Multiple Choice Questions

1. Find the Maclaurin series for \( f(x) = e^{4x-5} \).

2. Use the remainder estimate in Taylor's theorem to estimate the accuracy of \( T_3(x) \), centered at \( a = 0 \), when \( x \) lies on the interval \([0, 3.5]\).

2. Does the series \( \sum_{n=2}^{\infty} \frac{(-1)^n \ln(n)}{(2n + 2)!} \) converge or diverge?

3. Find the number of terms necessary to estimate the sum \( \sum_{n=1}^{\infty} \frac{(-1)^n n^6 + 4n + 5}{n^7 + 7n + 3} \) to within 0.1.

4. Does the series \( \sum_{n=1}^{\infty} \frac{(-1)^n}{n^2 + 4n + 32} \) converge or diverge? If it converges, conditionally or absolutely?

5. Find the Maclaurin series representing \( f(x) = \sqrt{x}e^{x^2} \).

6. What can we say about this series \( \sum_{n=1}^{\infty} \frac{(-1)^n (n - 16)}{n^2 - 16} \) using the Ratio test?

7. Find a power series representation of the function \( \frac{\cos(x^2) - 1}{x^2} \).

8. Does the series \( \sum_{n=1}^{\infty} \frac{(-1)^n(n + 1)}{n^2 + 2n} \) converge or diverge?

9. Find the Taylor series for \( f(x) = \sqrt{5 + x} \) centered at \( a = 2 \).

2. Use the remainder estimate to find the maximum error of the approximation \( T_2(x) \approx f(x) \) on the interval \([2, 2.5]\).

10. Find the power series representing \( f(x) = \frac{-4\sin(4x^3)}{x^2} \), and then determine its interval of convergence.

2. Compute \( \int_0^1 f(x)dx. \)

11. Find \( T_3(x) \) of \( \sin(2x) \) centered \( x = \pi \).

2. Find the max error of \( \sin(2x) \) on the interval \([\pi, \frac{4\pi}{3}]\).

12. Find the value of \( \int_0^{\pi/4} x^2 \cos(x^3)dx \). Then use a test to approximate the value of this integral.

13. Find a power series representing \( f(x) = \ln(4 + x) \).

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14. Find the radius of convergence and interval of convergence for \( \sum_{n=1}^{\infty} \frac{5^n}{n!(n+1)!}x^{2n+3} \).

15. Find the Maclaurin series for \( f(x) = e^{4x^2} \) and write out the cubic Taylor polynomial centered at \( a = 0 \).

16. Given \( \sum_{n=1}^{\infty} 2^n x^n \), find the radius of convergence.

17. Find the Maclaurin series for \( f(x) = \frac{1-x}{1-3x+3x^2-x^3} \).

18. Find the degree 3 taylor polynomial of \( \sqrt{x} \) centered \( a = 7 \).