

科目：微積分 適用：經濟系二 經濟系三

編號：222 722

考生注意：

1. 依次序作答，只要標明題號，不必抄題。
2. 答案必須寫在答案卷上，否則不予計分。
3. 限用藍、黑色筆作答；試題須隨卷繳回。

本 試 題

共 1 頁

第 1 頁

I. (16%) Please explain briefly (a) what is indefinite integral and (b) what is definite integral.

II. (14%) Please state carefully the fundamental theorem of Calculus.

III. (24%) Evaluate the following questions

(a) $\lim_{x \rightarrow 2} \frac{x^2 - x - 2}{\ln(6x - 11)}$

(b) $\int \frac{x^2 + 5}{x^3 - x^2 - 5x - 3} dx$

(c) $\int 2x^2 \sqrt{x^3 + 1} dx$

IV. (8%) Please state carefully the $\varepsilon - \delta$ definition of Limit.

V. (18%) Prove the Sum or Difference rule of limit (i.e., $\lim_{x \rightarrow c} f(x) = L$

and $\lim_{x \rightarrow c} g(x) = K \Rightarrow \lim_{x \rightarrow c} [f(x) \pm g(x)] = L \pm K$) using the $\varepsilon - \delta$ definition.

VI. (20%) A firm's production function is given by $f(l, k) = 10l^{0.8}k^{0.2}$

where l represents the units of labor (at \$40 per unit) and k represents the unit of capital (at \$100 per unit). The total cost of labor and capital is limited to \$5000. Find the maximum production level for this manufacturer.