Calculus III, MAT 2213.001. 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:

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

2. (30 pts.) Determine whether each of the following sequences or series converges to a real number. If so, find the limit. Otherwise state that the sequence or series diverges.

$$\text{(a)} \left(\frac{n-1}{n}\right)^{(n^2)} \qquad \text{(b)} \cos\left(\frac{n\pi}{4}\right) \qquad \text{(c)} \sum_{n=0}^{\infty} \left(\frac{1}{5^n} + \frac{2}{3^{n+1}}\right)$$

3. (20 pts.) For each of the following series find the set of all p such that the given series converges.

$$\text{(a)} \sum_{n=0}^{\infty} \frac{(-1)^n}{n^p} \qquad \text{(b)} \sum_{n=2}^{\infty} \frac{1}{n\,(\ln n)^p}$$

4. (20 pts.) Find the Taylor polynomial for $\ln x$ of degree $n = 2$ centered at $a = 1$. Estimate the error of approximating $\ln(9/10)$ with the above polynomial.

1	2	3	4	total (100)