

國立嘉義大學九十四學年度轉學生招生考試試題

科目：微積分

請將答案寫在答案卷上

1. Evaluate the following:

a. $\lim_{x \rightarrow \infty} \frac{4 \cdot (x-4)^2}{\ln(x-4)}$. (5 pts)

b. $\lim_{x \rightarrow \infty} \frac{x}{5^x \cdot e^{2x} - 1/x}$. (5 pts)

c. $\int (6 \cdot x^5 - 8) dx$. (5 pts)

d. $\int \frac{x^2}{8 \cdot x^3 + 6} dx$. (5 pts)

e. $\int_0^{20} \frac{1}{x} dx$. (5 pts)

2. Find the extreme value(s) of the following functions, and determine whether they are maximum or minimum:

a. $z = x^4 - 8 \cdot x^2 + 4$, given $2 \leq x \leq 8$. (10 pts)

b. $z = 4x^2 + 4 \cdot x \cdot y + y^2$. (15 pts)

3. Find the extreme value of function $F(x_1, x_2) = x_1^{1/2} \cdot x_2^2$ subject to the constraints $2 \cdot x_1 + 4 \cdot x_2 = 100$. Check the second order conditions to see if a maximum or minimum (if either) is achieved.

a. By the method of direct substitution. (10 pts)

b. By the method of Lagrange multipliers. (15 pts)

4. Assume that the market demand of good x , produced by a monopoly firm A , is $x^d(p) = 200 - 10 \cdot p^{1/2}$.

a. Derive the marginal revenue function (MR) for firm A . (10 pts)

b. Firm A sells good x at 100 per unit. Calculate the consumers' surplus. (15 pts)