淡江大學 103 學年度日間部轉學生招生考試試題

7-1

系別：商管組二年級　　科目：微 積 分

考試日期：7 月 19 日(星期六) 第 4 節　　本試題共 8 大題， 1 頁

注意事項: (1) 請按題號順序作答，並註明題號；(2) 不可使用計算機; (3) 寫出計算過程。

1. **(10%)** Find the indicated limit if it exists: **(a)** $\lim_{x\to -2}\dfrac{x^2-2x-8}{x^2+3x+2}$, **(b)** $\lim_{x\to +\infty}\dfrac{2x^2+3x+1}{x^2-5x+2}$.

2. **(10%)** Differentiate the given function: **(a)** $f(x)=\sqrt{x^3}+\dfrac{1}{\sqrt{x^3}}$, **(b)** $f(x)=(x^5-4x^3-7)^3$.

3. **(15%)** Determine where the given function, $f(x)=2x^3+3x^2-12x-7$, is increasing and decreasing, and where its graph is concave up and concave down. Find the relative extrema and inflection points, and sketch the graph of the function.

4. **(20%)** Find the indicated integral. **(a)** $\int\dfrac{2x\ln(x^2+1)}{x^2+1}\,dx$, **(b)** $\int_0^1 e^{-x}(4-e^x)\,dx$.

5. **(10%)** Find the area of the region enclosed by the curve $y=x^3$ and $y=x^2$.

6. **(10%)** Find $\int x^2e^{2x}dx$. (**Hint:** Integrating by parts twice).

7. **(15%)** Find the critical points of the given functions, $f(x,y)=x^3-y^3+6xy$, and classify each as a relative maximum, a relative minimum, or a saddle point.

8. **(10%)** Evaluate the double integral over the specified region ***R***. Choose the order of integration carefully. $\iint_R xe^{xy}dA$, $R: 0\le x\le 2, 0\le y\le 1$.