



Twintion:-A neal function f(x) is said to be even f(x) = f(-x), f(x) = x, $f(-x) = (-\pi)^2$ f(x) = f(-x), f(x) = x, $f(-x) = \pi$ f(x) = f(-x), $f(x) = \pi$, f(-x) f(x) = x, f(-x), $f(-x) = \pi$, f(-x), Exen function :it A seal function f(x) is sold to be edd f(x) = -f(x) f(x) = -x = -f(x)odd function!





Hen it is called neither even ner edd function. Example: 1. $f(x) = x^2$ $f(-x) = (-x^2)$ $= x^2 = f(x)$ It is Even function $2\int_{1}^{\pi} x \cdot dx = \left[\frac{x^2}{2}\right]_{1}^{\pi} \frac{1}{2} $	Note: (1] f(x), does not satisfies even and odd functions
Find the is called to be set of the image is the image i	
1. $f(x) = x^{2}$ $f(-x) = (-x^{2})$ $= x^{2} = f(x)$ It is Even function $2\int_{0}^{1} f(x) dx = \frac{\pi^{3}}{3} + \frac{\pi^{3}}{3}$ 2. $f(x) = x\cos x$ $f(-x) = (-x)\cos(-x)$ $= -x\cos x$ $f(-x) = (-x)\cos(-x)$ $= -x\cos x$ $f(-x) = (-x)\cos(-x)$ $= -x\cos x$ $f(x) = x\cos x$ $f(x) = x\cos x$ $f(x) = x\cos x$ $f(x) = x\sin x \Rightarrow Even function$ 3. $f(x) = 1x^{2} \Rightarrow Neither Even nor odd.$ Note: 1. Even function $x = ven fn$ 2. $odd = x x cd = fn = Even fn$ 3. $f(x) = x + x^{2} \Rightarrow Neither = Even fn$ 4. $f(x) = 1x + x = y = x + x^{2}$ $f(x) = x + x^{2} \Rightarrow Neither = Even fn$ 3. $f(x) = x + x^{2} \Rightarrow Neither = Even fn$ 4. $f(x) = x + x^{2} \Rightarrow Neither = Even fn$ 5. $f(x) = x + x^{2} \Rightarrow Neither = Even fn$ 5. $f(x) = x + x^{2} \Rightarrow Neither = Even fn$ 5. $f(x) = x + x^{2} \Rightarrow Neither = Even fn$ 5. $f(x) = x + x^{2} \Rightarrow Neither = Even fn$ 5. $f(x) = x + x^{2} \Rightarrow Neither = Even fn$ 5. $f(x) = x + x^{2} \Rightarrow Neither = Even fn$ 5. $f(x) = x + x^{2} \Rightarrow Neither = Even fn$ 5. $f(x) = x + x^{2} \Rightarrow Neither = Even fn$ 5. $f(x) = x + x^{2} \Rightarrow Neither = Even fn$ 5. $f(x) = x + x^{2} \Rightarrow Neither = Even fn$ 5. $f(x) = x + x^{2} \Rightarrow Neither = Even fn$ 5. $f(x) = x + x^{2} \Rightarrow Neither = Even fn$ 5. $f(x) = x + x^{2} \Rightarrow Neither = Even fn$ 5. $f(x) = x + x^{2} \Rightarrow Neither = Even fn$ 5. $f(x) = x + x^{2} \Rightarrow Neither = Even fn$ 5. $f(x) = x + x^{2} \Rightarrow Neither = Even fn$ 5. $f(x) = x + x^{2} \Rightarrow Neither = Even fn$ 6. $f(x) = x + x + x^{2} \Rightarrow Neither = Even fn$ 7. $f(x) = x + x + x^{2} \Rightarrow Neither = Fven fn$ 7. $f(x) = x + x + x^{2} \Rightarrow Neither = Fven fn$ 7. $f(x) = x + x + x^{2} \Rightarrow Neither = Fven fn$ 7. $f(x) = x + x + x^{2} \Rightarrow Neither = x + x^{2} \Rightarrow Neither = Fven fn$ 7. $f(x) = x + x + x^{2} \Rightarrow Neither = Fven fn$ 7. $f(x) = x + x + x^{2} \Rightarrow Neither = Fven fn$ 7. $f(x) = x + x^{2} $	then it is called neither over noi
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$f(-x) = (-x^{2})$ $= x^{2} = f(x)$ $It is Even function 2 \int f(x) dx = \frac{2\pi}{3}$ $2 \cdot f(x) = x \cos x$ $f(-x) = (-x)(\cos(-x))$ $= -x \cos x$ $f(-x) = (-x)(\cos(-x))$ $= -x \cos x$ $f(-x) = (-x)(\cos(-x))$ $= -x \cos x$ $\int (\cos x)^{-1} = (-x)(\cos(-x))$ $= -x \cos x$ $\int (\cos(-x)) = (\cos(-x))$ $= -x \cos x$ $\int (\cos(-x)) = (\cos(-x))$ $= -\pi (\cos x)$ $(\cos(-x)) = (\cos(-x))$ $= -\pi (\cos x)$ $(\cos(-x)) = (\cos(-x))$ $= -\pi (\cos(-x))$ $(\cos(-x)) = (\cos(-x))$ $= -\pi (\cos(-x))$ $(\cos(-x)) = (\cos(-x))$ $= -\pi (\cos(-x))$ $= -\pi (\cos(-x))$ $= -\pi (\cos(-x))$ $(\cos(-x)) = (\cos(-x))$ $= -\pi (\cos(-x))$ $(\cos(-x)) = (\cos(-$	
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It is Even function $2\int f(x) dx = \frac{2\pi}{3}$ 2. $f(x) = x \cos x$ $f(-x) = (-x)(\cos(-x))$ $= -x \cos x$ $= -\pi \cos x$ $= -\pi \cos x$ $= -\pi \cos x$ $f(x) = -\pi \cos x$ $= -\pi \cos x$ $f(x) = 2\pi \sin x$ $f(x) = 2\pi \sin x$ $f(x) = 1\pi d$ $f(x) = 1\pi d$ $f(x) = 2\pi + x^2$ $f(x) = x + x^2$	$= \chi = \pi \chi$
$f(-x) = (-x)(e^{-x})$ $= -x \cos x$ $= -x \cos x$ $= -f(x)$ It is odd function $f(x) = 1xi \Rightarrow Even function$ $f(x) = 1xi \Rightarrow Even function$ $f(x) = x + x^{2} \Rightarrow Neither Even nor odd$ Note: $i Even function \\ x Even fn \\ z odd fn \\ x Even fn \\ z odd fn \\ x Even fn \\ z ev$	It is even function $2\int f(x)dx = \frac{2715}{3}$
$f(-x) = (-x)(\cos(-x))$ $= -x\cos x$ $= -x\cos x$ $= -f(x)$ It is odd function $f(x) = x\sin x \Rightarrow Even function$ $f(x) = 1x1 \Rightarrow Even function$ $f(x) = x + x^{2} \Rightarrow Neuther Even nor odd.$ Note: $f(x) = x + x^{2} \Rightarrow Neuther Even for 2. odd Fn x odd fn = Even fn$ $g(x) = x + x + x^{2} \Rightarrow neuther fn$ $f(x) = x + x + x^{2} \Rightarrow neuther fn$ $f(x) = x + x + x^{2} \Rightarrow neuther fn$ $f(x) = x + x^{2} \Rightarrow neuther fn$	2. fix) = xcosx losx i
$= -f(x)$ It is odd function $3. f(x) = x \sin x \Rightarrow Even function$ $4. f(x) = 1x1 \Rightarrow Even function$ $5. f(x) = x + x^{2} \Rightarrow Neither Even nor odd$ $Note:$ $1. Even function x Even fn = Even fn$ $2. odd Fn x odd fn = Even fn$ $3. Even fn x odd fn = odd fn$ $4. odd fn x Even fn = odd fn$ $4. odd fn x Even fn = odd fn$	$f(-x) = (-x)(\cos(-x)) \qquad (0)^{3/2}$
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3. $f(x) = x \sin x \Rightarrow \text{Even function}$ 4. $f(x) = x \Rightarrow \text{Even function}$ 5. $f(x) = x + x^2 \Rightarrow \text{Neither Even nor odd}$ Note: 1. Even function $x \text{ Even fn} = \text{Even fn}$ 2. odd Fn x odd fn $= \text{Even fn}$ 3. Even fn x odd fn $= \text{odd fn}$ 4. odd fn $x \text{ Even fn} = \text{odd fn}$ 4. odd fn $x \text{ Even fn} = \text{odd fn}$ 4. odd fn $x \text{ Even fn} = \text{odd fn}$ 5. $f(x) = x + x^2 + x^$	$=-f(x)$ $g_{0}(x)=g_{0}(x)$
 4. f(x) = 1x1 → Even function 5. f(x) = x+x² → Neither Even nor odd. Note: Even function x Even fn = Even fn odd Fn x odd fn = Even fn Even fn x odd fn = odd fn Even fn x Even fn = odd fn add fn x Even fn = odd fn 	It is odd function success
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4. odd fn × Even fn = odd fn * For even function, bn=0	3. Even fin x odd fin = odd fin
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* For odd function aloso and an =0	* For even function, bn=0
	* For odd function aloso and an =0





() Find the fourier series for the function fin)=1211
The supervise
f(-x) = -x = x
f(x) = f(-x)
frances function
.: bn=0.
The fourier series is quies by
$f(x) = \frac{\alpha \sigma}{2} + \sum_{n=1}^{\infty} \alpha_n \cos nx^n$
TO find as: T
$a_0 = \frac{1}{2} \int f(x) dx = \frac{2}{2} \int f(x) dx$
dévice for even for, é fixida = 2 fixida
-2 0
$=$ $=$ $\int x dx$
$= \stackrel{2}{\neq} \left[\stackrel{\mathcal{H}}{\stackrel{\mathcal{H}}}{\stackrel{\mathcal{H}}{\stackrel{\mathcal{H}}}{\stackrel{\mathcal{H}}{\stackrel{\mathcal{H}}{\stackrel{\mathcal{H}}{\stackrel{\mathcal{H}}{\stackrel{\mathcal{H}}{\stackrel{\mathcal{H}}{\stackrel{\mathcal{H}}{\stackrel{\mathcal{H}}}{\stackrel{\mathcal{H}}{\stackrel{\mathcal{H}}}{\stackrel{\mathcal{H}}{\stackrel{\mathcal{H}}}{\stackrel{\mathcal{H}}{\stackrel{\mathcal{H}}}{\stackrel{\mathcal{H}}{\stackrel{\mathcal{H}}}{\stackrel{\mathcal{H}}{\stackrel{\mathcal{H}}{\stackrel{\mathcal{H}}{\stackrel{\mathcal{H}}{\stackrel{\mathcal{H}}{\stackrel{\mathcal{H}}{\stackrel{\mathcal{H}}}{\stackrel{\mathcal{H}}{\stackrel{\mathcal{H}}}{\stackrel{\mathcal{H}}{\stackrel{\mathcal{H}}}{\stackrel{\mathcal{H}}{\stackrel{\mathcal{H}}}{\stackrel{\mathcal{H}}}{\stackrel{\mathcal{H}}{\stackrel{\mathcal{H}}}{\stackrel{\mathcal{H}}}{\stackrel{\mathcal{H}}}{\stackrel{\mathcal{H}}}{\stackrel{\mathcal{H}}}{\stackrel{\mathcal{H}}}{\stackrel{\mathcal{H}}}{\stackrel{\mathcal{H}}}{\stackrel{\mathcal{H}}}}}}}}}}$
$a_0 = \pi$
Correct .
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To find an:

$$a_{n} = \frac{1}{\pi} \int_{-\pi}^{\pi} x \cosh x \, dx = \frac{3}{\pi} \int_{0}^{\pi} x \cosh x \, dx$$

$$u = x \qquad \forall = \cosh x$$

$$u' = 1 \qquad \forall = \frac{\sin nx}{n}$$

$$u'' = 0 \qquad \forall 2 = -\frac{\cosh nx}{n^{2}}$$

$$= \frac{2}{\pi} \left[x - \frac{\sinh nx}{n} - (y) \left(-\frac{\cosh nx}{n^{2}} \right) \right]_{0}^{\pi}$$

$$= \frac{2}{\pi} \left[0 + \frac{\cosh nx}{n^{2}} - \frac{\cos 0}{n^{2}} \right] = \frac{2}{\pi} \left[\frac{(-y)^{n} - 1}{n^{2}} \right]$$

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

$$\therefore \text{ The fourier series is} is$$

$$f(x) = \frac{\pi}{2} + \sum_{n=1}^{\infty} \frac{2}{n^{2}} \left[(-1)^{n} - 1 \right] \cosh x.$$

$$(A = Fund the fourier series f(x)) = x = 0 (-\pi, \pi)$$

$$= \frac{1}{4} (-x) = -x = -\frac{1}{4} (x)$$

$$\therefore f(-x) = -\frac{1}{4} (x)$$

$$\therefore f(-x) = -\frac{1}{4} (x)$$

$$\therefore f(x) \text{ is odd function}$$

$$\therefore a_{0} = 0 \text{ and } a_{0} = 0.$$
The fourier series is guiven by f(x) = \sum_{n=1}^{\infty} \ln \sinh x.





