國立暨南國際大學105學年度轉學生入學考試試題

第2節

**科目：微積分**　適用：經濟系二、財金系二

編號：222、242

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3頁 第1頁

一、 填空題(共70分，每空格5分，不需列出計算過程)

1. Evaluate the following integral.

(a) $\int (e^{2x}+e^{-3x})dx =$ _____.

(b) $\int e^{-\sqrt{x}}dx =$ _____.

(c) $\int 4x(2x^2+1)^7 dx =$ _____.

(d) $\int_1^2 \left(1+\frac{1}{x}+e^x\right)dx =$ _____.

(e) $\int_{-\infty}^{\infty} \left(x-\frac{1}{2}\right)e^{-x^2+x-1}dx =$ _____.

2. Find the indicated limit of following:

(a) $\lim_{x\to 4}\frac{x-4}{\sqrt{x}-2} =$ _____.

(b) $\lim_{x\to a}[2f(x)-3g(x)]=$ _____, given that $\lim_{x\to a} f(x)=3$ and $\lim_{x\to a} g(x)=4$.

3. Find the derivatives $dy/dx$ of the each function.

(a) Suppose $y=2u^2+1$ and $u=x^2+1$, find $dy/dx =$ _____.

(b) Suppose $y^2-xy=8$, find $dy/dx =$ _____.

(c) Suppose $y=x^{x+3}$, find $dy/dx =$ _____.

4. Find an equation of the tangent line to the graph of $y=e^{2x-3}$ at the point $\left(\frac{3}{2}, 1\right)$. Ans: _____

5. Determine the absolute extrema of the function

$$f(x) = x^3 + 3x^2 - 1 \text{ on } [-3, 2]$$

(a) Find absolute maximum value = _____.

(b) Find absolute minimum value = _____.

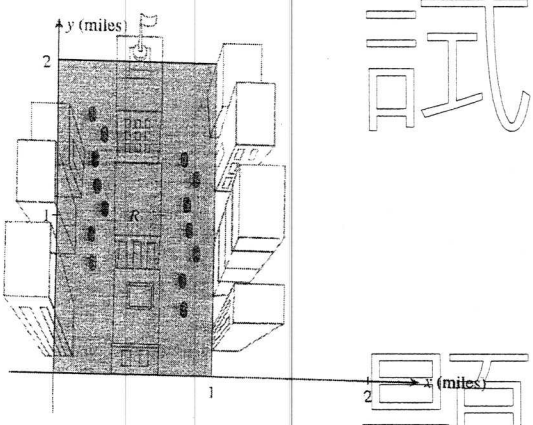
6. Solve the equation $4e^{t-1} = 4$. Then $t =$_____.

二、計算題（30 分，每題 15 分）

1. The rectangular region $R$ shown in the accompanying figure represents a city's financial district. The price of land in the district is approximated by the function

$$p(x,y) = 200 - 10\left(x - \frac{1}{2}\right)^2 - 15(y-1)^2$$

where $p(x,y)$ is the price of land at the point $(x,y)$ in dollars/square foot and $x$ and $y$ are measured in miles. What is the average price of land per square foot in the district? (15%)



2. The price-earnings ratio (PE ratio) of a stock is given by

$$R(x,y)=\frac{x}{y}$$

where $x$ denotes the price per share of the stock and $y$ denotes the earnings per share. Estimate the change in the PE ratio of a stock if its price increases from \$60/share to \$62/share while its earnings decrease from \$4/share to \$3.80/share. (15%)