

國立臺北商業大學 104 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)

商學研究所

筆試科目：微積分

共 1 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。
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1. If $\lim_{x \rightarrow 1} \frac{ax^3 + bx^2 + 2x + 1}{x - 1} = 5$, Compute $a=?$, $b=?$ (10%)
2. If $f(x + \frac{1}{x}) = x^3 + \frac{1}{x^3}$, Compute $f'(x)=?$ (10%)
3. If $e^y - e^{-x} + xy = 0$, Compute $\frac{dy}{dx}=?$ (10%)
4. Compute $\lim_{x \rightarrow +\infty} (2 + e^x)^{\frac{1}{x}} = ?$ (10%)
5. Compute $\int \frac{1}{(x-2)^3(x+1)^2} dx = ?$ (10%)
6. Find $\iint_R (3x^2y) dx dy$, $R = \{(x, y) | 2y^2 \leq x \leq 2y, 0 \leq y \leq 1\}$ (10%)
7. Is the improper integral $\int_0^{\infty} x^2 e^{-x} dx$ convergent or divergent? If convergent, find the value. (10%)
8. If $V = xy^4$, $x^3 + y = t$, $x^2 + y^3 = t^2$, find $\frac{dV}{dt} = ?$ (10%)
9. Find the area of the region bounded by the graphs of $y = x^2$ and $y = 2x + 8$. (10%)
10. The region bounded by the curve $y = |x| + 1$, $y = 2x^2$, and the line is revolved about the x-axis. Calculate the volume of the solid generated. (10%)

試題結束