

淡江大學 101 學年度轉學生招生考試試題

35-1

系別：物理學系三年級

科目：應用數學

考試日期：7月17日(星期二) 第4節

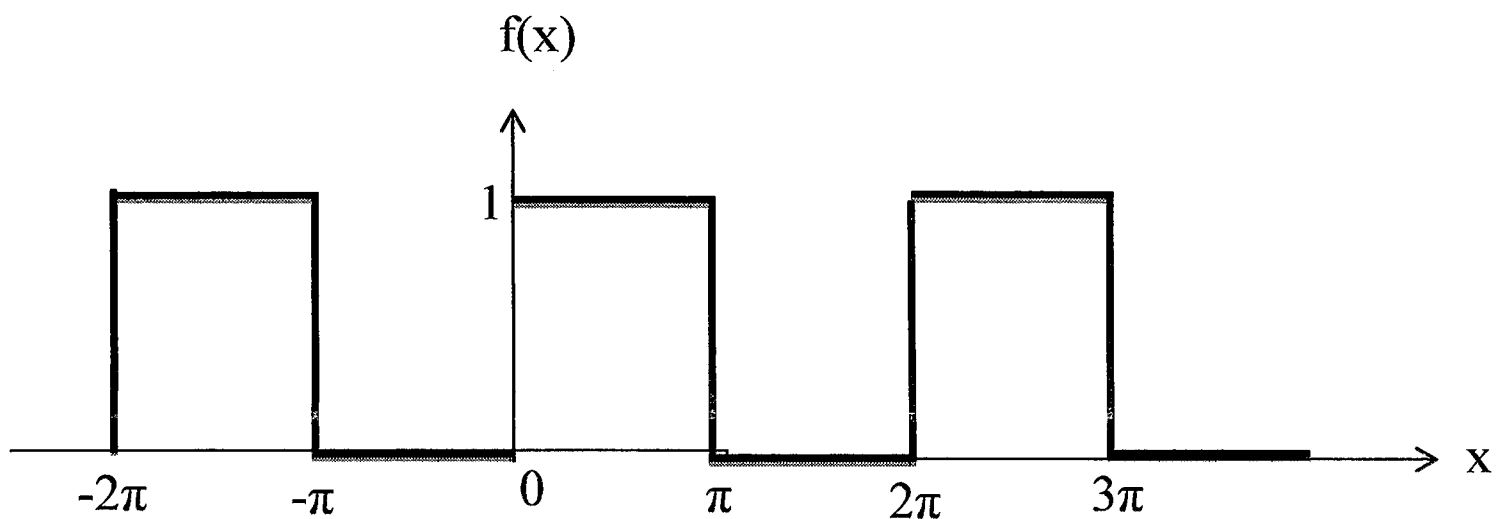
本試題共 5 大題， 1 頁

*每大題 20 分

(1) Find the eigenvalues and eigenvectors of the following matrix.

$$\begin{pmatrix} 5 & -2 \\ -2 & 2 \end{pmatrix}$$

(2) Expand in a Fourier series the function $f(x)$ sketched in following.



$$f(x) = 0, -\pi < x < 0 \\ = 1, 0 < x < \pi$$

(3) Solve the following 2nd-order differential equation

$$y'' + y' - 2y = 4 \sin 2x$$

(4) Evaluate $\int_0^{\infty} \frac{\cos x}{1+x^2} dx$

(5) Use Lagrange's equation to find the equation of motion of a particle in terms of the polar coordinate variables r and θ .