# Calculus II; MA 126
# Fall 2002

**Show all your work; solutions must be justified. Attach additional pages if necessary.**

1. Are the following series Absolutely convergent, convergent or divergent:

   (a) $\sum_{n=2}^{\infty} \frac{n}{\ln(n)}$

   (b) $\sum_{n=1}^{\infty} \frac{(-1)^n}{\sqrt{n}}$

   (c) $\sum_{n=1}^{\infty} \frac{2^{2n+1}}{5^n}$

   (d) $\sum_{n=1}^{\infty} \frac{1}{(2n+1)!}$

   (e) $\sum_{n=1}^{\infty} n e^{-n}$

2. Find the radius of convergence and the interval of convergence for the following power series:

(a) $\sum_{n=1}^{\infty} \frac{2^n (x+2)^n}{(n+3)!}$

(b) $\sum_{n=1}^{\infty} \frac{(x-4)^n}{n5^n}$

3. Find the MacLaurin series for

(a) $\frac{x}{5+2x}$

(b) $\frac{1}{(5+2x)^2}$

4. Alan Greenspan estimate the future inflation rate by approximating the sum of the infinite series $\sum_{n=1}^{\infty} \frac{(1/10)^n}{n!}$ by $1/10 + 1/200$ with an error less than $1/6000$. Is this correct? Explain!

5. First find a series expression for $\int_0^{1/10} \sin(x^4)$. Next use this series to estimate the integral with an error of less than $10^{-9}$ (You do not need to add the terms in the finite sum).