國立成功大學 107 學年度碩士班招生考試試題

系　　所：交通管理科學系

考試科目：微積分

考試日期：0206，節次：2

※ 考生請注意：本試題不可使用計算機。　請於答案卷(卡)作答，於本試題紙上作答者，不予計分。

1. (10%) If $f(x)=\sqrt{x}$ and $g(x)=\sqrt{2-x}$, find the composite function of $f\circ g$ and its domains.

2. (10%) If $f_0(x)=x/(x+1)$ and $f_{n+1}=f_0\circ f_n$ for $n=0,1,2,\ldots$, find a formula for $f_n(x)$.

3. (20%) Find limits. (a) $\lim_{x\to 1}\arcsin\left(\frac{1-\sqrt{x}}{1-x}\right)$; (b) $\lim_{x\to 0^+}(1+\sin 4x)^{\cot x}$.

4. (20%) Differentiate (a) $y=\frac{1}{\sin^{-1}x}$; (b) $f(x)=x\arctan\sqrt{x}$.

5. (10%) Find the area enclosed by the line $y=x-1$ and the parabola $y^2=2x+6$.

6. (10%) Evaluate (a) $\int_4^5\frac{1}{3-x}dx$; (b) $\int_{-1}^3\frac{1}{x^2}dx$

7. (20%) A sealed cylindrical can is to be made to hold 1 liter of oil. Find the dimensions that will minimize the cost of the metal to manufacture the can, where r is the radius and h the height (both in centimeters).