

Math 1497 – Calculus II Spring 2024 – Homework 5

Week 6: Feb. 19-23, 2024

pg. 613, #3, 5, 9, 11, 13, and 15. Using the integral test, determine whether the following convergence or diverge?

$$\begin{array}{ll}
 3. \quad \sum_{n=1}^{\infty} \frac{1}{n+3} & 5. \quad \sum_{n=1}^{\infty} \frac{1}{2^n} \\
 9. \quad \frac{\ln 2}{2} + \frac{\ln 3}{3} + \frac{\ln 4}{4} + \frac{\ln 5}{5} + \dots & 11. \quad \frac{1}{3} + \frac{1}{5} + \frac{1}{7} + \frac{1}{9} + \dots \\
 13. \quad \sum_{n=1}^{\infty} \frac{\tan^{-1} n}{1+n^2} & 15. \quad \sum_{n=1}^{\infty} \frac{\ln n}{n^2}
 \end{array}$$

pg. 620 #17, 18, 20, and 21. Use the limit comparison test to determine the convergence of the following series

$$\begin{array}{ll}
 17. \quad \sum_{n=1}^{\infty} \frac{n}{n^2+1} & 18. \quad \sum_{n=1}^{\infty} \frac{5}{4^n+1} \\
 20. \quad \sum_{n=1}^{\infty} \frac{2^n+1}{5^n+1} & 21. \quad \sum_{n=1}^{\infty} \frac{2n^2-1}{3n^5+2n+1}
 \end{array}$$

pg. 620, #7, 9, 11, and 15. Use the direct comparison test to determine the convergence of the following series

$$\begin{array}{ll}
 7. \quad \sum_{n=2}^{\infty} \frac{1}{\sqrt{n}-1} & 9. \quad \sum_{n=2}^{\infty} \frac{\ln n}{n+1} \\
 11. \quad \sum_{n=0}^{\infty} \frac{1}{n!} & 15. \quad \sum_{n=1}^{\infty} \frac{\sin^2 n}{n^3}
 \end{array}$$

pg. 637, #23, 25, 32, and 35. Use the ratio test to determine the convergence of the following series

$$\begin{array}{ll}
 23. \quad \sum_{n=1}^{\infty} \frac{9^n}{n^5} & 25. \quad \sum_{n=1}^{\infty} \frac{n^3}{3^n} \\
 32. \quad \sum_{n=1}^{\infty} \frac{n!}{n^n} & 35. \quad \sum_{n=0}^{\infty} \frac{5^n}{2^n+1}
 \end{array}$$

pg. 638, #39, 41, 47, and 49. Use the root test to determine the convergence of the following series

$$\begin{array}{ll}
 39. \quad \sum_{n=1}^{\infty} \left(\frac{n}{2n+1} \right)^n & 41. \quad \sum_{n=1}^{\infty} \left(\frac{3n+2}{n+3} \right)^n \\
 47. \quad \sum_{n=1}^{\infty} \frac{n}{3^n} & 49. \quad \sum_{n=1}^{\infty} \left(\frac{1}{n} - \frac{1}{n^2} \right)^n
 \end{array}$$

Due: Friday Feb. 23, 2024 by 3pm.