Math 272
Infinite Series Part I

Determine whether the following sequences converge or diverge. If the converge , find the limit.

1. $\{ (e^n)/(n) \}$

2. $\{ {}^{(n+1)}/_n \}$

Determine if the following series converge or diverge.

3. $\sum\limits_{n=1}^{\infty} 1/(n^2)$

4. $\sum\limits_{n=1}^{\infty} 1/n$

5. $\sum\limits_{n=0}^{\infty} (-1)^n$

6. $\sum\limits_{n=0}^{\infty} (^1/_2)^n$

7 $\sum\limits_{n=0}^{\infty} 3(^5/_2)^n$

8. $\sum\limits_{n=1}^{\infty} (n^2)/(n!)$

Determine if the series below converges or diverges by the method indicated. Show you work.

9. $\sum\limits_{n=1}^{\infty} ne^{-n^{\wedge}2}$ (integral test)

10. $\sum\limits_{n=1}^{\infty} 1/(2 + 3^n)$ (comparison test)

11. $\sum\limits_{n=0}^{\infty} (n^2 - 2n)/(7n^3 - 5n + n)$ (limit comparison test)

12. $\sum\limits_{n=1}^{\infty} (-1)^n/(n)$ (alternating series test)

13. $\displaystyle\sum_{n=1}^{\infty} (n!)/(5^n)$ (ratio test)

Use the nth term divergence test to show that the series diverges.

14. $\displaystyle\sum_{n=0}^{\infty} (2n^2 + 3n - 7)/(n^2 + 5)$

Show the series is absolutely convergent.

15. $\displaystyle\sum_{n=1}^{\infty} (\cos n)/(n^2)$

16. When does the ratio test fail?