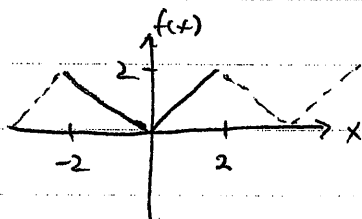


Quest 8

$$1. \quad f(x) = \begin{cases} -x & -2 \leq x \leq 0 \\ x & 0 \leq x \leq 2 \end{cases} \quad f(x+4) = f(x)$$



even, so $b_n = 0$

$$a_n = \frac{2}{L} \int_0^L f(x) \cos \frac{n\pi x}{L} dx \quad L=2$$

$$= \int_0^2 x \cdot \cos 2\pi x dx \quad \begin{array}{l} u = x \quad dv = \cos 2\pi x dx \\ du = dx \quad v = \frac{1}{2\pi} \sin 2\pi x \end{array}$$

$$= \frac{x}{2\pi} \sin 2\pi x \Big|_0^2 - \frac{1}{2\pi} \int_0^2 \sin 2\pi x dx$$

$$= \frac{1}{4\pi^2} \cos 2\pi x \Big|_0^2 = \frac{1}{4\pi^2} (\cos 4\pi - 1) = \boxed{0}$$