

國立臺北大學 107 學年度日間學士班暨進修學士班轉學生招生考試試題

系 別：資訊工程學系日間學士班 2 年級

科 目：微積分

第 1 頁 共 1 頁

可 不可使用計算機

一、

1. (12%) Compute $\int_0^1 \tan^{-1} x dx$.
2. (12%) Find the area enclosed by the equation $\frac{x^2}{a^2} + \frac{y^2}{b^2} \leq 1$.
3. (12%) Compute $\int_0^1 \ln x dx$.
4. (14%) Use Simpson's rule with $n=10$ to approximately compute $\int_1^2 \frac{1}{x} dx$.

二、

1. (8%) Prove that $\lim_{x \rightarrow 2} (3x - 1) = 5$.
2. (8%) Show that the function $f(x) = \sqrt{4 - x^2}$ is continuous on the interval $[-2, 2]$.
3. (8%) Show that the function $f(x) = x^2 - x + 1$ is differentiable for $x \in \mathbb{R}$.
4. (8%) Suppose that $f(0) = 0$ and $f'(x) \geq 6$ for $x \in \mathbb{R}$. How small can $f(100)$ possibly be?
(Hint: the Mean Value Theorem)
5. (6%) Find y' if $x^4 + y^4 = 8xy^2$.
6. (6%) Find y' if $y = \cos(x \cos x)$.
7. (6%) Find y' if $y = \frac{x}{x + \frac{a}{x}}$.

試題隨卷繳交