Worksheet, Hw 3

Part I. Suppose that \( f(x) = 12\cos 2x - \sin x \). Compute the following integrals.

1. \( \frac{1}{\pi} \int_{-\pi}^{\pi} \sin x f(x) \, dx \)
2. \( \frac{1}{\pi} \int_{-\pi}^{\pi} \cos x f(x) \, dx \)
3. \( \frac{1}{\pi} \int_{-\pi}^{\pi} \sin 2x f(x) \, dx \)
4. \( \frac{1}{\pi} \int_{-\pi}^{\pi} \cos 2x f(x) \, dx \)

Part II. Suppose that you have a function \( g(x) \) whose graph is shown on the next page. You suspect that \( g(x) \) is some combination of trig functions, say

\[
g(x) = a \sin x + b \cos x + c \sin 2x + d \cos 2x
\]

Compute \( a, b, c \) and \( d \).

HINT: Either compute or guess the answers to the same integrals you worked in the preceding problem.