

# 淡江大學 96 學年度進修學士班轉學生招生考試試題

5

系別：工組二年級

科目：微 積 分

可否使用計算機			
可	<input type="checkbox"/>	否	<input checked="" type="checkbox"/>

本試題共 / 頁

1. Find the indicated limit or state that it does not exist. (10%)

(a)  $\lim_{t \rightarrow 2} \frac{t-2}{t+2}$

(b)  $\lim_{x \rightarrow 0} \frac{\sqrt{x+2} - \sqrt{2}}{x}$

2. Find the derivative of the function. (20%)

(a)  $f(t) = 5t^2 + 2t - 3$

(b)  $f(x) = (x^3 + 13x - 4)^6$

(c)  $h(x) = 5x + 2\sqrt{x} - \frac{3}{5x}$

(d)  $g(x) = x^2 \ln x - 3$

3. If  $f(x) = -x^3 - 6x^2 - 9x + 3$ . (10%)

(a) Find the intervals of increase or decrease.

(b) Find the local maximum and minimum values.

4. Find  $\frac{dy}{dx}$ , if  $x^3 - 3xy + y^3 = 3x - 5$ . (10%)

5. Evaluate the integral. (20%)

(a)  $\int x^3(x^2 + 1)dx$

(b)  $\int \frac{x-3}{x^2-6x+1} dx$

(c)  $\int_3^{\infty} \frac{dx}{(x-1)^3}$

(d)  $\int_0^1 \int_0^{2x} (1+x) dy dx$

6. Find the Taylor series for  $f(x) = e^{2x}$  at  $x = 0$ . (10%)

7. Find the area of the region bounded by  $y = x^2 + 1$  and  $y = x^3 + 1$ . (10%)

8. Determine whether the series is convergent or divergent. (10%)

(a)  $\sum_{n=1}^{\infty} \frac{1}{2^n - 1}$

(2)  $\sum_{n=1}^{\infty} (-1)^n \frac{n^3}{3^n}$