Solution

Check convergence of $\sum_{n=1}^{\infty} \frac{(n+9)!}{9!n! \cdot 9^n}$: converges

Steps

$\sum_{n=1}^{\infty} \frac{(n+9)!}{9!n! \cdot 9^n}$

Apply the constant multiplication rule: $\sum c \cdot a_n = c \cdot \sum a_n$

$= \frac{1}{9!} \cdot \sum_{n=1}^{\infty} \frac{(n+9)!}{n! \cdot 9^n}$

Simplify

$= \frac{1}{362880} \cdot \sum_{n=1}^{\infty} \frac{(n+9)!}{n! \cdot 9^n}$

Apply Series Ratio Test: converges   *Show Steps*

$= \frac{1}{362880}$ converges

$=$ converges