CALCULUS 1501 WINTER 2010

HOMEWORK ASSIGNMENT 7.

Due March 5.

7.1. Find the values of p for which the series is convergent:
$$\sum_{n=2}^{\infty} \frac{1}{n(\ln n)^p}.$$

7.2. Determine whether the series converges or diverges.

(i) $\displaystyle\sum_{n=1}^{\infty} \frac{n+3}{\sqrt[3]{n^7+n^2+1}}$

(ii) $\displaystyle\sum_{n=1}^{\infty} \frac{e^{1/n}}{n}$

(iii) $\displaystyle\sum_{n=1}^{\infty} \frac{n!}{n^n}$

7.3. Show that if $a_n > 0$ and $\sum a_n$ is convergent, then $\sum \ln(1+a_n)$ is convergent.

7.4. Give an example that shows that it is possible for both $\sum a_n$ and $\sum b_n$ to diverge, but for $\sum a_n b_n$ to converge.

7.5. If $\sum a_n$ and $\sum b_n$ are both convergent series with positive terms, is it true that $\sum a_n b_n$ is also convergent? Justify your answer.