

淡江大學八十七學年度日間部轉學生入學考試試題

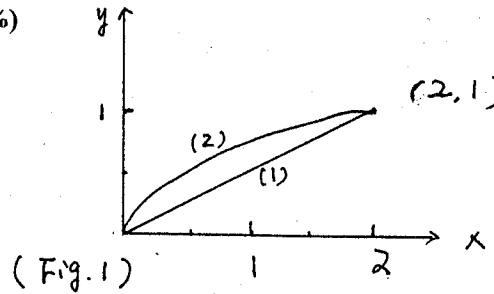
系別：物理系三年級

科目：應用數學

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1. Find $\int_0^{\infty} t^n e^{-kt^2} dt$ for odd $n, k > 0$. (20%)

2. Given the force $\mathbf{F} = xy\mathbf{i} - y^2\mathbf{j}$, find the work done by \mathbf{F} along the paths indicated in Fig. 1 from $(0,0)$ to $(2,1)$. (20%)



(1). Straight line
 (2). $x = 2t^3, y = t^2$

3. Solve differential equation $x^2y' - 2xy = 1/x$. (20%)

4. Find the eigenvalues and eigenvectors of the following matrices. (20%)

(a) $\begin{pmatrix} 5 & -2 \\ -2 & 2 \end{pmatrix}$; (b) $\begin{pmatrix} 1 & 3 & 0 \\ 3 & -2 & -1 \\ 0 & -1 & 1 \end{pmatrix}$

5. Find $I = \int_0^{2\pi} \frac{d\theta}{5 + 4 \cos \theta}$. (20%)