大同大學 107 學年度 (暑) 轉學入學考試試題

考試科目: 微積分　　系別: 各學系　　

註: 本次考試不可以參考自己的書籍及筆記; 不可以使用字典; 不可以使用計算器。

1. Evaluate the limits:(每小題5分)

(a) $\lim_{x\to 0}\dfrac{\sqrt{2x+4}-2}{x}$　　(b) $\lim_{n\to\infty}\dfrac{\sin n}{n}$

2. Find the derivatives $\frac{dy}{dx}$ of the followings:(每小題6分)

(a) $y=\sqrt[3]{x}+\dfrac{2}{\sqrt[5]{x}}$　　(b) $y=(x^5-2x+3)^{20}$

3. (10分) Find the derivative of $f(x)=x^x+2^x+x^2$.

4. (10分) Find the relative maximum and relative minimum of $f(x)=x-\sin(2x)$ on the interval $(0,\pi)$.

5. Evaluate the following integrals:

(8分)(a) $\int xe^{x^2}\,dx$　　(10分)(b) $\int \dfrac{12x^2+8x+3}{(2x+1)^3}\,dx$

(10分)(c) $\int e^{-x/2}\sin(2x)\,dx$

6. (10分) Find the partial derivatives $\frac{\partial f}{\partial x}$, $\frac{\partial f}{\partial y}$, $\frac{\partial f}{\partial z}$ for $f(x,y,z)=\int_{yz}^{x^2}\sqrt{2t^2+3}\,dt$.

7. (10分) Find an equation of the tangent plane to the surface $z=\ln\sqrt{x^2+y^2}$ at the point $(3,4,\ln 5)$.

8. (10分) Find the volume of the solid region bounded above by the hemisphere $z=\sqrt{9-x^2-y^2}$ and below by the circular region R given by $x^2+y^2\le 4$.