Hatematila G2 - G409 1. Seradat 

$$f(x) = \begin{cases} 0 & \text{ha} \\ \Im & \text{ha} \end{cases}$$

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Furtable mo.:
$$\frac{1}{2\pi} \int_{-\pi}^{\pi} f(x) dx = \frac{1}{2\pi} \int_{-\pi}^{0} O dx + \frac{$$

conyorutable mo.:
$$\alpha_{o} = \frac{1}{2\pi} \int_{-\pi}^{\pi} f(x) dx = \frac{1}{2\pi} \int_{-\pi}^{0} Odx + \frac{1}{2\pi} \int_{0}^{\pi} i dx = \frac{\pi}{2}$$

$$\alpha_{k} = \frac{1}{2\pi} \int_{-\pi}^{\pi} f(x) \cos(kx) dx = \frac{1}{2\pi} \int_{0}^{\pi} \cos(kx) dx = \frac{\sin(kx)}{k} \Big|_{0}^{\pi} = 0$$

$$\alpha_{k} = \frac{1}{2\pi} \int_{-\pi}^{\pi} f(x) \cos(kx) dx = \frac{1}{2\pi} \int_{0}^{\pi} \cos(kx) dx = \frac{\sin(kx)}{k} \Big|_{0}^{\pi} = 0$$

conyoliultable mo.:
$$a_0 = \frac{1}{2\pi} \int_{-\pi}^{\pi} f(x) dx = \frac{1}{2\pi} \int_{-\pi}^{0} Odx + \frac{1}{2\pi} \int_{0}^{\pi} dx = \frac{\pi}{2} / \sqrt{2\pi}$$

initable mo.:

$$\frac{1}{2\pi} \int_{-\pi}^{\pi} f(x) dx = \frac{1}{2\pi} \int_{-\pi}^{0} O dx + \frac{1}{2\pi} \int_{-\pi}^{\pi} O dx$$

S(x) = S(x + 2kii)

 $b_k = \frac{1}{n} \int_{-n}^{n} f(x) \sin(kx) dx = \frac{1}{n} \int_{0}^{n} \sin(kx) dx = \frac{-\cos kx}{k} \Big|_{0}^{n} =$ 

 $f(x) = \frac{\pi}{2} + \frac{2}{4} \sin x + \frac{2}{3} \sin 3x + ... + \frac{2}{2k+1} \sin \left[ (2k+1)x \right] + ...$ 

egyszerűbb mo.: g(x) = f(x) - 172 = 2 g(x) páratlan

 $bk = \int_{-\pi}^{0} \frac{-\sin(kx)}{2} dx + \int_{0}^{\pi} \frac{\sin(kx)}{2} dx = \int_{0}^{\pi} \sin(kx) dx = ...$ 

 $= \frac{11}{2} + \sum_{k=0}^{\infty} \frac{\sin((2k+1)x)}{2k+1}$ 

ao=au=O

 $= \frac{1 - \cos k \tilde{i}}{k} = \begin{cases} 0, \text{ ha k paros} \\ 2/k, \text{ ha k parotlan} \end{cases}$ 

$$\frac{\text{feradat}}{f(x) = x, \text{ ha } x \in (-\pi; \pi]} \qquad f(x) = f(x + 2\mu\pi)$$

$$f(x)$$
 parathan =>  $a_0 = a_k = 0$   
 $b_k = \frac{1}{n} \int_{-n}^{n} x \sin kx \, dx = \frac{-x \cos kx}{n} \int_{-n}^{n} + \frac{1}{kn} \int_{-n}^{n} \cos kx \, dx$ 

$$f = x \quad g = -\cos kx / k = 0$$

$$f' = 1 \quad g' = \sin kx$$

$$= \frac{1}{kn} \left[ -i \cos k i - i \cos (-kn) \right] = \frac{2}{k} \cos k i = 0$$

= 
$$\begin{cases} -2/k, ha k páros \\ 2/k, ha k páratlan \end{cases}$$

$$f(x) = \sum_{k=1}^{\infty} (-1)^{k+1} \cdot \frac{2}{k} \cdot \operatorname{sink} x$$

$$\mathcal{L}(\widehat{n}) = ? = 3 \sin kO = 0 = 3 \mathcal{L}(\widehat{n}) = 0$$

$$\mathcal{L}(\widehat{n}) = \frac{1}{2} \lim_{x \to \widehat{n}^+} f(x) + \frac{1}{2} \lim_{x \to \widehat{n}^-} f(x)$$

3. 
$$f(x) = \begin{cases} \sin x \\ 0 \end{cases}$$

0 ≤ x < 1ĭ

介 ≤ x < 2 î ~

$$\alpha_{0} = \frac{1}{2\pi} \int_{0}^{\pi} \sin x \, dx = \frac{1}{2\pi} (\cos x) \Big|_{0}^{\pi} = \frac{1}{2\pi} \left( -(-\ell) - (-\ell) \right) = \frac{1}{\pi}$$

$$\alpha_{1} = \frac{1}{2\pi} \int_{0}^{\pi} \sin x \, \cos x \, dx = \frac{1}{2\pi} \int_{0}^{\pi} \sin 2x \, dx = 0$$

$$\alpha_0 = \frac{1}{2\pi} \int_0^{\pi} \sin x \, dx = \frac{1}{2\pi} (\cos x) \Big|_0^{\pi} = \frac{1}{2\pi} \left( -(-1)^{\frac{1}{2}} \cos x \, dx \right) = \frac{1}{2\pi} \int_0^{\pi} \sin 2x \, dx = 0$$

$$\alpha_1 = \frac{1}{\pi} \int_0^{\pi} \sin x \cos x \, dx = \frac{1}{2\pi} \int_0^{\pi} \sin 2x \, dx = 0$$

$$\alpha_1 \ge 1 = \frac{1}{\pi} \int_0^{\pi} \sin x \cos kx \, dx = \frac{1}{2\pi} \int_0^{\pi} \sin 2x \, dx = 0$$

$$\alpha_{1} = \frac{1}{n} \int_{0}^{n} \sin x \cos x \, dx = \frac{1}{2n} \int_{0}^{n} \sin 2x \, dx = 0$$

$$\alpha_{k>1} = \frac{1}{n} \int_{0}^{n} \sin x \cos kx \, dx = \frac{1}{2n} \int_{0}^{n} \sin \left[ (u^{1})^{x} \right] - \sin \left[ (u^{1})^{x} \right] dx$$

 $b_1 = \frac{1}{\pi} \int_0^{\pi} \sin^2 x \, dx = \frac{1}{2}$ 

$$\int_{0}^{\infty} \sin x \cos kx \, dx = \frac{1}{2\pi}$$

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$$k > 1 = \frac{1}{\pi} \int_{0}^{\pi} \sin x \cos kx \, dx = \frac{1}{2\pi} \int_{0}^{\pi} \sin \left[ (k+1)x \right] - \sin \left[ (k+1)x \right] dx$$

$$= \frac{1}{2\pi} \left[ \frac{\cos \left[ (k+1)x \right]}{k-1} - \frac{\cos \left[ (k+1)x \right]}{k+1} \right]_{0}^{\pi} = \frac{1}{2\pi} \left[ \frac{(-1)^{k-1}}{k-1} - \frac{(-1)^{k+1}}{k+1} - \frac{1}{k+1} \right] = \begin{cases} 0, \text{ ha k parollar} \\ \Delta_{1}, \text{ ha k pairos} \end{cases}$$

$$= \frac{1}{2\pi} \left[ \frac{(-1)^{k-1}}{k-1} - \frac{(-1)^{k+1}}{k+1} - \frac{1}{k-1} + \frac{1}{k+1} \right] = \begin{cases} 0, \text{ ha k pairos} \\ \Delta_{1}, \text{ ha k pairos} \end{cases}$$

 $b_{k>1} = \frac{1}{2\pi} \int_{0}^{\pi} \cos\left[\left(n+i\right)x\right] - \cos\left[\left(n+i\right)x\right] dx = 0$ 

$$\int_{0}^{\infty} \sin x \cos kx \, dx = \frac{1}{2\pi} \int_{0}^{\infty} \frac{1}{\left[\left(k+1\right)x\right]} \frac{\cos \left[\left(k+1\right)x\right]}{\left(k+1\right)}$$

$$osk \times dx = \frac{1}{2\pi} \int_{0}^{\pi}$$

$$\int_{0}^{\infty} \frac{1}{2\pi} \left[ (k+1) \times (k+1) \times (k+1) \times (k+1) \right]$$

 $\Delta = \frac{-2}{2\pi(k-1)} + \frac{-2}{2\pi(k+1)} = \frac{-(k+1) - (k+1)}{\pi(k^2 - 1)} = \frac{-2k}{\pi(k^2 - 1)}$ 

$$\frac{1}{2\pi} \int_{0}^{\pi} \sin \left[ \frac{1}{2\pi} \right] dx$$

$$n[(u^{1})x]-sin[(k-1)^{n-1}]$$

 $\mathcal{F}(x) = \mathcal{F}(x + 2 \ln x)$ 

4. Seladat
$$f(x) = \sin^4 x$$

$$\sin^4 x = \left(\frac{1 - \cos 2x}{2}\right)^2 = \frac{1}{4} - \frac{1}{2}\cos 2x + \frac{1}{4}\cos^2 2x =$$

$$= \cos^4 \frac{1 + \cos 4x}{8} = \frac{3}{8} - \frac{1}{2}\cos 2x + \frac{1}{8}\cos 4x$$

$$\alpha_0 = 3/8 \quad \alpha_2 = -1/2 \quad \alpha_3 = 1/8$$

$$g(x) = \cos 3x \sin^2 x$$

$$g(x) = \cos 3x \cdot \frac{1 - \cos 2x}{2} =$$

$$= \frac{\cos 3x}{2} - \frac{\cos 3x \cdot \cos 2x}{2}$$

$$= \frac{\cos 3x}{2} - \frac{\cos 5x}{4} - \frac{\cos x}{4}$$

$$= > \alpha_1 = -1/4 \quad \alpha_3 = 1/2 \quad \alpha_5 = -1/4$$

Hásili mo: 
$$sin x = -i sinh(ix)$$
 és  $cos x = cosh(ix)$ 

$$g(x) = \frac{e^{3ix} + e^{-3ix}}{2} \cdot \left(\frac{e^{2ix} - e^{-2ix}}{2i}\right)^2 = \dots$$

$$g(x) = \frac{e^{3ix} + e^{-3ix}}{2} \cdot \left(\frac{e^{2ix} - e^{-2ix}}{2i}\right)^2 = .$$

5. Seladat  

$$S(x) = x^{2} \times E(-1/1) \quad f(x+2) = f(x) \quad 2\rho = 2$$

$$\alpha_{0} = \frac{1}{2} \int_{-1}^{1} x^{2} dx = \int_{0}^{1} x^{2} dx = \frac{1}{3}$$

$$\alpha_{k} = \frac{1}{4} \int_{-1}^{1} x^{2} \cos k \hat{\mathbf{n}} x \, dx = 2 \int_{0}^{1/2} \cos k \hat{\mathbf{n}} x \, dx$$

$$\frac{D}{x^{2}} \cos k \hat{\mathbf{n}} x \qquad \frac{1}{4 \cos k \hat{\mathbf{n}}} x \qquad \frac{1}{4 \cos k \hat{\mathbf{n}}}$$

$$\frac{D}{x^{2}} \frac{1}{\cos k \tilde{n} x}$$

$$\frac{1}{x^{2}} \frac{1}{\cos k \tilde{n} x}$$

$$\frac{1}{x^{2}} \frac{1}{\cos k \tilde{n} x}$$

$$\frac{1}{x^{2}} \frac{1}{x^{2}} \frac{1}{x^{2}}$$

$$\frac{1}{x^{2}} \frac{1}{x^{2}}$$

bh = 0

$$\begin{array}{c|c}
\hline
D & \overline{I} \\
\hline
x^2 & \cos k \widehat{i} x \\
2x & \frac{\sin k \widehat{i} x}{k \widehat{i}} \\
\hline
2 & -\frac{\cos k \widehat{i} x}{k^2 \widehat{i}^2} \\
\hline
0 & -\frac{\sin k \widehat{i} x}{k^2 \widehat{i}^2}
\end{array}$$

$$\begin{array}{c|c}
\hline
1 & \frac{1}{4 \cos k \widehat{i}} x \\
\hline
-\frac{\cos k \widehat{i} x}{k^2 \widehat{i}^2} \\
\hline
0 & -\frac{\sin k \widehat{i} x}{k^2 \widehat{i}^2}
\end{array}$$

$$\begin{array}{c|c}
\hline
-\frac{1}{4 \cos k \widehat{i}} x \\
\hline
-\frac{1}{4 \cos$$