銘傳大學 95 學年度轉學生招生考試

資訊管理學系、資訊傳播工程學系、資訊工程學系、
電腦與通訊工程學系、醫療資訊與管理學系

7月25日第四節　　（第 1 頁共 1 頁）

微積分試題　　（限用答案本作答）

(1) Find each limit : (10 %)

(a) $\lim_{x\to 2} \frac{x-2}{x^2-x-2}$　　(b) $\lim_{x\to 0} \frac{e^x - x - 1}{x^2}$

(2) Find the derivative $\frac{dy}{dx}$: (20 %)

(a) $y = x^2 + 1$　　(b) $y = \sqrt{x^2+1}$

(c) $y = \ln(x + \sqrt{x^2+1})$　　(d) $y = \frac{x}{2}\sqrt{4-x^2} + 2\sin^{-1}(\frac{x}{2})$

(3) Find the equation of the tangent to the curve $y = x^3 - 3x^2 + 1$ at the point of inflection. (10 %)

(4) Find the relative maximum and minimum values for the function $f(x) = \sqrt[3]{x^2(x-3)}$. (10 %)

(5) Find the average value of $f(x) = \frac{xe^x}{(1+x)^2}$ over $[0, 2]$. (10%

(6) Find the area bounded by $y = x^2$ and $y = 2x - x^2$. (10 %)

(7) Evaluate : (10 %)

(a) $\int_0^2 \int_0^1 4xy\, dx\, dy$　　(b) $\int_0^1 \int_y^1 e^{x^2} dx\, dy$

(8) Let $u = \ln\sqrt{x^2+y^2}$, show that $u_{xx} + u_{yy} = 0$. (10 %)

(9) Let $f(x, y) = \int_y^{x^2} \frac{\sin t}{\sqrt{1+t^2}} dt$, find $f_x(0, \frac{\pi}{2})$ and $f_y(0, \frac{\pi}{2})$. (10 %)

試題完