Solution: Crack the Problem 34

$$f(x) = \frac{2x(\sin x + \tan x)}{2\left[\frac{x+2\pi}{\pi}\right]-3}$$

$$\Rightarrow f(x) = \frac{2x(\sin x + \tan x)}{2\left[\frac{x}{\pi}+2\right]-3}$$

$$\Rightarrow f(x) = \frac{2x(\sin x + \tan x)}{2\left[\frac{x}{\pi}\right]+1}$$

$$\Rightarrow f(x) = \frac{2x(\sin x + \tan x)}{2[t]+1} \quad \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots(1)$$

Where, $t = \frac{x}{\pi}$

$$f(-x) = \frac{-2x\{\sin(-x) + \tan(-x)\}}{2\left[\frac{-x}{\pi}+2\right]-3}$$

$$\Rightarrow f(-x) = \frac{2x\{\sin(x) + \tan(x)\}}{2\left[\frac{-x}{\pi}\right]+1}$$

$$\Rightarrow f(-x) = \frac{2x\{\sin(x) + \tan(x)\}}{2[-t]+1} \quad \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots(2)$$

Case (I)
when x/π = t = integer that mean x = nπ
Since sin(nπ) = 0 and tan(nπ) = 0
Hence whole expression becomes zero
f(x) = 0 ; f(-x) = 0
or f(-x) = - f(x)

Case (II)
To prove that, 2[t]+1 = - {2[-t] +1}
when x/π = t = integer+fraction = n + p
Consider 2[t]+1 = 2[n+p]+1 = 2n+1
Now, consider 2[-t]+1= 2[-n-p]+1= 2(-n-1)+1= -2n-1 = -(2n+1)

f(x) = -f(-x) in all cases
hence given function is odd function

The solution has been edited from the file provided by **Premraj Manohar Narkhede, 12, V G Vaze College, Mulund (E), Mumbai,** one of the few students using equation editor.