

Example (1). Is the series $\sum_{n=1}^{\infty} \frac{1}{n^2}$ convergent or divergent?

Example (2). Is the series $\sum_{n=1}^{\infty} \frac{1}{n}$ convergent or divergent?

Example (3). Is the series $\sum_{n=1}^{\infty} \frac{1}{\sqrt{n}}$ convergent or divergent?

Example 1. (Key Example p-series) Determine the value of p such that the **p-series** $\sum_{n=1}^{\infty} \frac{1}{n^p}$ convergent?

Determine whether the series converges:

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

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

Example 4*. $\sum_{n=1}^{\infty} \frac{1}{n^2+1}$

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

Example 6. $\sum_{n=1}^{\infty} \frac{1}{n\sqrt{\ln n}}$

Example 7. $\sum_{n=1}^{\infty} \frac{n}{\sqrt{n^2+1}}$

Example 8*. Approximate the sum of the series $\sum_{n=1}^{\infty} \frac{1}{n^2}$ using the first 10 terms. Estimate the error.