淡江大學 108 學年度進修學士班轉學生招生考試試題

系別：工組二年級　　科目：微積分

考試日期：7 月 25 日(星期四) 第 2 節　　本試題共　10　大題，　1 頁

請詳列計算過程，否則不予計分，每題 10 分，共 100 分

1. (a) $\lim_{x\to 2}\dfrac{x^2+x-6}{x-2}$　　(b) $\lim_{x\to 4}\left(x^2-x\right)$

2. (a) $\int_0^2\left(\dfrac{4}{5}x^3-\dfrac{3}{4}x^2+\dfrac{2}{5}x\right)dx$　　(b) Find $\int\dfrac{x}{1+x^2}dx$

3. Find the absolute maximum and minimum values of $f(x)=3x^4-4x^3-12x^2+1$ on $[-2,3]$.

4. By using implicit differentiation, find dy/dx if $x^2-4xy+y^2=4$.

5. Calculate $\int_0^2\int_0^1(4-x-y)\,dydx$.

6. (a) Find $\lim_{x\to\infty}\dfrac{\ln x}{x}$　　(b) Find $\lim_{x\to\infty}x^{1/x}$

7. Find the Maclaurin seires of the function $f(x)=e^x$ and its radius of convergence.

8. Use Lagrange multipliers to find the maximum and the minimum of $f(x,y)=xy$ subject to the constraint $x^2+y^2=1$.

9. Find $\dfrac{d}{dx}x^x$.

10. Evaluate $\iint_R(x+2y)\,dA$ where R is the region bounded by the parabolas $y=2x^2$ and $y=1+x^2$.