The Integral and Comparison Tests- HW Problems

Use the integral test to determine the convergence or divergence of the following series.

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

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

3. $1 + \frac{1}{\sqrt[4]{2}} + \frac{1}{\sqrt[4]{3}} + \frac{1}{\sqrt[4]{4}} + \cdots + \frac{1}{\sqrt[4]{n}} + \cdots$

4. $\frac{1}{2} + \frac{2}{5} + \frac{3}{10} + \frac{4}{17} + \cdots + \frac{n}{n^2+1} + \cdots$

Use the comparison test to determine the convergence or divergence of the following series.

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

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

Determine if the following series are convergent or divergent.

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

8. $\sum_{n=1}^{\infty} \frac{\cos^2(n)}{n^2}$

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

10. $\sum_{n=1}^{\infty} \dfrac{1}{e^n+1}$

11. $\sum_{n=2}^{\infty} \dfrac{1}{n^2-n}$

12. $\sum_{n=1}^{\infty} \dfrac{3}{2n^2+n+1}$

13. $\sum_{n=2}^{\infty} \dfrac{3}{2n^2-n-1}$

14. $\sum_{n=1}^{\infty} n^2 e^{-n^3}$

15. $\sum_{n=3}^{\infty} \dfrac{1}{[\ln(n)][n^2+1]}$

16. $\sum_{n=1}^{\infty} \dfrac{1}{\sqrt{n^2+1}}$