

淡江大學 97 學年度轉學生招生考試試題

系別：理工組二年級

科目：微 積 分

可否使用計算機			
可		否	X

本試題共

大題，

頁

第一部份、(40%) 填空題 (不需寫出演算過程，答案依照題號寫在答案卷第一頁，題號要清楚標明，共 8 題，每小題 5 分)：

1. $\lim_{x \rightarrow -5} \frac{x^2 + 3x - 10}{x + 5}$

2. $\lim_{x \rightarrow 0} \frac{\tan 3x}{\sin 8x}$

3. Find $\frac{d}{dx}(\sin^{-1} x^2)$

4. Find an equation of the tangent line (切線) to the curve $x^2 + xy - y^2 = 1$ at (2,3).

5. Evaluate $\int_1^e \ln x dx$

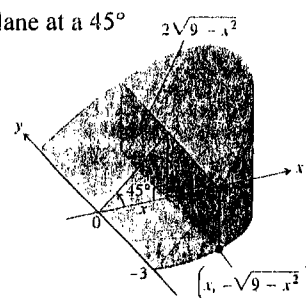
6. Find $\int_0^{\frac{\pi}{2}} \frac{\cos x}{1 + \sin^2 x} dx$

7. Find the directional derivative of $f(x, y) = 2xy - 3y^2$ at the point (5,5) in the direction of $\vec{v} = 4\vec{i} + 3\vec{j}$.

8. Evaluate $\int_0^1 \int_y^1 x^2 e^{xy} dx dy$.

第二部份、(60%) 計算或證明題 (過程必須寫清楚，直接寫答案不計分，共 4 題，每題 15 分)：

1. A curved wedge(楔子) is cut from a cylinder(圓柱體) of radius 3 by two planes. One plane is perpendicular(垂直) to the axis of the cylinder. The second plane crosses the first plane at a 45° angle at the center of the cylinder. Find the volume of the wedge.



2. Use the method of Lagrange multiplier to maximize the function $f(x, y, z) = x^2 + 2y - z^2$ subject to the constraints $2x - y = 0$ and $y + z = 0$.

3. Find the interval of convergence (收斂區間) of the series

$$\sum_{n=0}^{\infty} \frac{x^n}{\sqrt{n^2 + 3}}$$

4. Find the volume of the solid D cut from the solid sphere $\rho \leq 1$ by the cone $\phi = \frac{\pi}{3}$.

