Exam 2

Math 231

October 25, 2006

Name:

Directions

1. Be sure to show all work to recieve full credit.
2. No calculators, books, notes or cell phones are allowed during the exam.
3. To receive full credit, you must state all rules that you use.

1. (a) (7 pts) Use the integral test to determine if the series $\sum_{n=1}^{\infty} \frac{1}{n^{3/2}}$ converges or diverges.

(b) (3 pts) State the p test for series.

2. (a) (7 pts) Determine if the sequence $a_n = \dfrac{1 - n^2}{2 + 3n^2}$ converges. If it does, find its limit.

(b) (3 pts) State the bounded monotonic sequence property.

3. (a) (3 pts) Define the n^{th} partial sum of the series $\sum_{k=0}^{\infty} a_k$.

(b) (3 pts) Define what it means for an infinite series to converge.

(c) (7 pts) Determine if $\sum_{n=1}^{\infty} \left(\frac{1}{n+1} - \frac{1}{n} \right)$ converges. If it does, evaluate the sum.

4. (a) (4 pts) State the Taylor series for $f(x) = \cos x$ and $g(x) = e^{\pi x^2}$

(b) (7 pts) Find the 3^{rd} degree Taylor polynomial for $f(x) = \sqrt[3]{2+x}$ at $x = 6$. There is no need to simplify the coefficients of the polynomial.

5. (a) (3 pts) State either the comparison test or the limit comparison test.

(b) (7 pts) Determine the convergence of $\displaystyle\sum_{n=1}^{\infty} \frac{n^3+1}{n^4-2}$

6. (a) (3 pts) Define what it means for an alternating series to converge absolutely.

(b) (7 pts) Use the root test to determine if the series $\sum_{n=0}^{\infty} \left(\frac{-2}{3}\right)^n$ converges absolutely, conditionally or diverges.

(c) (6 pts) Evaluate $\sum_{n=0}^{\infty} \left(\frac{-2}{3}\right)^n$.

7. (10 pts) Find the interval and radius of convergence for the power series $\displaystyle\sum_{n=1}^{\infty} \frac{(-2)^n (x-3)^n}{n}$.