(113)輔仁大學碩士班招生考試試題	考試日期：113 年 3 月 8 日第 二 節
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科目：**微積分**　　系所組：**企業管理學系**
管理學碩士班乙組

1. Determine whether the following function is continuous or discontinuous. If discontinuous, state where it is discontinuous: $f(x)=\dfrac{12}{5x^3-5x}$ (10%)

2. Find the derivative of each function.

   (1) $f(x)=\sqrt[3]{1+\sqrt[3]{x}}$ (5%)

   (2) $f(x)=\sin(1+\tan 2x)$ (5%)

3. Find the tangent and normal to the curve $x^2 - xy + y^2 = 7$ at the point (-1, 2). (10%)

4. Does the sequence whose nth term is $a_n=\left(\dfrac{n+1}{n-1}\right)^n$ converge? If so, find $\lim\limits_{n\to\infty} a_n$. (20%)

5. Evaluate the following integral or state it is divergent.

   (1) $\int_{-\infty}^{\infty}\dfrac{e^{-x}}{1+e^{-x}}dx$ (5%)

   (2) $\int_{-\infty}^{\infty}\dfrac{1}{1+x^2}dx$ (5%)

6. Evaluate the following integrals.

   (1) $\int x^3(x^2-1)^6\,dx$ (10%)

   (2) $\int\sqrt{\ln x}\dfrac{1}{x}dx$ (10%)

7. Find the absolute maximum and minimum values of $y=x^{2/3}$ on [-2, 3]. (10%)

8. An airline finds that if it prices a cross-country ticket at $200, it will sell 300 tickets per day. It estimates that each $10 price reduction will result in 30 more tickets sold per day. Find the ticket price and the number of tickets sold that will maximize the airline's revenue. (10%)

※ 注意：1.考生須在「彌封答案卷」上作答。
2.本試題紙空白部份可當稿紙使用，試題須隨答案卷繳回。
3.考生於作答時可否使用計算機、法典、字典或其他資料或工具，以簡章之規定為準。