

Determine whether the series is absolutely convergent, conditionally convergent or divergent.

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

2) $\sum_{n=0}^{\infty} \frac{(-10)^n}{n!}$

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

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

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

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

$$7) \sum_{n=1}^{\infty} \frac{1}{(2n)!}$$

$$8) \sum_{n=1}^{\infty} e^{-n} n!$$

$$9) \sum_{n=1}^{\infty} \frac{\sin 4n}{4^n}$$

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

$$11) \sum_{n=1}^{\infty} \frac{10^n}{4^{2n+1}(n+1)}$$

$$12) \sum_{n=2}^{\infty} \frac{(-1)^n}{\ln n}$$

$$13) \sum_{n=1}^{\infty} \frac{n!}{n^n}$$

$$14) \sum_{n=1}^{\infty} \frac{\cos(n\pi/3)}{n!}$$

$$15) \sum_{n=2}^{\infty} \frac{(-1)^n}{(\ln n)^n}$$

$$16) \sum_{n=1}^{\infty} \frac{n^n}{3^{3n+1}}$$

$$17) \sum_{n=2}^{\infty} \frac{(-1)^n}{n \ln n}$$

$$18) \sum_{n=1}^{\infty} \frac{(-1)^n}{(\arctan n)^n}$$

$$19) 1 - \frac{1 \cdot 3}{3!} + \frac{1 \cdot 3 \cdot 5}{5!} - \frac{1 \cdot 3 \cdot 5 \cdot 7}{7!} + \dots + (-1)^{n-1} \frac{1 \cdot 3 \cdot 5 \cdot \dots \cdot (2n-1)}{(2n-1)!} + \dots$$

$$20) \sum_{n=1}^{\infty} \frac{2 \cdot 4 \cdot 6 \cdot \dots \cdot (2n)}{n!}$$

21) The terms of a series is defined recursively by the equations:

$$a_1 = 2 \quad a_{n+1} = \frac{5n+1}{4n+3} a_n$$

Determine whether $\sum a_n$ converges or diverges.

22) For which positive integers k is the following series convergent?

$$\sum_{n=1}^{\infty} \frac{(n!)^2}{(kn)!}$$