Calculus III, MAT 2213.002 Exam, Oct. 18, 1993. Instructor: D. Gokhman Show all pertinent work, answers alone are not sufficient. Box the answers.

Name: _____

1. (30 pts.) Find the interval of convergence for the following power series:

(a)
$$\sum_{n=1}^{\infty} \frac{(x+2)^n}{\sqrt{n}}$$
 (b) $\sum_{n=0}^{\infty} \frac{(-3)^{n+1}(x-5)^n}{2^{3n}}$

2. (30 pts.) Determine whether each of the following sequences or series converges to a real number.

(a)
$$\frac{\sqrt{n}\ln(n)}{n}$$
 (b) $\sum_{n=1}^{\infty} \frac{(2n)!}{(3n)!}$ (c) $\sum_{n=1}^{\infty} \frac{n^{\frac{1}{2}}\cos(n\pi)}{(n^5+1)^{\frac{1}{4}}}$

- 3. (20 pts.) Find the Taylor polynomial for $\sqrt[5]{x}$ of degree n = 2 centered at a = 32. Estimate the error of approximating $\sqrt[5]{30}$ with the above polynomial.
- 4. (20 pts.) For each of the following functions f(x) find the Taylor series with center a = 0.

(a)
$$f(x) = \frac{x^{10}}{5 - x^2}$$
 (b) $f(x) = \frac{x}{(1 + x)^2}$

1	2	3	4	total (100)