義守大學 101 學年度碩士班入學招生考試試題

系所別	管理學院管理碩士班(MBA)	考試日期	101/3/18
考試科目	微積分	頁碼/總頁數	1/1

※此為試題卷，請將答案填寫在**答案卷**內，未寫於答案卷內者，不予計分。
※本科目不可使用計算機。

1. Find each of the following limits (if it exists).

   (a) $\lim\limits_{x\to 0} \dfrac{\tan \pi x}{\ln(1+x)}$ (5 points)

   (b) $\lim\limits_{x\to 0^+} x^x$ (5 points)

2. Find the derivative $\dfrac{dy}{dx}$.

   (a) $y = \ln|\sec 5x + \tan 5x|$ (5 points)

   (b) $y = e^{\sin^3(\ln(x^2+1))}$ (5 points)

   (c) $x^3 + x^2 y + y = 6$ (5 points)

3. Find the following integrals.

   (a) $\int \dfrac{x}{\sqrt{x^2+4}}\,dx$ (5 points)

   (b) $\int \ln x\,dx$ (5 points)

   (c) $\int \tan^3 x\,dx$ (5 points)

   (d) $\int \dfrac{\sqrt{9-x^2}}{x^2}\,dx$ (5 points)

4. If $F(x) = \int_1^x f(t)\,dt$, where $f(t) = \int_1^{t^2} \dfrac{\sqrt{1+u^4}}{u}\,du$, find $F''(2)$. (10 points)
5. Find the area enclosed by the line $y=x-1$ and the parabola $y^2 = 2x+6$. (15 points)
6. Find the intervals of concavity and the inflection points of the function $f(x) = (\ln x)/\sqrt{x}$. (15 points)
7. Find the local maximum and minimum values and saddle points of $f(x,y) = x^4 + y^4 - 4xy + 1$. (15 points)