Determine if the series converges or diverges

$$1 - \frac{1\cdot 3}{3!} + \frac{1\cdot 3\cdot 5}{5!} - \frac{1\cdot 3\cdot 5\cdot 7}{7!} + \cdots$$

$$a_n = (-1)^n \frac{\text{Something}}{(2n-1)!}$$

Alternating Series Test

The series appears to approach 0

$$\lim_{n\to 0} a_n = 0$$

Converges

Determine if the series converges or diverges

$$\sum_{n=1}^{\infty} (-1)^n \frac{2}{9n\sqrt{n}}$$

Alternating Series Test

$$\lim_{n\to \infty} (-1)^n \frac{2}{9n\sqrt{n}} = 0$$

Converges

Determine if the series converges or diverges

$$\sum_{n=1}^{\infty} (-1)^n \frac{n+3}{9n+5}$$

Alternating Series Test

$$\lim_{n\to\infty} (-1)^n \frac{n+3}{9n+5}$$

$$= \pm 1 \cdot \frac{1}{9}$$

Diverges

Determine if the series converges or diverges

$$\sum_{n=1}^{\infty} (-1)^{n-1} \frac{9n}{e^{9n}}$$

Alternating Series Test

$$\lim_{n\to\infty} (-1)^{n-1} \frac{9n}{e^{9n}}$$

$$= \pm 1 \frac{\infty}{\infty} \rightarrow \text{Use LH}$$

$$= \lim_{n\to\infty} (-1)^{n-1} \frac{9}{4e^{9n}}$$

$$= 0$$

Converges