國立臺北商業技術學院 95 學年度研究所碩士班考試入學試題

准考證號碼：□□□□□□（請考生自行填寫）

財務金融研究所　　筆試科目：微積分　　共 3 頁，第 1 頁

注意事項	1. 本科目合計 100 分，答錯不倒扣。 2. 請於答案卷上依序作答，並標註清楚題號（含小題）。 3. 考完請將答案卷及試題一併繳回。

1. Given the follow equation, find the f(m,w). (10 points)

$$\int_{m}^{\infty}\int_{-\infty}^{w} f(x,y)dydx = \frac{1}{\sqrt{2\pi t}}\int_{2m-w}^{\infty} e^{-\frac{x^2}{2t}}dx$$

2. Calculate the maximum values of the following expressions. (20 points)

$(a).\dfrac{x^2+6xy+3y^2}{x^2-xy+y^2}$

$(b)\dfrac{x^4+8/13x^3y}{x^4+y^4}$

3. Given that $\dfrac{dy}{dx}=(0.005-0.1y)$ (10 points)

(a) Find $\dfrac{d(e^{0.1x}y)}{dx}$.

(b) Find the solution of $\dfrac{dy}{dx}=(0.005-0.1y)$ with initial condition x=0,y=0.03.

背面尚有試題

4. Consider the Black Scholes formula $C(S,X,r,\tau,\sigma)=SN(d_1)-Xe^{-r\tau}N(d_2)$, where $N(x)=\int_{-\infty}^{x}\frac{1}{\sqrt{2\pi}}e^{-\frac{z^2}{2}}dz$, $d_1=\frac{\ln\frac{S}{X}+r\tau+\frac{1}{2}\sigma^2\tau}{\sigma\sqrt{\tau}}$ and $d_2=d_1-\sigma\sqrt{\tau}$. Calculate the $\frac{\partial C}{\partial \sigma}$ (10 points)

5. Evaluate the iterated integral $\int_0^2\int_y^{y^2}\frac{x^2}{y}dxdy$. (10分)

6. Use implicit differentiation to find $\frac{dy}{dx}$ for $xe^y+ye^x=x$. (10分)

7. Find $f'(x)$ when $f(x)=x^2\ln x$. (10分)

8. Evaluate (a) $\int x^2\cos x dx$

(b) $\int\frac{1+\sec^2 x}{x+\tan x}dx$ (每小題5分，共10分)

背面尚有試題

9. An object move along the x axis in such a way that at each time t, its velocity is given by the differential equation $\frac{dx}{dt} = x^2 \ln t$. If the object is at $x = -3$ when $t = 1$, where is it when $t = 2$? (10分)