

1. Which of the following series is convergent?

(a) $\sum_{n=1}^{\infty} \frac{n^2}{n^{5/7} + 1}$

(b) $\sum_{n=1}^{\infty} \frac{\cos^2 n}{3^n}$

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

2. Approximate the sum of the series $\sum_{n=1}^{\infty} ne^{-n^2}$ by using the sum of first 4 terms. Estimate the error involved in this approximation.

3. Approximate the sum of the series $\sum_{n=1}^{\infty} (-1)^{n-1} ne^{-n^2}$ by using the sum of first 4 terms. Estimate the error involved in this approximation.

4. Which of the following series is absolutely convergent?

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

(b) $\sum_{n=0}^{\infty} \frac{(-3)^n}{n!}$

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

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

(e) $\sum_{n=0}^{\infty} (-1)^n \frac{2^{2n}}{3^{3n}}$

5. Find the radius of convergence and interval of convergence of the series $\sum_{n=1}^{\infty} \frac{2^n(x-3)^n}{\sqrt{n+3}}$.

6. Find the Maclaurin series for the function

(a) $f(x) = \ln(3 - 2x)$

(b) $f(x) = \frac{x^2}{(1 + 9x)^3}$

7. Find the Taylor series for $f(x) = xe^{2x}$ at $x = 2$.

8. Find the Maclaurin series for $f(x) = x \sin(x^3)$.

9. Find the sum of the series

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

$$(b) \sum_{n=0}^{\infty} \frac{(-1)^n \pi^{2n}}{6^{2n} (2n)!}$$

10. Evaluate the indefinite integral as a power series $\int e^{x^2} dx$.
11. Write the Taylor polynomial of degree 3 for the function $f(x) = \sin x$ at $\pi/4$.
12. Find radius and center of sphere given by the equation $x^2 + y^2 + z^2 = 6x + 4y + 10z$