Fourth Examination
Friday, November 11, 2011

Instructions: This exam should be done on your own paper. Your name should be on each sheet and on the back of the last sheet; the answers should appear written carefully and in order. If in doubt, show intermediate steps: Full credit may not be given, even for correct answers, unless work is arranged clearly and explained. This exam is closed book. You may leave after handing in your exam paper, but be sure to check your answers carefully. Each part of each problem is worth 12 points, and 4 points are free. You may keep this exam sheet.

1. State whether or not the following series converge or diverge. In each case, explain what principle or test you use to come to your conclusion, and show your computations that lead to the conclusion.

   (a) $\displaystyle\sum_{n=0}^{\infty} \frac{2^n}{n!}$ 　　　　 (b) $\displaystyle\sum_{n=2}^{\infty} \frac{1}{n^2 \ln(n)}$

   (c) $\displaystyle\sum_{n=2}^{\infty} \frac{(-1)^n}{\ln(n)}$ 　　　　 (d) $\displaystyle\sum_{n=2}^{\infty} \frac{1}{\ln(n)}$

2. State the center, radius and interval of convergence of each of these power series, and state whether or not the series converges at each end point of its interval of convergence.

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

   (c) $\displaystyle\sum_{n=0}^{\infty} \frac{(-1)^n}{n+1}(x-1)^n$ 　　　　 (d) $\displaystyle\sum_{n=1}^{\infty} n!x^n$