

淡江大學 96 學年度轉學生招生考試試題

59

系別：商管組三年級

科目：微 積 分

可否使用計算機			
可	✓	否	

本試題共 / 頁

1. Find the following integrals or limits:(每小題 6 points)

(a) $\int x^4 \ln x \, dx.$ (b) $\int_0^{\infty} \frac{x}{(x^2+1)^2} \, dx.$ (c) $\int \frac{e^x}{e^x+1} \, dx.$

(d) $\int_0^2 \int_0^1 (3x^2 + 6xy^2) \, dy \, dx.$ (e) $\lim_{x \rightarrow 0} \frac{\sqrt{1+x}-1}{x}.$

2. Find $\frac{dy}{dx}$ or $\frac{\partial g}{\partial y}$ (每小題 6 points) if

(a) $y = e^{3x}$ (b) $y = \frac{\ln x}{x^5}$ (c) $y = \int_0^{x^2} 1/(1+\sqrt{t}) \, dt, x > 0$ (d) $g(x, y) = \frac{xy}{x^2+y^2}.$

3. Find the maximum and minimum values for the function

$f(x) = x^3 - 3x^2 - 24x + 5$ for x on the interval $[-3, 8]$. (10points)

4. Find the relative extreme values of $f(x, y) = y^3 + x^3 - 4xy$. (10 points)

5. Find the Taylor series for $\int_0^x \frac{1-e^t}{t} \, dt$ at $x=0$. (10points).

6. A manufacturer of digital clocks determines that he can sell x clocks per week at price p where x and p are related by the equation

$$x^2 + 3xp + p^2 = 4400.$$

This equation determines demand as a function of price, $x=Q(p)$, near the point $(p_0, x_0)=(40, 20)$.

(a) If price is increasing at the rate of 50% per week how fast is demand changing when $p=\$40$? (8points)

(b) Find $\frac{dx}{dp}$ at the point $(p_0, x_0)=(40, 20)$. (8points)