C.1 微積分期中考 (2003 Spring) 系級: 學號: 姓名: P.1

1. Use power series to solve the following initial value problem: $y' + 2y = 0$, $y(0) = 3$. (15分)

2. Find $\lim_{n\to\infty}(\frac{n-5}{n})^n$. (10分)

3. Use power series to evaluate $\lim_{x\to 0}\frac{7\sin x}{e^{2x}-1}$. (15分)

4. Show that the Maclaurin series for $\sin x$ converges to $\sin x$ for every value of x. (15分)

C.1

5. Identify the function $f(x) = x - \frac{x^2}{2} + \frac{x^3}{3} - \frac{x^4}{4} + \cdots$, $-1 < x < 1$ (15分)

P 2

6. Find the following series' radius and interval of convergence (15分)

$$\sum_{n=1}^{\infty} (1 + \frac{1}{n})^n x^n.$$

7. Determine whether the following series converges or diverges (15分)

$$\sum_{n=1}^{\infty} \frac{8 \tan^{-1} n}{1 + n^2}.$$