

南華大學九十四學年度學士班暨進修學士班
轉學生招生考試考試試題卷

招生 學系	學士班 2 年級：資訊工程學系	編號：D2-25-04
科 目：微積分		試題紙第 <u>1</u> 頁共 <u>2</u> 頁

1. compute (12 %)

(1) $\lim_{x \rightarrow -2} f(x)$ where $f(x) = \begin{cases} -3x & \text{if } x \neq -2 \\ 1 & \text{if } x = -2 \end{cases}$ (2) $\lim_{x \rightarrow 1} \frac{\sqrt{2x-1}}{3x+5}$

(3) $\lim_{x \rightarrow -5} \frac{x+5}{x^2-25}$ (4) $\lim_{x \rightarrow \infty} \frac{3x^2+5x+1}{2-4x^2}$

2. (6 %) (By definition)

$f(x) = 2x^2 - 1$, find $f'(x)$

3 compute **Average** rate of change of f over the interval $[x, x+h]$

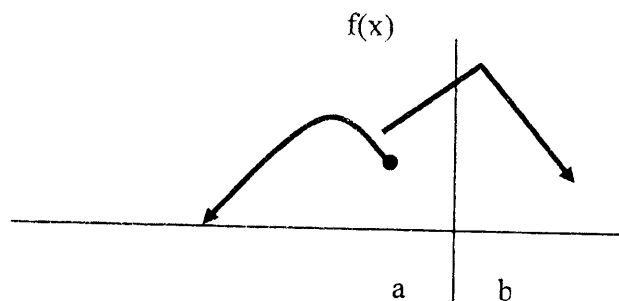
Instantaneous rate of change of f at x (10 %)

4. (10 %)

Given $f(x) = 3x^2 - 2x - 5$,

Show that $f(x) = 0$ on $[1, 2]$.

5. Describe Differentiability and Continuity of function f at point a and b . (8 %)



6. compute the derivative of (12%)

a. $f(x) = \frac{3x+5}{x^2-2}$ b. $G(x) = \left(\frac{2x-1}{3x+5}\right)^7$ c. $f(x) = (x^3 + 2x + 5)(3x^7 - 8x^2 + 1)$

7. **Growth in a Health Club Membership.** The membership of the Fitness Center, which opened a few years ago, is approximately by the function

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試題紙第 2 頁共 2 頁

$$N(t)=100(64+4t)^{(2/3)} \quad (0 \leq t \leq 52)$$

Where $N(t)$ gives the numbers at the beginning of week t .

- find the derivative of $N(t)$.
- How fast was the center's membership increasing initially ($t=0$)?
- How fast was the membership increasing at the beginning of the 40th week?
- What was the membership when the center first opened? At the beginning of the 40th week? (20%)

8. Find the absolute extrema of (5%)

$$f(x) = x^3 - 3x^2 \text{ on } \left[-\frac{1}{2}, 4\right].$$

9. Find an equation of the tangent line to the graph of (5%)

$$f(x) = 2x + \ln x \text{ at } (1, 2).$$

10. Use logarithmic differentiation to find the derivative of (6%)

$$y = \sqrt{3x+2}(9x-1)^5$$

11 Evaluate (6%)

$$\int_{-\infty}^{\infty} -xe^{1-x^2} dx$$

if it converges.