

系別：物理學系三年級

科目：應用數學

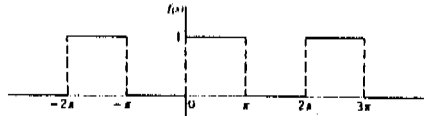
准帶項目請打「○」否則打「×」	
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本試題共1頁

- (1) Solve the following differential equation

$$x^2 y' - 2xy = 1/x$$

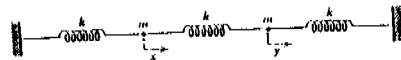
- (2) Expand in a Fourier series the function $f(x) = \begin{cases} 0 & -\pi < x < 0 \\ 1 & 0 < x < \pi \end{cases}$ sketched in Fig. 1.



(Fig. 1)

- (3) Given two points x_1 and x_2 on the x axis, and an arc length $l > x_2 - x_1$, find the shape of the curve of length l joining the giving points which, with the x axis, incloses the largest area.

- (4) Find the characteristic vibration frequencies for the system of masses and spring shown in Fig. 2.



(Fig. 2)

- (5) Evaluate $\int_{-\infty}^{\infty} \frac{\sin x}{x} dx$.