淡江大學九十三學年度進修學士班轉學生招生考試試題 12-1

系別：統計學系二年級　　科目：微　積　分

准帶項目請打「○」否則打「×」	
0	簡單型計算機

節次：7 月 14 日第 3 節

本試題共 1 頁

1. (14%) Find the following limits:

(a) $\lim_{x\to\infty}\frac{3-\sqrt{x}+4x^2}{3x^2+2x-5}$　　(b) $\lim_{x\to 5}\frac{x^2-25}{\ln(x^2-24)}$

2. (28%) Evaluate the following integrals.

(a) $\int_0^{\pi/2}\frac{\sin x\cos x}{\sqrt{1+\sin^2 x}}dx$　(b) $\int\frac{\sin(3+\ln x)}{x}dx$　(c) $\int\frac{dx}{9x^2-64}$　(d) $\int_1^e\sqrt{x}\ln x\,dx$

3. (7%) Find the sum of the series, if it converges $\sum_{k=0}^{\infty}\frac{7\cdot 2^{k+1}-3\cdot 4^{k+1}}{5^{k+1}}$.

4. (7%) Calculate the derivative $\frac{d}{dx}\left(x^3(\ln x)^2\right)$.

5. (14%) Evaluate the following double integrals

(a) $\int_2^4\int_1^e\frac{y}{x}\,dx\,dy$　　(b) $\int_0^1\int_0^{\sqrt{1-x}}xy^2dy\,dx$

6. (10%) Use the procedure for reversing order of integration to evaluate the iterated integral $\int_0^1\int_{y^2}^1 ye^{x^3}dx\,dy$.

7. (10%) Suppose that the percentage of the population that knows the result of an election t hours after the result is announced is $P(t)=100(1-Ce^{-kt})$. **If 40% of the population knows the result 2 hours after it is announced, when will 80% of the population know it?**

8. (10%) Find the minimum value of the function $f(x,y)=x^2+y^2+z^2$ **subject to the constraint** $x+y+z=25$.