

國立中央大學94學年度碩士班考試入學試題卷 共 / 頁 第 / 頁
所別：產業經濟研究所碩士班 甲組 科目：微積分

以下每題 25 分，可選擇以英文或中文作答。

1. Show that continuity is a necessary, but not a sufficient condition for differentiability.
2. Suppose that a wine dealer is in possession of a case of wine, which he can either sell at the present time ($t=0$) for a sum of K or else store for a variable length of time and then sell at a higher value. The growing value V of the wine is known to be the following function of time: $V = Ke^{rt}$. Assume that the interest rate $r=0.1$. Find the value of t that maximizes the present value of V . (Note: You should check both FOC and SOC.)
3. Let B be a closed convex set of points in n -dimensional euclidean space, and let $x = (x_1, \dots, x_n)$ be a point not in B . Show that there exist numbers p_1, \dots, p_n, p_{n+1} such that $\sum_{i=1}^n p_i x_i = p_{n+1}$ and $\sum_{i=1}^n p_i y_i > p_{n+1}$ for all $y \in B$.
4. Consider the CES production function, $Q = A[\delta K^{-\rho} + (1-\delta)L^{-\rho}]^{-1/\rho}$, where $A > 0$, $0 < \delta < 1$, $-1 < \rho \neq 0$. Show that the function satisfies Euler's theorem (i.e., $K \frac{\partial Q}{\partial K} + L \frac{\partial Q}{\partial L} = Q$).