

Test series

H-w: Test each of the following series for convergence

$$1 - \sum_{n=1}^{\infty} \frac{3^n}{4^n + 4}$$

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

$$3 - \sum_{n=1}^{\infty} \frac{n+5}{n \sqrt{n+3}}$$

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

$$5 - \sum_{n=1}^{\infty} (-1)^n \frac{n!}{\pi^n}$$

$$6 - \sum_{n=0}^{\infty} \frac{e^n}{1 + e^{2n}}$$

$$7 - \sum_{n=0}^{\infty} \frac{(n!)^2}{((2n)!)}$$

$$8 - \sum_{n=1}^{\infty} \frac{(-1)^n}{n - \ln(n)}$$

$$9 - \sum_{n=1}^{\infty} \frac{\sqrt{n}}{3n^3 + 4}$$

$$10 - \sum_{n=1}^{\infty} \frac{3^{n+2} n!}{4^n}$$

$$11 - \sum_{n=1}^{\infty} \left(\frac{2n^3 - 1}{6n^3 + n + 2} \right)^{3n}$$

$$12 - \sum_{n=1}^{\infty} \frac{n^2 + 2n + 1}{3^n + 1}$$

$$13 - \sum_{n=1}^{\infty} \frac{n}{2^n}$$