淡江大學 95 學年度轉學生招生考試試題

10-1

系別：理工組二年級　　科目：微　積　分

准帶項目請打「V」	
	簡單型計算機

本試題共 1 頁

第一部份、(40%) 填空題（不需寫出演算過程，答案依照題號寫在答案卷第一頁，題號要清楚標明，共 8 題，每小題 5 分）：

(1) $\lim_{x\to 2}\frac{\sqrt{x+7}-3}{\sqrt{x+2}-2}=?$　　(2) $\lim_{x\to 1}\frac{\ln x}{x-1}=?$

(3) The position（位置）of a particle is given by the equation s = f(t) = 1/(1+t), where t is measured in seconds（秒）and s in meters（米）. The velocity（速度）after 2 seconds is ?

(4) If $f(x)=\frac{1}{x}$, find a formula for $f^{(n)}(x)$.

(5) $\int_1^4 e^{\sqrt{x}}dx=?$　　(6) Let $f(x,y)=xe^{y}$, find the maximum rate of change of f at the point(2,0).

(7) $\int_0^3\int_{y^2}^9 y\cos(x^2)dxdy=?$　　(8) Find the interval of convergence（收斂區間）of the power series $\sum_{n=0}^{\infty}\frac{(-3)^n x^n}{\sqrt{n+1}}$.

第二部分、(60%) 計算或證明題（過程必須寫清楚，直接寫答案不計分，共 5 題，每題 12 分）：

(9) Show that the parabola $y=-x^2$ and the line $x-4y-18=0$ intersect at right angle at one of their points of intersection（於二個交點之一以直角相交）.

(10) A ladder（梯） 10 feet long rests against a vertical wall（斜靠於一垂直牆面）. If the bottom（底） of the ladder slides away（滑開） from the wall at a rate of 1 ft/sec, how fast is the top of the ladder sliding down the wall when the bottom of the ladder is 6ft from the wall?

(11) Find the volume of the solid obtained by rotating（旋轉） the region（區域） bounded by $y=x-x^2$ and $y=0$ about the line $x=2$.

(12) Determine whether $\sum_{k=1}^{\infty}\frac{(-1)^k}{k+\sqrt{k}}$ converges absolutely, converges conditionally, or diverges（要清楚寫出判斷之依據）.

(13) The plane $x+y+z=1$ cuts（切過）the cylinder（圓柱） $x^2+y^2=1$ in an ellipse（橢圓）. Use Lagrange multipliers to find the points on the ellipse that lie closest to（最近） and farthest from（最遠） the origin（原點）.