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

\( a_n = \frac{1}{ln(n+1)} \) is decreasing and \( \lim_{n \to \infty} \frac{1}{ln(n+1)} = 0 \). so the series converges by the alternating series test.

12 \( \sum_{n=1}^{\infty} \frac{(-1)^{n+1}2^n}{n!} \). Apply absolute ratio test

\[
\lim_{n \to \infty} \left| \frac{a_{n+1}}{a_n} \right| = \lim_{n \to \infty} \frac{2^{n+1}n!}{(n+1)!2^n} = \lim_{n \to \infty} \frac{2}{n+1} = 0 < 1
\]

Therefore the series converges absolutely.

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

Note that \( a_n = \frac{3^{n+1}}{n^2} \) is increasing sequence. Therefore the series is divergent by nth term test.