pi^2}\left((-1)^k - \cos\left(\frac{k\pi}{2}\right)\right)$$

$$= \frac{4}{k^2\pi^2}\left[2 + (-1)^k - 3\cos\left(\frac{k\pi}{2}\right)\right]$$

$k \geq 1$

$$a_0 = \frac{3}{4}$$

$$a_1 = \frac{4}{\pi^2}$$

$$a_2 = \cancel{\frac{24}{\pi^2}} \quad \frac{6}{\pi^2}$$

$$g_2(x) = \frac{3}{4} + \frac{4}{\pi^2}\cos\left(\frac{\pi}{2}x\right) + \frac{6}{4\pi^2}\cos(\pi x)$$