

Show that the following series converge and approximate each series accurate within 0.001.

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

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

3. $\sum_{k=2}^{\infty} \frac{7 - \sin(k)}{k^2 + 14k}$

Determine whether the following series converge absolutely, converge conditionally, or diverge. For those that converge, find upper and lower bounds.

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

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

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