銘傳大學 98 學年度研究所碩士班招生考試

管理研究所碩士班(甲組)、資訊管理學系碩士班

第二節

微積分試題

(第 1 頁共 1 頁)(限用答案本作答)　　□可使用計算機 ☑不可使用計算機

填充題: (每一小題 5 分，必須按照題目順序作答，共計 60 分，可酌以寫下相關過程，有部分分數)

(a) $\lim_{x\to 0}\frac{\log 4-\log(4-x)}{x}$ = _____　(b) $\lim_{x\to\infty}\frac{\log(x^3)}{x}$ = _____　(c) $\lim_{x\to\infty}\frac{3x^{10}}{x^{10}-5x^5+6}$ = _____

(d) $D_x(x^3-\sqrt{x})$= _____　(e) $\int_0^{\pi}\frac{2^x}{2^x+2^{x-3}}dx$ = _____　(f) $\int_0^{\infty}e^{-2x}dx$ = _____

(g) $\int_0^{\infty}e^{-x^2}dx$= _____　(h) $\int_3^5\frac{x+2}{x^3-x}dx$ = _____　(i) $\int_0^2\frac{x^2}{\sqrt{x^3+1}}dx$ = _____

(j) Let $f(x)=\frac{\sin(x)(1-x)(2-x)(3-x)(4-x)(5-x)}{(1+x)(2+x)(3+x)(4+x)(5+x)}$, then $f'(0)$ = _____.

(k) Let $f(x,y)=\frac{x}{x^2-1}$, then the vertical asymtote(s) is(are) _____.

(l) If $f(1,1)=e, \frac{\partial f(x,y)}{\partial x}=4x^3+y^2+ye^x$, and $\frac{\partial f(x,y)}{\partial y}=2xy+\frac{1}{y}+e^x$. Then f(x, y) = _____.

計算及過程問答: (每小題 10 分，必須寫出相關過程，否則可能不計分)

(A) Find out the Maclaurin Series generated by $x^2\cos(x)$.

(B) Use differentials to approximate the increase in the area of a soap bubble when its radius increases from 10 cm to 10.025 cm. (Note: the area of a spherical soap bubble is given by $A = 4\pi r^2$)

(C) Find the equation of the tangent line to the curve $y^3 - x y^2 = 1$ at the point (0, 1).

(D) Sketch the graph of $f(x) = (3x^5 - 20x^3)/4$.

試題完