

考試科目	微積分	系所別	企管所 (MBA 學位課程) 乙組	考試時間	2 月 5 日(五) 第四節
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1. (20 points) Evaluate the integral $\int_0^{\infty} x^{-1} e^{-x} dx$.

2. (20 points) Let

$$f(x) = \prod_{i=1}^{10} x_i^{i-0.5} = x_1^{0.5} x_2^{1.5} \dots x_{10}^{9.5},$$

where $0 < x_i < 1$ and $\sum_{i=1}^k x_i = 1$. Find $x^* = (x_1^*, \dots, x_{10}^*)$ that maximizes $f(x)$.

3. (20 points) Find the value of x such that

$$\int_0^x 2te^{-t^2} dt = \int_x^{\infty} 2te^{-t^2} dt.$$

4. (40 points) W Bookstore purchases textbooks at wholesale price is \$225 per item, and the selling price is \$350 per item. Any unsold books are salvaged at \$100. Let q denote the order quantity and d denote the demand.

(a) (15 points) Write down the profit as

$$C_1 \min\{q, d\} + C_2 \max\{0, q - d\} + C_3 q.$$

Determine C_1 , C_2 and C_3 .

(b) (25 points) Assume that the demand has a normal distribution with mean 12,000 and standard deviation 200; the probability density function for a normal distribution with mean μ and variance σ^2 is

$$f(x) = \frac{1}{\sqrt{2\pi}\sigma} e^{-\frac{(x-\mu)^2}{2\sigma^2}}.$$

Write down the expected profit and find the optimal order quantity that maximizes the expected profit.

備

註

- 一、作答於試題上者，不予計分。
- 二、試題請隨卷繳交。