大葉大學94學年度轉學招生考試試題紙						
系組別	日\第二部	年級	考試科目（中文名稱）	考試日期	節次	備註
機械與自動化工程學系，工業工程與科技管理學系，資訊工程學系，電機工程學系，生物產業科技學系	日	二	微積分	7月12日	3	共乙頁

註：考生可否攜帶計算機或其他資料作答，請在備註欄註明（如未註明，一律不准攜帶） 11:10 ~12:30

You must justify your answers correctly. Otherwise, won't be any credits.

1. Find $\frac{dy}{dx}$ of the following given equations, respectively.

(i) $y=\frac{1-x^3}{1+x^4}$ 5% (ii) $y=\left(x^3-x+5\right)^{100}$ 5% (iii) $y=\sin^3\left(x^2\right)$ 5%

(iv) $y=\int_{x^2+x+1}^{x}\frac{t}{t^4+1}dt$ 5% (v) $y=e^x\left(\ln x\right)$ 5% (vi) $y=5^{x^2-x+1}$ 5%

2. Find the following indefinite integrals, respectively.

(i) $\int\left(x^2+2x+3\right)^4(x+1)\,dx$ 5% (ii) $\int xe^x\,dx$ 5%

(iii) $\int\sin^2 x\,dx$ 5% (iv) $\int\frac{x^3}{x^2-x-2}\,dx$ 5%

3. Let $f(x,y)=x^2-2xy+2y$.

(i) Find the critical points of $f(x,y)$. 5%

(ii) Find the absolute maximum value of the function $f(x,y)$ on the closed triangular region with vertices $(0,0)$, $(3,0)$, and $(0,3)$. 10%

4.

(i) Sketch the region of integration for the integral $\int_0^1\int_x^1\sin\left(y^2\right)dy\,dx$. 5%

(ii) Then evaluate the integral $\int_0^1\int_x^1\sin\left(y^2\right)dy\,dx$. 10%

(**Hint:** You may reverse the order of integration.)

5. Let E be the solid tetrahedron bounded by the four planes

$x-y=0$, $x=0$, $z=0$, and $x+y+z=2$.

Write the triple integral $\iiint_E(x+y)dV$ as an iterated integral in the order

(i) $dzdydx$ 10%

(ii) $dzdxdy$ 10%

(You do not need to evaluate these iterated integrals.)