

Calculus II - Final practice C

1. Show whether the series is AC, CC, or D.

$$(a) \sum_{n=1}^{\infty} (-1)^n \frac{1}{n^4} \quad (b) \sum_{n=1}^{\infty} (-1)^n \frac{n}{n^2 + 2} \quad (c) \sum_{n=1}^{\infty} (-1)^n \frac{n^2 + 2}{n}$$

2. What is the Maclaurin series for $f(x)$?

$$(a) f(x) = 5x^2 \cos(3x^2) \quad (b) f(x) = 6e^{5x^3} \quad (c) f(x) = -\ln(1 + 4x)$$

3. Find a non-series representation of the following Maclaurin series:

$$(a) \sum_{n=0}^{\infty} (-1)^n \frac{x^{4n+3}}{2n+1} \quad (b) \sum_{n=0}^{\infty} (-1)^n \frac{x^{4n+3}}{(2n)!} \quad (c) \sum_{n=0}^{\infty} (-5)^n \frac{x^{2n}}{n!}$$

4. Find the total sum for each of the following series:

$$(a) \sum_{n=0}^{\infty} (-1)^n \frac{\pi^{2n+2}}{4^n (2n+1)!} \quad (b) \sum_{n=0}^{\infty} (-1)^n \frac{5^{2n}}{n!}$$

5. If $f(x) = x^3 \cos(2x^2)$, then what is $f^{(83)}(0)$?

6. If $f(x) = 3xe^{-x^2}$, then what is $f^{(44)}(0)$?

7. Estimate $\int_0^{0.1} 3e^{-x^2} dx$ with $|\text{error}| < 10^{-6}$.

8. Suppose $f(x) = \sum_{n=0}^{\infty} (-1)^n \frac{(x-1)^{2n}}{5^n}$. Find the power series representation for $f'(x)$, centered at $a = 1$.

9. Find the radius and interval of convergence of the series: $\sum_{n=0}^{\infty} (-1)^n \frac{(x-3)^n}{n^2 + 1}$