

淡江大學 108 學年度日間部轉學生招生考試試題

系別：理、工、商管學院二年級

科目：微積分

11-1

考試日期：7月24日(星期三) 第2節

本試題共 2 大題，

頁

第一部份 簡答題 (60%) (不需呈現計算過程，但題號必須標示清楚)

1. (10%) Find the indicated limit, if it exists, $\lim_{x \rightarrow 1} \frac{x-1}{x^3+x^2-2x}$.
2. (10%) Find the slope of the tangent line to the graph of the function at the given point, and determine an equation of the tangent line. $f(x) = 2x^2 + 1$ at $(1, 3)$
3. (10%) Find the **absolute extrema** of the function $f(x) = e^{-x^2}$ on $[-1, 1]$.
4. (10%) Find the indefinite integral $\int \left(xe^{x^2} - \frac{x}{x^2+2} \right) dx$.
5. (10%) Find the area of the region completely enclosed by the graphs of the functions $f(x) = x^3 - 3x + 3$ and $g(x) = x + 3$.
6. (10%) Evaluate $\iint_R f(x, y) dA$ given that $f(x, y) = x^2 + y^2$ and R is the region bounded by the graph of $h_1(x) = x$ and $h_2(x) = 2x$ for $0 \leq x \leq 2$.

第二部份 計算題 (40%) (計算過程要寫清楚否則不予計分)

1. (10%) Evaluate $\int_e^{\infty} \frac{1}{x \ln^3 x} dx$ if it converges.
2. (15%) Evaluate $\iint_R f(x, y) dA$ where $f(x, y) = xe^y$ and R is the plane region bounded by the graphs of $y = x^2$ and $y = x$.
3. (15%) Find the dimensions of an open rectangular box of maximum volume and having an area of 12 ft^2 that can be constructed from a piece of cardboard. What is the volume of the box?