MTHT 530 Analysis for Teachers II
Problem Set 11

Due: Wednesday April 19

1) Decide if the following series coverges or diverges. Justify your answers and state explicity which test or tests you are using.

a) $\sum_{n=1}^{\infty} \frac{n^2}{3^n}$

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

c) $\sum_{n=2}^{\infty} \frac{1}{n \ln n}$

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

e) $\sum_{n=1}^{\infty} \frac{n^5}{2^n + n^2}$

2) a) Show that if $a_n > 0$ for all n and $\lim na_n = L \neq 0$, then $\sum a_n$ diverges.
b) Assume $a_n > 0$ and $\lim n^2 a_n$ exists. Show that $\sum a_n$ converges.

3) Suppose $\sum a_n$ and $\sum b_n$ converge. Show that

$$\sum_{n=1}^{\infty}(a_n + b_n) = \sum_{n=1}^{\infty} a_n + \sum_{n=1}^{\infty} b_n.$$