

Ex-1 Find a formula for the n th term of the sequence.

- a) The sequence 1,-1,1,-1..... b) 1,-4,9,-16,25.....

Ex-2 Which of the following sequence $\{a_n\}$ are converge, and which of diverge ?

(a) $\frac{\ln n}{n}$ (b) $\frac{5^n}{7n}$ (c) $\frac{1-2n}{1+2n}$ (d) $\left(1-\frac{7}{n}\right)^n$

Ex-3 Determine the following sequences are Increasing or decreasing .

(a) $a_n = \frac{3n+1}{n+1}$ (b) $a_n = \frac{(2n+3)!}{(n+1)!}$ (c) $a_n = \frac{2^n 3^n}{n!}$

Ex-4 Define the term: Bounded sequence .Write three example of bounded sequence.

Ex-5 Give suitable examples of the following. A Convergent sequence $\{a_n\}$ and divergent sequence $\{b_n\}$ such that $\{a_n b_n\}$ converges, and prove it.

Ex-6 Find whether the series are convergent ? (A) $\sum_{n=1}^{\infty} \frac{n+2}{10^{10}(n+3)}$ (B) $\sum_{n=1}^{\infty} \cos \frac{\pi}{n}$

Ex-7 Test the convergence of the series $\sum_{n=1}^{\infty} \frac{(-1)^n}{4^n}$, $\sum_{n=0}^{\infty} \left(\frac{2^{n+1}}{5^n}\right)$, $\sum_{n=1}^{\infty} \frac{6}{(2n-1)(2n+1)}$

Ex-8 Find the sums of the series : $\sum_{n=1}^{\infty} \frac{3^{n-1} - 1}{6^{n-1}}$.

Ex-9 Test the convergence of series: $\sum_{n=1}^{\infty} \frac{8 \tan^{-1} n}{1+n^2}$ and $\sum_{n=1}^{\infty} \frac{n}{1+n^2}$ by integral test.

Ex-10 Discuss the convergence of following series: (A) $\sum_{n=1}^{\infty} \frac{\ln n}{n^{3/2}}$ (b) $\sum_{n=1}^{\infty} \frac{7}{7n-2}$ (C) $\sum_{n=1}^{\infty} \frac{4^n n! n!}{(2n)!}$

Ex-11 Let $a_n = \begin{cases} \frac{n}{2^n}, n \sim \text{odd} \\ \frac{1}{2^n}, n \sim \text{even} \end{cases}$ Does $\sum a_n$ convergent ?

Ex-12 Discuss the convergence of series: (a) $\sum_{n=1}^{\infty} \frac{(n+3)!}{3!n!3^n}$ (b) $\sum_{n=1}^{\infty} (-1)^{n+1} \frac{3\sqrt{n+1}}{\sqrt{n+1}}$, (c)

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

Ex-13 Find the radius of convergent and interval of convergent of the following series, and also determine for which value of x the series converge (a) absolutely (b)

Conditionally? (a) $\sum_{n=1}^{\infty} x^n$ (b) $\sum_{n=1}^{\infty} \frac{(x-2)^n}{10^n}$ (c) $\sum_{n=1}^{\infty} \sqrt[n]{n} (2x+5)^n$

Ex-14 Find the Taylor's series generated by $f(x) = \frac{1}{x}$ at $a = 2$.

Ex-15 Find Taylor's polynomials for e^x and $\cos x$.

Ex-16 Find the Maclaurin Series for the functions (a) $f(x) = \frac{1}{1+x}$ (b) $f(x) = \sin \frac{x}{2}$
