大同大學 102 學年度 (寒) 轉學考試 試題

科目名稱: 微積分　　系別: 各系所　　

註: 本次考試不可參考書籍及筆記　　不可使用字典　　不可使用計算機

1. Evaluate the limits:(每小題8分)

   (a) $\lim_{x\to -2} \dfrac{x^2+5x+6}{x+2}$.

   (b) $\lim_{x\to 2^+} \left(\dfrac{\sqrt{x}-\sqrt{2}}{x-2}\right)$.

2. Find the derivatives $\dfrac{dy}{dx}$ of the following:(每小題8分)

   (a) $y = e^x(x^2+1)$.

   (b) $y = (1-x)^x$.

   (c) $x^2 + 2xy + y^3 = 3$.

3. Find the equation of the tangent line (切線) to the curve $y = \dfrac{x+1}{x-5}$ at $(6,7)$. (10分)

4. Calculate the approximate value of $\sqrt{99.4}$ by using the total differential. (6分)

5. Find all extreme value(s) (極值) of $y = x - \cos x$ on the interval $[0, 2\pi]$. (10分)

6. Find the relative extreme value(s) (極值) of $f(x) = \displaystyle\int_{-3}^{x} (t^2+2t)dt - 3x$. (10分)

7. Evaluate the following:(每小題8分)

   (a) $\displaystyle\int \left(\frac{x}{4} - \frac{7}{x^2} + 4x^3\right) dx$.

   (b) $\displaystyle\int_0^1 x^2(1-x)^{2014} dx$.

   (c) $\displaystyle\int x \ln x \; dx$