Integral Test

Determine if the following series converge or diverge.

1. $\sum_{n=1}^{\infty} \frac{8}{\sqrt[6]{n^2}\ \sqrt[4]{n}}$

2. $\sum_{n=1}^{\infty} \frac{1}{n^2+4n}$

3. $\sum_{n=1}^{\infty} \tan^{-1}\left(\frac{1}{n}\right)$

Comparison / Limit Comparison Test

Determine if the following series converge or diverge.

4. $\sum_{n=2}^{\infty} \frac{3-\cos^2(3n)}{n^2+\mathbf{e}^{-n}}$

5. $\sum_{n=1}^{\infty} \frac{n^4+3\sin^4(6n)}{n^5\cos^2(5n+1)}$

6. $\sum_{n=3}^{\infty} \frac{6n^2+2n-1}{\sqrt[3]{n^{12}-n^3}}$

7. $\sum_{n=1}^{\infty} \frac{2n^6-n^4+n^2}{5n^7+6n^3-4}$

Alternating Series Test

Determine if the following series converge or diverge.

8. $\sum_{n=0}^{\infty} \frac{\cos(n\pi)}{6n^3+9n+2}$

9. $\sum_{n=4}^{\infty} \frac{(-1)^{n-6}(4-n)}{1-2n^2}$

10. $\sum_{n=1}^{\infty} \frac{(-1)^{n+5}(n+4)}{7n+1}$

Continued on Back $\Rightarrow$

Ratio & Root Test

Determine if the following series converge or diverge.

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

12. $\sum_{n=1}^{\infty} \frac{9^{1-n}\, 2^{1+3n}}{n^2}$

13. $\sum_{n=4}^{\infty} \frac{6^{3+2n}}{n^{n+2}}$

14. $\sum_{n=0}^{\infty} \left(\frac{6-8n}{1+11n} \right)^{3n}$

Strategy for Series

Determine if the following series converge or diverge. Clearly indicate the test used and you are allowed to use the *p*-series test only if the series is in the form $\sum_{n=k}^{\infty} \frac{a}{n^p}$.

NOTE : THESE PROBLEMS WILL NOT BE GRADED. THEY ARE ONLY FOR PRACTICE!!!

15. $\sum_{n=2}^{\infty} \frac{1}{n} - \frac{1}{n-1}$

16. $\sum_{n=1}^{\infty} \frac{4}{(-1)^{n+2}(n+3)}$

17. $\sum_{n=0}^{\infty} \frac{n^2}{3^{1-2n}(-4)^{4+n}}$

18. $\sum_{n=1}^{\infty} \frac{[\ln n]^2}{n}$

19. $\sum_{n=0}^{\infty} \frac{2^{n+1}}{(2n+1)!}$