

國立臺北商業技術學院 101 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 2 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。

1. Let  $f$  and  $g$  be differentiable at  $x$ . Proof the following

formula  $\frac{d}{dx}(f \cdot g) = \left(\frac{df}{dx}\right)g + f\left(\frac{dg}{dx}\right)$ , by using the definition of the derivative of the function  $f$  with respect to  $x$ , (10 points)

2. Find the constant  $a$  so that the graph of  $y = \frac{1}{ax-3}$  has tangent

$9y+4x-3=0$  at  $(0, \frac{1}{3})$ . (10 points)

3.  $\lim_{x \rightarrow 3} \frac{\sqrt{12 + \sqrt{2x+10}} - 4}{x-3} = ?$  (10 points)

4. Solve the initial value problem :  $\frac{dy}{dt} = 2 - 4t$ ,  $y(0) = 3$  (10 points)

5. For the probability density function  $f(x) = \frac{3}{32}x(4-x)$ ,  $0 \leq x \leq 4$

on the sample space  $[0, 4]$ .

Find (1)  $\Pr\{0 \leq x \leq 2\} = ?$

(2) The expected value  $E(x) = ?$  (10 points)

背面尚有試題

6. If  $F\left(x^3 - \frac{3}{2}x\right) = \int_{x^2}^1 (11+t^2)^{\frac{1}{3}} dt$  then  $F'(5)$  (10 points)

7. Sketch the graph of  $g(x) = \frac{x^2(x-2)}{(x+1)^2}$

determine where the function is increasing or decreasing? find the maximum and minimum of  $g$  if they exist. (10 points)

8. Evaluate  $\iint_R e^{\frac{3y-x}{y+3x}} dA$ , where  $R$  is the trapezoid with

vertices  $(0,3), (1,0), (3,0)$  and  $(0,9)$  (10 points)

9. Evaluate the integrals (10 points)

(1)  $\int e^{2\sqrt{x}} dx$ ,

(2)  $\int \frac{x dx}{x^4 + 6x^2 + 8}$

10. For the following function, find all critical points and determine whether each corresponds to a relative maximum, a relative minimum, or a saddle point  $f(x, y) = 2x^3 + 2y^2 + 4xy - 5x - 3y + 5$  (10 points)

試題結束