淡江大學 106 學年度日間部轉學生招生考試試題 2-10

系別：運管系、統計系二年級　　科目：微積分　10-1

考試日期：7 月 20 日(星期四) 第 2 節　　本試題共 8 大題，1 頁

1 (10%) Find the indicated limits if it exists (a) $\lim_{x\to 4}(\frac{1}{\sqrt{x}}-\frac{1}{2})(\frac{1}{x^2-16})$ (b) $\lim_{x\to-\infty}\frac{\sqrt{x^2+9}}{x+3}$

2. (14%) (a) Find $\frac{dy}{dx}$ if $y=(2x+1)^{\ln x}$ (b) Find $f'(x)=e^{\sqrt{3x^2+1}}-\frac{x}{1-e^{-x}}$

3. (16%)Determine where the function $f(x)=x^{2/3}-\frac{1}{5}x^{5/3}$ is increasing or decreasing, and where its graph is concave up and concave down. Find the relative extrema, inflection points.

4. (20%)Find the integral:(a) $\int_0^1\int_0^2 xe^{xy}dxdy$ **(b)** $\int e^{-2x}/(e^{-x}-1)dx$

5. (10%) Determine whether the integral $\int_2^\infty\frac{1}{x(\ln x)^2}dx$ is convergent or divergent .Evalute it if it is convergent.

6. (10%)Find the area between the curves $y_1=12-3x^2$ and $y_2=4x+5$ from $x=0$ to $x=3$.

7. **(10%)Find all critical points and determine where each corresponds to a relative maximum, a relative minimum, or a saddle points for the function** $f(x,y)=x^3-y^3+6xy$.

8.**(10%)The productivity of a certain company is given by the Cobb-Douglas model as** $P(x,y)=100x^{1/4}y^{3/4}$ **where** x **units of labor and** y **units of capital are utilized. Each unit of labor costs** \$200 **and each unit of capital costs** \$150**. If the company has a total of** \$1,600 **for labor and capital, how much of each should it use to maximize production?**