

9.5 Testing Convergence at Endpoints (continued)

One More Convergence TestAlternating Series Test

The series

$$\sum_{n=1}^{\infty} a_n = \sum_{n=1}^{\infty} (-1)^{n+1} u_n = u_1 - u_2 + u_3 - u_4 + \cdots$$

converges if ALL three of the following conditions are true:

- ① each $u_n > 0$
- ② $u_n \geq u_{n+1} \forall n \geq N$ (where N is some integer)

- ③ $\lim_{n \rightarrow \infty} u_n = 0$

Determine if the series converges or diverges.*Example 1*

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

Example 2

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