

## Alternating Series Test

The **Alternating Series Test** applies to series of the form

$$\sum (-1)^n b_n \quad \text{or} \quad \sum (-1)^{n+1} b_n,$$

where  $b_n > 0$ . If the terms  $b_n$  satisfy

$$\lim_{n \rightarrow \infty} b_n = 0 \quad \text{and} \quad b_{n+1} \leq b_n \text{ for all sufficiently large } n,$$

then the alternating series converges.

Determine whether each series converges or diverges. If the Alternating Series Test does not apply, state why.

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

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

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

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

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

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

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

9.  $\sum_{n=1}^{\infty} \frac{(-1)^n \cdot \sin(1/n)}{n}$

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

10.  $\sum_{n=1}^{\infty} (-1)^n \cdot \frac{1}{n^{0.9}}$