

淡江大學 101 學年度轉學生招生考試試題

系別：商管組二年級

科目：微積分

不可使用計算機

考試日期：7月16日(星期一) 第4節

本試題共 10 大題， 1 頁

請按照題號作答，並註明題號。

Part A: 填充題 (每題10分, 共80分) 只須寫答案, 不必寫出過程。

1. (10%) $\lim_{x \rightarrow 1^+} \frac{\sqrt{2x+1} - \sqrt{3}}{x-1} =$ _____

2. (10%) Consider the function

$$f(x) = \begin{cases} -x + 1, & x < 1; \\ 2x + a, & x \geq 1. \end{cases}$$

Find the constant $a =$ _____ such that f is continuous on the entire real line.

3. (10%) For the function $f(x) = \frac{4}{3}x\sqrt{3-x}$ on the interval $[1,3]$, the absolute minimum value is _____.

4. (10%) For the function $f(x, y) = x^2y - \ln(x + y)$, $f_{xy}(1, 1) =$ _____.

5. (10%) For the equation $y^2 - ye^x - x \ln y = 12$, the slope of the tangent line at the point $(1, 1) =$ _____.

6. (10%) $\int_e^\infty (\ln x)^{-2} \frac{1}{x} dx =$ _____.

7. (10%) $\int_0^2 e^{x^2} x^3 dx =$ _____.

8. (10%) A rectangular solid is measured to have length x , width y , and height z , but each measurement may be in error by 1%. The estimated percentage error in calculating the volume is _____.

Part B: 計算題 (每題10分, 共20分) 必須詳列計算過程, 否則不予計分。

9. (10%) A closed rectangular box whose volume is 128 cubic inches is to be made with a square base. If the material for the top and bottom costs twice as much per square inch as the material for the sides, use Lagrange Multipliers to find the dimensions of the box that minimize the cost of material.

10. (10%) Evaluate $\int_0^4 \int_{x/2}^2 e^{y^2} dy dx$