

1. Find the sum of the series

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

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

2. Which of the following series is convergent?

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

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

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

3. Which of the following series is absolutely convergent?

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

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

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

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

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

5. Find the power series representation for the function $f(x) = \ln(1-2x)$ centered at 0.

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

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

8. Find the sum of the series

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

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

9. Evaluate the indefinite integral as a power series $\int e^{x^2} dx$.
10. Find the length of the medians of the triangle with vertices $A(1, 2, 3)$, $B(-2, 0, 5)$, $C(4, 1, 5)$.
11. Find the equation of the sphere with center $(2, -3, 6)$ that touches the yz -plane.
12. Find an equation of the set of all points equidistant from the points $A(-1, 5, 3)$ and $B(6, 2, -2)$.