

Determine whether the series converges:

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

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

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

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

Example 5. $\sum_{n=1}^{\infty} (-1)^n \frac{3n^2-1}{5n^2+6}$

Example 6. $\sum_{n=1}^{\infty} (-1)^n \cos\left(\frac{1}{n}\right)$

Example 7. Approximate the sum of the series $\sum_{n=1}^{\infty} \frac{(-1)^n}{n^3}$ correct to 3 decimal places.