

東吳大學 104 學年度轉學生(含進修學士班轉學生)招生考試試題

第1頁，共1頁

系級	資訊管理學系二年級	考試時間	100 分鐘
科目	微積分	本科總分	100 分

1. Let $f(x) = \begin{cases} 2x + \ln |x| & \text{if } x < 1 \\ \frac{-6 + x + x^2}{-2 - x + x^2} & \text{if } 1 \leq x \leq 4 \\ 1 + \frac{1}{10}x & \text{if } x > 4 \end{cases}$. Find all x -values where f is not differentiable. (10%)

2. $y = \frac{8}{3x - 5}$ from $x = 1$ to $x = 5$.

(a) Find the average rate of change for y on the given interval. (5%)

(b) Find the instantaneous rate of change at the first x -value. (5%)

3. Find an equation of the line tangent to the graph of $f(x) = x^2/(x - 2)$ at $(4, 8)$. (10%)

4. An analyst has found that a company's costs and revenues in dollars for one product are given by

$$C(x) = 4x^2 - 80x - 600 \quad \text{and} \quad R(x) = \frac{1}{20}x^2 - x$$

(a) Find the marginal cost function. (5%)

(b) Find the marginal profit function. (5%)

5. Find the minimum value of $f(x, y) = 4x^2 + 3y^2 - xy - 23$, subject to $x + 2y = 21$. (10%)

6. Solve $x \frac{dy}{dx} - 3y + 4 = 0$, $y(1) = 7$. (10%)

7. Find $\lim_{x \rightarrow 0} \frac{1 + \frac{2}{5}x - (1+x)^{2/5}}{x^2}$ (10%)

8. Jessie deposits 150000 in an IRA at 5% interest compounded continuously for her retirement in 20 years. She intends to make continuous deposits at the rate of 60000 a year until she retires. How much will she have accumulated at that time? (10%)

9. $\int_0^2 \frac{3x^2 - x}{5e^x} dx$ (10%)

10. Evaluate $\int_1^6 \int_x^{x^3} \frac{1}{y} dy dx$ (10%)