

Determine whether the series is convergent or divergent

1.
$$\sum_{n=0}^{\infty} \frac{1}{1+n^2}$$

2.
$$\sum_{n=0}^{\infty} (-1)^n \frac{5}{4^n}$$

3.
$$\sum_{n=2}^{\infty} \frac{n}{(n^2+2)^{3/2}}$$

4.
$$\sum_{n=0}^{\infty} \frac{1}{n+4}$$

5.
$$\sum_{n=1}^{\infty} n^2 e^{-n^3}$$

6.
$$\sum_{n=1}^{\infty} \ln\left(\frac{1}{3^n}\right)$$

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

8.
$$\sum_{n=1}^{\infty} n \tan \frac{1}{n}$$

9.
$$\sum_{n=1}^{\infty} \left(\frac{1}{e^n} + \frac{1}{n(n+1)} \right)$$

10.
$$\sum_{n=1}^{\infty} \frac{1}{\sqrt{n+7}}$$

11. Find the values of x for which the series converges and find the sum of the series for those values $\sum_{n=1}^{\infty} (x-4)^n$

12. Find the values of x for which the series converges and find the sum of the series for those values $\sum_{n=1}^{\infty} \frac{\cos^n x}{2^n}$