Consider the function defined by
$$f(t) = \begin{cases} 1 & \text{if } -1 < t < 0, \\ -1 & \text{if } \;\;\; 0 \le t < 1, \end{cases}$$

and $f(t+2) = f(t)$. Select the option that gives the Fourier series expansion of f.

Options

A $\quad \dfrac{1}{2} - \displaystyle\sum_{k=1}^{\infty} \dfrac{4}{k\pi} \cos(k\pi t)$

B $\quad 1 - \displaystyle\sum_{k=1}^{\infty} \dfrac{4}{k\pi} \cos(k\pi t)$

C $\quad \dfrac{1}{2} - \displaystyle\sum_{k=0}^{\infty} \dfrac{4}{(2k+1)\pi} \cos((2k+1)\pi t)$

D $\quad 1 - \displaystyle\sum_{k=0}^{\infty} \dfrac{4}{(2k+1)\pi} \cos((2k+1)\pi t)$

E $\quad -\displaystyle\sum_{k=1}^{\infty} \dfrac{4}{k\pi} \cos(k\pi t)$

F $\quad -\displaystyle\sum_{k=0}^{\infty} \dfrac{4}{(2k+1)\pi} \cos((2k+1)\pi t)$

G $\quad -\displaystyle\sum_{k=1}^{\infty} \dfrac{4}{k\pi} \sin(k\pi t)$

H $\quad -\displaystyle\sum_{k=0}^{\infty} \dfrac{4}{(2k+1)\pi} \sin((2k+1)\pi t)$

I believe this is an ODD function so should contain SINE terms,

but I am still unsure how to solve this problem...I will guess H if

no-one can help!