Exercise 1
Identify even or odd functions and find their Fourier series for the period $-1 \leq x \leq 1$:
(i) $f(x) = 2x$;
(ii) $f(x) = -x^2$.

Exercise 2
Use Fourier series to find a solution of the equation

$$y''(x) - y(x) = a(x),$$

where $a(x) = 2x$ for $-1 \leq x \leq 1$.

Exercise 3
Find the Fourier integral representation of the function

$$f(x) = \begin{cases} x & \text{if } |x| \leq 1 \\ 0 & \text{if } |x| > 1. \end{cases}$$