MATH 349
Handout # 2

1. Is the series $\sum_{n=1}^{\infty} \frac{3^n \ln n}{n^n}$ convergent or divergent? Explain.

2. (a) Is the series $\sum_{n=2}^{\infty} \frac{1}{n(\ln n)^2}$ convergent or divergent? Explain.

   (b) Is the series $\sum_{n=2}^{\infty} \frac{1}{(\ln n)^2}$ convergent or divergent? Explain.

3. Is the series $\sum_{n=1}^{\infty} \frac{1}{n} \sin \frac{1}{n}$ convergent or divergent? Explain.

4. Is the series $\sum_{n=1}^{\infty} \frac{(2n)!}{n! n^n}$ covergent or divergent? Explain.

5. Is the series $\sum_{n=1}^{\infty} \frac{e^n \cos^2 n}{\pi^n - 1}$ convergent or divergent? Explain.

6. Find the sum of $\sum_{n=2}^{\infty} \frac{1}{e^{\frac{n}{2}}}$

7. Is the series $\sum_{n=1}^{\infty} \frac{2 + \cos n}{\sqrt{n} + n}$ convergent or divergent? Explain.

8. Is the series $\sum_{n=1}^{\infty} \frac{5^n}{n^{n+1}}$ convergent or divergent? Explain.

9. Find the sum of $\sum_{n=1}^{\infty} \frac{5 + 2^n}{5^{n+2}}$.

10. Is the series $\sum_{n=1}^{\infty} \frac{\ln n}{n}$ convergent or divergent? Explain.

11. Is the series $\sum_{n=1}^{\infty} \frac{(n!)^2}{(2n)!}$ convergent or divergent? Explain.