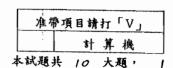
## 淡江大學 98 學年度轉學生招生考試試題

系別: 商管組二年級

科目:微 積。分



頁

請詳列計算過程, 否則不予計分. (10% each)

- 1. Let  $f(x) = \begin{cases} 2-3x & x \le 1 \\ -x+1 & x > 1 \end{cases}$ . Find  $\lim_{x \to 1^+} f(x)$ ,  $\lim_{x \to 1^+} f(x)$ . Is f(x) continuous at x = 1?
- 2. Let  $f(x) = \frac{x}{3x+1}$ , find the equation of the line tangent to y = f(x) at x = 2.
- 3. Find the absolute extreme values of  $f(x) = x^3 9x^2 + 15x 4$  on [-1,3].
- 4. A study of urban pollution predicts the sulfur oxide emission in a city will be  $S = 5 13x + 0.05x^2$  tons, where x is the population (in thousands). The population of the city t years from now is expected to be  $x = 120 + 80\sqrt{2t + 3}$  thousand people. Find how rapidly the sulfur oxide pollution will be increasing 3 years from now.
- 5. For the equation  $y^2 x \ln y = x^2 y 10$ , find  $\frac{dy}{dx}$  implicitly.
- 6. Find  $\int_{0}^{4} x \sqrt{x^2 + 9} dx$
- 7. Find the area of the region bounded by the curves  $y = x^3$  and  $y = x^2 + 2x$
- 8. Find  $\int_{1}^{x} \frac{\ln x}{\sqrt{x}} dx$
- 9. A company's output is given by the Cobb-Douglas production function
  P(L, K) = 240L<sup>2/3</sup>K<sup>1/3</sup>, where L and K are the numbers of units of labor and capital. Suppose each unit of labor costs \$ 200 and each unit of capital costs \$ 50.
  If there are only \$9000 available to pay for labor and capital, how many units of labor and capital should be used to maximize the production? Use the method of Lagrange multipliers to find the answer.

10. 
$$\iint_R (3x^2 - xy) dA$$
, where  $R = \{(x, y), 0 \le x \le 2, -1 \le y \le 3\}$