國立臺北商業大學 106 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）

財務金融系碩士班財務工程組

企業管理系　　筆試科目：微積分　　共 2 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 normal probability density function: $f(x)=\frac{1}{\sigma\sqrt{2\pi}}e^{-\frac{x^2}{2\sigma^2}}$, σ is constant.

   Please show that (1) $f'>0$ for x<0 and $f'<0$ for x>0 [10 points] (2) the points of inflection [10 points] (3) what are the maximum value of the function. [10 points]

2. Please find an equation of the tangent line of $y=\log_3 x$ at the point (27, 3). [10 points]

3. Please use eighth-degree Taylor polynomial for e^{-x^2} to approximate the definite integral $\int_0^1 e^{-x^2}dx$. [10 points]

4. Suppose f(x)= f(x)=$\begin{cases}|x|, & if\ |x|\geq 1\\ ax^2-b, & if|x|<1\end{cases}$, and f(x) is differentiable on (-∞, ∞).

   Please find the value of (a, b) =_____. [10 points]

背面尚有試題

5. Find the integral value of: (1) $\int \frac{1}{e^x + 5} dx = ?$ (2) $\int_1^2 \frac{1}{x} lnx dx$ =? [10 points]

6. What is the maximum value |f''(x)| for the function $f(x) = x^3(10 - 2x^2)$ on the closed interval [0, 2]? [10 points]

7. If f(x) is the inverse function of $g(x) = 2x^3 + x + 3$, please find the value of f'(6)=? [10 points]

8. If $f(\frac{1+x}{1-x}) = x$, find f'(5)=? [10 points]