MATH 12003 ALTERNATING SERIES TEST SECTION 12.5

Definition: An **alternating series** is a series whose terms are alternately positive and negative.

Alternating Series Test: Let (a_n) be decreasing sequence of positive numbers such that $\lim a_n = 0$. Then the alternating series $\sum_{n=1}^{\infty} (-1)^n a_n$ converges.

EXAMPLES: Determine if the series converges or diverges.

1. $\sum_{n=2}^{\infty} \frac{(-1)^{n-1}}{3n-5}$

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

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

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

5. $\sum_{n=1}^{\infty} \left(-\frac{n}{5}\right)^n$