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

准帶項目請打「V」	
	計 算 機

本試題共 10 大題， 1 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 $f(x)=\dfrac{x}{3x+1}$, 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 $y^2-x\ln y=x^2y-10$, find $\dfrac{dy}{dx}$ 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 $\int_1^e \dfrac{\ln x}{\sqrt{x}}dx$
9. A company's output is given by the Cobb-Douglas production function $P(L,K)=240L^{2/3}K^{1/3}$, 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 $R=\{(x,y),\ 0\le x\le 2,\ -1\le y\le 3\}$