

Series

6.1 Test the series for convergence or divergence using the comparison test

a) $\sum_{n=1}^{\infty} \frac{n^2 + 4}{n^3 + n}$

b) $\sum_{n=1}^{\infty} \frac{2n + 1}{n^2 \sqrt{n + 3}}$

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

6.2 Test the series for convergence or divergence using the ratio test

a) $\sum_{n=1}^{\infty} \frac{n!4^n}{n^n}$

b) $\sum_{n=1}^{\infty} \frac{4^n}{(n + 1)^4}$

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

6.3 Test the series for convergence or divergence using the root test

a) $\sum_{n=1}^{\infty} \frac{3^n}{n(5^n + 2)}$

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

c) $\sum_{n=1}^{\infty} \frac{1}{3^{n^2}}$

6.4 Test the alternating series for convergence or divergence

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

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

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

6.5 Test the series for absolutely or conditionally convergence

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

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

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

6.6 Test the series for convergence or divergence using the integral test

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

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

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

6.7 Test the series for convergence or divergence

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

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

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

d) $\sum_{n=1}^{\infty} \frac{(-1)^n}{\sqrt{n} - 1}$

e) $\sum_{n=1}^{\infty} \frac{\sqrt{n^2 - 1}}{n^3 + 2n^2 + 5}$

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

g) $\sum_{n=1}^{\infty} n^2 e^{-n^3}$

h) $\sum_{n=1}^{\infty} \frac{\sin \frac{1}{n}}{\sqrt{n}}$

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