Week 9 & 10 Week in Review

courtesy: David J. Manuel

(covering 11.3, 11.4, 11.5, and 11.6)

(Problems with a * beside them will also be done in Python)

1 Section 11.3-11.6

1. Determine if the following series converge or diverge. Clearly show the series satisfies the conditions of the test you use.

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

   (b) $\displaystyle\sum_{n=1}^{\infty} \frac{n}{n+1}$

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

   (d) $\displaystyle\sum_{n=1}^{\infty} \frac{n^{100}}{n!}$ *

   (e) $\displaystyle\sum_{n=0}^{\infty} \frac{(-1)^n(n^2+1)}{2^n}$

   (f) $\displaystyle\sum_{n=2}^{\infty} \frac{1}{n^2+(-1)^n}$

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

   (h) $\displaystyle\sum_{n=1}^{\infty} \frac{\sqrt{n}}{n+1}$

   (i) $\displaystyle\sum_{n=1}^{\infty} \left(\frac{n}{n+1} - \frac{n-1}{n}\right)$

   (j) $\displaystyle\sum_{n=1}^{\infty} \frac{n+e^{-2n}}{n^2-e^{-n}}$ *

2. Given the series $\sum_{n=1}^{\infty} ne^{-n^2}$

   (a) Estimate the maximum possible error when using s_5 to approximate the sum of the series.

   (b) How many terms of the series (N) are needed to guarantee that the partial sum S_N is within $.005 \left(\frac{1}{200}\right)$ of the sum of the series.

3. Given the series $\sum_{n=0}^{\infty} (-1)^n ne^{-n^2}$

   (a) Estimate the maximum possible error when using s_5 to approximate the sum of the series.

   (b) STATE the inequality needed to find the minimum value of N to guarantee that the partial sum S_N is within 10^{-6} of the sum of the series. *