Homework/ Convergence Tests for the Series

1- Test the convergence of the following series:

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

2- Use the Limit Comparison Test , determine whether the following series converge or diverge?

$$\sum_{n=1}^{\infty} \frac{tanh(n)}{\sqrt{n}}$$

3- Use the integral test, determine whether the following series converge or diverge?

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

4- Test the convergence of the following series:

$$\sum_{n=1}^{\infty} \frac{(-1)^n n^{64}}{3^n}$$

5-Test the convergence of the following series:

$$\sum_{n=1}^{\infty} \frac{5nln(n)}{6^n}$$

6- Test the convergence of the following series:

$$\sum_{n=1}^{\infty} \frac{(3n)!}{n!\,(n+2)!\,(n+1)!}$$

7-Test the convergence of the following series:

$$\sum_{n=1}^{\infty} \frac{n!\,(n+1)!}{(3n)!}$$

8-Test the convergence of the following series:

$$\sum_{n=1}^{\infty} (-1)^n \frac{n!}{\pi^n}$$

9- Test the convergence of the following series:

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

10- Test the convergence of the following series:

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