淡江大學八十九學年度日間部轉學生招生考試試題

系別：商管組二年級　　科目：微 積 分

一. 填充題 (每小格 7 分, 共 70 分)

請依順序寫上小題號. 只須寫答案, 不必寫出計算過程.

(1). $\lim_{x\to 2} \dfrac{\sqrt{x+2}-2}{x-2} =$ _____.

(2). $\dfrac{d}{dx}\, e^{2x}\sqrt{\ln x} =$ _____.

(3). $\int_1^{e^2} x^2 \ln x\, dx =$ _____.

(4). $\int \dfrac{(x^{\frac{2}{3}}-5)^{\frac{2}{3}}}{\sqrt[3]{x}}\, dx =$ _____.

(5). $\int \dfrac{xe^x}{(x+1)^2}\, dx =$ _____.

(6). Consider the function $f(x) = \begin{cases} -x+1 & \text{if } x<0 \\ x^2 & \text{if } x\geq 0 \end{cases}$
Is $f(x)$ continuous at $x=0$? Ans.: _____.

(7). Let $\sqrt{x}y + x^3y^2 = 20$. The slope of the tangent line at $(1,4)$ is _____.

(8). Consider the function $f(x) = x^4 - 8x^2 + 3$ on the interval $[1,2]$. Then the absolute maximum is _____.

(9). The area enclosed by the curves $y = x^3$ and $y = 9x$ is _____.

(10). The volume under the surface $z = f(x,y) = y$ and over the domain D which is the region bounded by curves $y = \dfrac{1}{2}x$, $y = x$, and $y = 2$ is _____.

二. 計算題 (共 30 分) 必須寫出計算過程, 否則不予計分.

(1). (20%) Consider the function $f(x) = \dfrac{x-1}{x^2}$.

(a) (15%) Find all critical points, relative extrema, inflection points, and asymptotes.

(b) (5%) Sketch the graph.

(2). (10%) Evaluate the double integral $\int_0^1 \int_y^1 e^{-x^2} dxdy$.