大葉大學九十三學年度碩士班甄試試題紙					
所　別	組別	考試科目（中文名稱）	考試日期	考試時間	備註
環境工程學系碩士班	甲	微積分	**12** 月 **8** 日	9:00~10:30	P1-1

註：備註欄若未註明可攜帶計算機或其他輔助工具作答時，考生一律不准攜帶。

1. The graph (函數圖) of $y = f(x)$ is given as Figure 1. (5 x 2 points)

   Draw the graphs of the following functions.

   (a) $y = f(-x) + 2$ (b) $y = f(x-1) - 3$

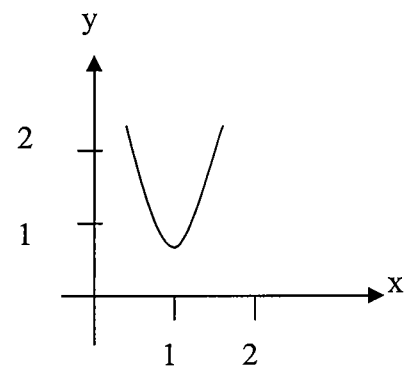

Figure 1

2. Find the derivative (導數) of the function. (5 x 6 points)

   (a) $y(x) = (2x - \frac{1}{x})^{0.5}$ (b) $y(x) = (x^2 + 5)^6$

   (c) $y(x) = (x^3 + 1)(2x^2 + 6)$ (d) $y(x) = \frac{x^2 + 2x - 6}{x + 5}$

   (e) $y(x) = \frac{\sin x}{x}$ (f) $y(x) = \ln(\frac{1}{\sqrt{x+2}})$

3. Evaluate the integral. (5 x 4 points)

   (a) $\int \frac{x^2}{(x+2)^3} dx$ (b) $\int \frac{2x}{\sqrt{3x^2+5}} dx$

   (c) $\int_0^1 \int_0^{2-2x} (1 + 3x + y) dy dx$ (d) $\iint_R (2x + 5y) dy dx$, $R = \{(x, y) \mid 0 \le x \le 2, x \le y \le 2\}$

4. Find the point on the parabola (拋物線) $y^2 = 2x$ that is closest to the point (1, 4). (15 points)

5. Sketch (描繪) the region enclosed (被包圍) by the given curves and find its area. (15 points)

   $y = x^2 + 4$, $y = x$, $x = -1$, $x = 1$

6. A transformation is defined by the equations (10 points)

   $u = x^2 - y^2$, $v = 2xy$

   Find the image (映射區域) of the square S = { (x, y) | 0≦x≦1, 0≦y≦1}.